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December 9, 2011

Superintendent Cicely Muldoon
Draft EIS DBOC SUP c/o Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Submitted online and via USPS

Re: Drakes Bay Oyster Company Special Use Permit – Support Alternative A

Dear Superintendent Muldoon:

Thank you for the opportunity to comment on the Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement: Draft Environmental Impact Statement.

Defenders of Wildlife ("Defenders") is a non-profit, conservation organization with more than one million members and supporters nationwide, more than 100,000 of which reside in California. Defenders is dedicated to protecting all wild animals and plants in their natural communities. To this end, Defenders employs science, public education, media, legislative advocacy, litigation, and proactive on-the-ground solutions in order to impede the accelerating rate of extinction of species, loss of biological diversity, and habitat alteration and destruction.

Drakes Estero is a national treasure long-destined for wilderness protection in 2012. The Estero is the ecological heart of Point Reyes National Seashore and a refuge for migrating birds, fish, and marine mammals. It is home to 20 percent of California's mainland breeding population of harbor seals and is used by tens of thousands of shorebirds and waterfowl.

Defenders strongly supports Wilderness designation for Drakes Estero and urges you to adopt Alternative A, the No Action Alternative, since it is the Environmentally Preferred Alternative and the only alternative that is wholly supported by federal law, policy and best available science. Alternative A upholds the intentions of the Point Reyes Wilderness Act to ensure that all Americans have access to a wild marine environment. The Point Reyes enabling legislation, the Wilderness Act, the Point Reyes Wilderness Act, National Park Service policies and a long list of other federal and state laws and policies direct the National Park Service to protect, conserve and restore natural resources and ecosystems and prevent their degradation by incompatible uses and invasive species.

To allow a private, commercial use to retain control over this public treasure would set a terrible precedent for publicly owned, national park and wilderness lands throughout the United States. The Park Service and the original oyster operation owner made a legal agreement that oyster production would cease on November 30, 2012. The Park Service must select Alternative A and provide full wilderness protection for the Estero as intended by the Point Reyes Wilderness Act of 1976.

The peer-reviewed science used in the DEIS to illustrate impacts to harbor seals from mariculture operations was recently validated by the Marine Mammal Commission Report. The negative impact on harbor seals is only one of the numerous long-term adverse environmental impacts from non-native oyster and clam cultivation. Other

significant adverse impacts include to eelgrass, birds, native fish, benthic fauna, endangered species, overall ecological integrity, and to the resilience of Drakes Estero in the face of climate change.

The oyster operation also generates untold volumes of PVC plastic that litters local beaches, literally trashing the wilderness and the visitor experience. Our oceans have been significantly impacted by plastic debris as demonstrated by the Plastic Trash Vortex in the North Pacific Gyre. The National Park Service should end the contribution of plastic marine debris made by Drakes Bay Oyster Company and cease the company's operations at the end of its current permit.

Defenders respectfully urges you to select Alternative A, which will restore the benefits of this national public resource for wildlife and the American people for generations to come. Thank you for the consideration of these comments.

Sincerely,

Kim Delfino
California Program Director

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Mike Peirson
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Pt. Reyes National Seashore
ATTN: DBOC SUP DEIS
1 Bear Valley Rd.
Pt. Reyes Station, CA 94956

To whom it may concern,

I am writing to address the Draft Environmental Impact Statement Drakes Bay Oyster Company Special Use Permit (DEIS ID 43309) in the hopes that certain omissions, scientific errors and factual distortions can be corrected in the final document. Based on my evaluation of the DEIS and several hundred pages of related material that I have reviewed at length over the past three years it is my considered opinion that the Drakes Bay Oyster Company (DBOC) should be championed by the National Park Service as an exemplar of how humans can work and farm in harmony with nature, while supporting all the goals of environmental preservation, sustainable food production and job creation while ensuring that the ecosystem services of the natural system are maintained.

The process of oyster farming should not be considered a non-conforming use of the wilderness area. The oyster farm provides critical ecosystem services that support the function and ecological integrity of Drakes Estero. Removal of the DBOC, and the ecosystem services it provides, could result in ecological degradation due to excessive nitrogen buildup, which in turn could lead to eutrophication and hypoxic conditions. In similar estuaries that lack adequate filter feeding populations, excessive nutrients have led to phytoplankton blooms, increased turbidity, limited light penetration and the loss of eelgrass beds. Removal of the structures used in oyster farming will degrade critical habitat function to the detriment of vast populations of nekton (small fish and crustaceans) that rely on these structures for protection from predators, spawning habitat and food.

DEIS fails to address the long-term impacts of removing the farm

The farm has a long history of working in this bay and has become an important part of the social and cultural fabric of Marin County. The DEIS fails entirely to mention or address the negative social, cultural and environmental impacts that would result if the farm is removed fro Drakes Estero. Listed below are some of the impacts that will result from the removal of the farm that need to be addressed.

- The farm is a tourist attraction that explains to hundreds of visitors annually how sustainable aquaculture can produce local, nutritious food in harmony with nature.
- The farm provides employment opportunities and income for dozens of people with positive economic multiplier impacts that flow through the entire community. Farm harvests provide a significant proportion of the shellfish harvest of the entire state.

- The farm provides physical structure that serves as critical habitat for myriad juvenile fish and crustaceans while enhancing the productivity of the bay (DeAlteris et al. 2004, Dumbauld et al. 2009, Ferraro and Cole 2007).
- The farm structures act not only as fish attracting devices, but they actually enhance habitat value by providing food and shelter from predators and by enhancing reproductive success (Tallman and Forrester 2007, Coen et al. 1999).
- The filter feeding activity of the shellfish in culture significantly improves water quality by reducing turbidity and grazing down excessive phytoplankton blooms. The reduction in turbidity improves light penetration and has been shown to be critical to the survival and health of eelgrass (Newell and Koch 2004).
- The removal of excess turbidity by shellfish improves the productivity of microphytobenthos, thereby enhancing denitrification rates and reducing eutrophication (Newell et al. 1999, Newell et al. 2002).
- Many researchers have shown how the harvest of cultured shellfish removes excess nitrogen and phosphate from growing areas, reducing eutrophication (Newell 2004, Higgins et al. 2010, Rice 2002). The harvest of approximately 4.3 million oysters and 1 million clams annually results in the direct removal of approximately 2,500 kg N and 750 kg P from these sensitive waters.
- Removal of the farm will have an impact on nutrient fluxes in the system similar to dumping over 2.5 metric tons of fertilizer directly into Drakes Estero. Any resource manager would agree this would be an undesirable impact.

The DEIS refers to sediment disturbance and turbidity impacts from the DBOC

- The DEIS alludes to sediment disturbance and increased turbidity related to propellers, footprints and bag flipping. Anyone familiar with shallow marine ecosystems should be aware that these systems are regularly impacted by wind and storm events that elevate turbidity on scales that dwarf human impacts. The organisms that inhabit shallow-water unconsolidated habitats are adapted to regular disturbances and periods of high turbidity (Godwin 1973, Hall 1994). During storm events entire sandbars can migrate and tons of sediment can be moved.
- On page 337 the DEIS authors claim that the Drakes Estero is not a highly turbid system because it enjoys a low residence time. Apparently turbidity is not considered to be a significant problem in this system, unless it is anthropogenic in origin.
- The DEIS suggest that turning and lifting bags results in sediment agitation, suspension and transfer. The impacts of this activity are very limited in scope, both temporally and spatially. The increased turbidity associated with this activity is more than compensated for by the reductions in turbidity associated with the filter feeding activity of millions of shellfish (Dame et al. 1974, Rhodes 1973).
- The DEIS suggests that the elimination of boats would terminate propeller damage to E2US and E2AB wetlands (estuarine intertidal aquatic bed, rooted vascular)- and reduce sediment disturbance to the mudflats and sandbars, p 260. The DEIS suggests that eliminating the boat traffic would result in a desired reduction in turbidity and productivity. This fails to acknowledge the fact that the filtration activity of several million oysters removes far more suspended particulate than a fleet of skiffs might cause.
- The DEIS suggests that continued boat operation (including beaching) would lead to sediment disturbance, footprints, "boat-hull scarring" and propeller damage to eelgrass. The turbidity impacts related to boating activities are of a very limited and localized nature (reviewed by Coen 1995, Black and Parry 1999). Larger sediment particles settle immediately and the vast majority of sediment settles within a few meters of its source (Barnes et al. 1991). In shallow, high-energy environments "boat hull scarring" evidence, footprints and sediment disturbances are unlikely to

persist beyond a single tidal cycle. The impacts of a few small boats in such a large system are so insignificant that they are not measurable. The discussion of footprints as "impacts" in such a system defies credulity.

- If footprints and "boat hull scarring" are a significant concern to resource managers, then what do NPS managers propose to do about the impacts of the thousands of kayakers who visit Drakes Estero annually, pulling ashore and leaving millions of footprints in the tidal sands?
- Historically, Drakes Estero supported large populations of the native Olympia oyster, *Ostrea lurida*. The feeding activity of these oysters removed much of the suspended particulate material in Drakes Estero and kept turbidity at appropriate levels, allowing eelgrass to proliferate. This ecosystem service is now provided by the farmed oysters and clams that collectively clear excess turbidity from 350,000 m^3 each day, removing particles as small as 2 microns. Estuaries with excessive nitrogen inputs and inadequate populations of filter-feeding bivalves often suffer losses of eelgrass habitat caused by inadequate light penetration (Koch and Beers 1996, Rice 2001).

The DEIS suggests that the elimination of boats would terminate propeller damage to E2US and E2AB wetlands (rooted vascular eelgrass)

- The concerns about eelgrass being clipped by boat propellers as workers go to harvest or tend the oysters are greatly overstated. The eelgrass beds in the Drakes Estero were described by the National Academy of Science inspectors as being lush and expansive, covering vast areas in high densities. The few trips that the DBOC boats make to and from the dock follow a consistent path and do minimal damage. Certainly one would expect to find that far more "damage" to the beds had occurred after a good storm. In fact, there are seasonal patterns to eelgrass growth and natural periods of seasonal senescence. Some breakage and regrowth of eelgrass thallii is natural and expected; providing a source of food for detritivores in the system (Dame et al 1984).
- To evaluate the true extent of this impact one need only examine aerial photography of Drakes Estero. Even looking at pictures provided by opponents of the farm (http://www.savedrakesbay.org/Threats.html) one can see that the damage to eelgrass is minimal and localized. Many tens of acres of eelgrass remain undisturbed. Using data presented in the DEIS one can calculate that the percentage of eelgrass beds that are disturbed is a fraction of one percent of the eelgrass habitat in the system.
- The primary reason why resource managers want to protect eelgrass is because it provides cherished ecosystem services such as: habitat for juvenile fish and invertebrates, food, benthic stabilization and nutrient and turbidity mitigation. There is ample evidence that similar ecosystem services are provided by the oyster gear and oysters that are allegedly displacing the eelgrass (DeAlteris et al. 2004, Tallman and Forrester 2007, Coen et al. 1999).
- Shellfish have been shown by multiple researchers to provide benefits to eelgrass habitat (Reusch and Williams 1998, Peterson and Heck 2001, Newell 2006). Eelgrass habitat has doubled in the last 16 years in Drakes Estero, which has been attributed to the presence of DBOC shellfish (NRC 2009).
- It is self-evident that a mosaic of habitat types supports a greater diversity of life than an expansive monoculture of a single species such as *Zostera marinus*. Removal of the farm would actually decrease species diversity and reduce systemic stability (Folke et al. 2004).

The DEIS refers to "erosive forces on sediments" caused by waters flowing around the shellfish bags. The DEIS suggests that the natural hydrodynamics would be restored following the removal of the farm structures.

- The erosion and deposition of sediments around shellfish bags placed on the bottom is akin to a ripple in the sand. While this structure may not be "natural" it is clear that the structure supports a greater diversity of life (DeAlteris et al. 2004).
- In shallow, high-energy environments such as this, these ripples are short-lived features that do not rise to the level of concern so as to be characterized by the term "impact." Even serious sedimentary disturbances (dredge scars) are erased in a matter of days and have limited (or negligible) impact in sandy, unconsolidated environments such as Drakes Estero (reviewed by Coen 1995, Stokesbury et al. 2011).

The DEIS suggests that the removal of oyster bags would "allow natural processes to resume" and allow benthic organisms to recolonize non-vegetated seabed.

- It is well-documented that the productivity and abundance of the organisms associated with shellfish aquaculture gear is several orders of magnitude greater than the non-vegetated seabed nearby (DeAlteris et al. 2004, Erbland and Ozbay 2009, Ferraro and Cole 2007, Pinnix et al. 2005).
- The diversity and associated stability of the mixed and vibrant populations associated with shellfish culture gear are traits that resource managers should be trying to preserve (Dumbauld et al. 2009, Folke et al . 2004).
- The farm also provides shell hash substrate in Drakes Estero, not only related to the shucking operations, but from shell that drops from the longline clusters or from typical mortalities that occur in the field. The habitat associated with shell-hash supports a unique zootic community that is clearly a limited niche in the Drakes Estero system, a system dominated by sand and mud and eelgrass with only isolated areas of firm substrate (NRC 2009). Historically, this niche was provided by the now-extirpated Olympia oyster that once thrived in this area. Removal of the farm would remove an important habitat type in the Drakes Estero.

The DEIS claims that shellfish do not measurably improve water quality or clarity p 337, 339

- The authors fail to provide any measurements or scientific evidence to back up this claim, stating that this conclusion is evident because the estuary is well flushed and has a low turbidity. I have calculated that the farmed oysters and clams collectively clear excess turbidity from 350,000 m^3 each day, removing particles as small as 2 microns. This is approximately four percent of the volume of Drakes Estero, suggesting that the filtration impacts are significant, measurable and quantifiable.
- Oysters and clams contain nitrogen in their tissues and shell ((Newell 2004, Higgins et al. 2010, Rice 2002). As noted earlier, the harvest of approximately 4.3 million oysters and 1 million clams annually results in the direct removal of approximately 2,500 kg N and 750 kg P from these sensitive waters due to the harvest alone.
- When shellfish feed they accelerate the flux of organic material to the benthos where it is made available to benthic deposit feeders. This flux also increases the rate of bacterial denitrification, which transforms inorganic nitrogen into harmless nitrogen gas (Newell 2004).
- Excess flux of inorganic nitrogen (ammonia and nitrate) to our rivers and coastal waters has been identified as the primary cause of degraded water quality, hypoxia, habitat loss and biodiversity in our nation's coastal ecosystems (Bricker et al 2007).

- Nutrient and pathogens from runoff associated with ranching activity in the watershed is cited in the DEIS as a significant impact to Drakes Estero. It is likely that the cultured shellfish mitigate this impact and improve water quality.

The DEIS misrepresents the threats associated with invasive tunicates (p 263, 266)

- It is unlikely that the DBOC was responsible for the introduction of the invasive tunicate *Didemnum*. Dozens of other invasive introductions have been linked to ballast water discharged at nearby shipping terminals, and I am unaware of any reports suggesting that the farm is in any way responsible for this introduction.
- The DEIS suggests that the firm substrate associated with the oysters and farm structures will somehow stimulate the tunicate to proliferate and expand its range. While the range of the species has not been described in Drakes Estero, there is no evidence to suggest that the range is spreading now.
- The DEIS suggests that there should be an effort to eradicate the invasive *Didemnum*, but I am unaware of any reports of any successful eradication of an invasive marine invertebrate. I doubt it can be done.
- The DEIS suggests that there are costs associated with the monitoring and control of the invasive *Didemnum*, but if this is important (or feasible) than the NPS should be doing that work now.
- The suggestion in the DEIS that removing the farm would somehow facilitate the management, monitoring and eradication of *Didemnum*. This is pure fantasy. Even if all of the firm substrate related to the farm were removed from Drakes Estero, there are still ample sites for attachment on shell, rubble and eelgrass that would provide suitable habitat.
- Were the eradication of *Didemnum* from Drakes Estero somehow successful, it is logical to assume that it would quickly recolonize from nearby populations.
- The DEIS suggests that the removal of the shellfish culture bags would reduce the potential for introduction of noxious species such as *Didemnum*. (p 250, 252) The mere presence of such structures cannot impact tunicate introductions. The new species must be introduced into the system by a vector. There are already state and federal regulations and Best Management Practices in place to minimize the risks of such introductions by shellfish farmers. Enforcing existing federal laws on ballast water discharges would be a much more effective way of reducing the chances of unwanted species introductions.
- By increasing the amount of firm substrate in the Estero, DBOC returns the balance to a more natural state, one in which broad tracts of fine sand and silt were once balanced by extensive patches of native oyster shell (NRC 2009).
- The DEIS repeatedly refers to their "monitoring and management of invasive species," yet no data are presented and no viable control or eradication mechanism exists. On the bottom of page 251 the DEIS states that additional invasive species are known to occur and their monitoring and management is expected to have long-term beneficial impact on wetlands. Exactly what sorts of management procedures have been implemented and how successful have these efforts been?
- The existence of DBOC is clearly irrelevant to the issue of invasive tunicates.

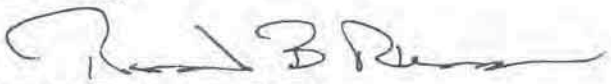
Conclusions

The elimination or restriction of the Drakes Bay Oyster Company would result in severe habitat loss and destruction of ecosystem function. Ending the sustainable harvest of 5.5 million bivalves would have an impact similar to dumping 2.5 metric tons of nitrogen and 0.75 metric tons of phosphate in the Drakes Estero annually. Eliminating the nutrient removal associated with denitrification would have an additional impact of similar magnitude. One can predict that this would have profound negative impacts

on the water quality and eelgrass survival in the Drakes Estero. If anyone were proposing a new activity that involved dumping tons of fertilizer into Drakes Estero they would surely be denied a permit. Removing the DBOC would also result in the removal 147 acres of culture structures and shell that provide a rich and diverse habitat for millions of fish and invertebrates. These organisms in turn are the forage for myriad predators. If someone were to suggest a new project that would remove 147 acres of eelgrass beds (which provide similar ecosystem services and habitat value) they would be quickly thwarted. The oyster farming activities have been demonstrated to be a compatible use of Drakes Estero for decades. At this point their ecosystem services have become an integral part of the ecological function of Drakes Estero. Denial of a permit for the DBOC would have profound negative impacts on the ecosystem structure and function that should be fully analyzed and assessed.

I hope these comments are taken in the constructive light in which they are offered and I encourage you to contact me if you need clarification of any of the comments I have offered.

Sincerely,



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PCSGA

PACIFIC COAST SHELLFISH GROWERS ASSOCIATION

December 9, 2011

Point Reyes National Seashore
ATTN: DBOC SUP DEIS
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: Comment Letter Pertaining to Drakes Bay Oyster Company Special Use Permit DEIS

Dear Sir/Madam:

The Pacific Coast Shellfish Growers Association ("PCSGA"), founded in 1930, represents over 150 shellfish growers in Alaska, Washington, Oregon, California and Hawaii. Members of PCSGA pride themselves on their environmental stewardship and contributions to their local economies and communities. Their products are healthful and sustainable, and include oysters, clams, mussels, scallops and geoduck. PCSGA represents both private and tribal shellfishing interests. This letter provides comments on the Draft Environmental Impact Statement ("DEIS") for the Drakes Bay Oyster Company Special Use Permit. These comments supplement comments submitted on behalf of PCSGA by Plauché & Stock LLP and Confluence Environmental Company.

The United States National Oceanic and Atmospheric Association ("NOAA") agreed to participate as a cooperating agency in the EIS process for the Drakes Bay Oyster Company Special Use Permit. NOAA Fisheries is the lead federal agency responsible for the stewardship of the nation's offshore living marine resources and their habitat. It works within the Magnuson-Stevens Act, the Marine Mammal Protection Act and the Endangered Species Act to fulfill its mission of promoting healthy ecosystems, fisheries and habitat for the benefit of all Americans.

Consistent with its stated mission, NOAA recently released a national aquaculture policy to increase domestic seafood production, create sustainable jobs and restore marine habitats. The policy builds on priorities of President Obama's National Ocean Policy, which emphasizes protecting, maintaining and restoring healthy and diverse ecosystems, supporting sustainable uses of the ocean, increasing scientific knowledge, and applying that knowledge to make better

decisions. Among other things, the new NOAA aquaculture policy focuses on: encouraging and fostering sustainable aquaculture; making management decisions based on the best scientific information available, and developing sustainable aquaculture compatible with other uses. In addition to this new policy, NOAA announced plans to actively support the development of the aquaculture industry through a National Shellfish Initiative in partnership with the shellfish industry to increase commercial production of shellfish to create jobs, provide locally-produced food, restore shellfish populations and habitat, and improve water quality.

The DEIS describes various laws, policies and plans that informed the EIS and the alternatives considered. The DEIS purports to discuss relevant federal laws and policies on pages 37-42. However, the DEIS does not discuss the NOAA national aquaculture policy and National Shellfish Initiative, even though NOAA Fisheries is a cooperating agency. The DEIS must include such a discussion in this section of the document. In particular, the DEIS must discuss encouraging and fostering sustainable aquaculture; making management decisions based on the best scientific information available; and developing sustainable aquaculture that is compatible with other uses. Further, the National Aquaculture Act of 1980 declares aquaculture development in the national interest, establishes a national policy to encourage the development of aquaculture in the United States, and requires federal agencies to address barriers to aquaculture development. The DEIS must also discuss the National Aquaculture Act.

At most, the DEIS lists the NOAA aquaculture policy on pages 243-44 as a past, present and reasonably foreseeable action, and briefly mentions the policy in the socioeconomic resources section of the document. Rather, it is entirely inconsistent with the NOAA national aquaculture policy, which is premised on the sustainable character of shellfish aquaculture. The policy recognizes that although commercial shellfish aquaculture may result in some temporary disruption to the environment, impacts are minor and/or temporary and are offset by the ecosystem services introduced by shellfish farms and provided over the course of the entire culture cycle. Perhaps for this reason bivalve aquaculture is considered one of the most ecologically sustainable types of aquaculture.[1] Indeed, the Monterey Bay Aquarium's Seafood Watch places farmed clams, oysters, scallops and mussels in the "Best Choices" category. And the Food and Water Watch Smart Seafood Guide recommends U.S. farmed oysters, mussels and clams to conscientious consumers. Again, this is because farmed shellfish utilize environmentally-responsible management practices. Shellfish aquaculture is consistent with the sustainability and long-term management of Drakes Estero, and should so be determined in the DEIS. *See* DEIS, p. 411.

Eliminating the Drakes Bay Oyster Company shellfish farm would have more than a minor adverse impact on regional socioeconomic resources. Removing the farm will serve only to exacerbate the increasing seafood trade deficit, which now stands at $10 billion annually as reported by the U.S. Census Bureau. The domestic aquaculture industry currently supplies only five percent of the seafood consumed in the United States. Drakes Bay Oyster Company supplies approximately 13-28 percent of the total shellfish grown in the state of California. That is a significant percentage, particularly for a state the size of California. Eliminating Drakes Bay Oyster Company would come at a time when Gulf Coast production is at a fraction of what it

[1] Shumway, S.E., Davis, C., Downey, R., Karney, R., Kraeuter, J., Parsons, J., et al. 2003. Shellfish aquaculture – in praise of sustainable economies and environments. World Aquac. 34 (4), 15-17.

was prior to the *Deepwater Horizon* disaster. Oyster growers around the country are struggling to keep up with demand for their product; such demand would increase if Drakes Bay Oyster Company is not permitted to continue its operations. Consumers in the United States are clamoring for safe, domestic and sustainable seafood choices. A decision not to renew the Special Use Permit for Drakes Bay Oyster Company reduces, and in some cases may eliminate, those choices. This result is the opposite of what cooperating agency NOAA intended when it adopted a national aquaculture policy and announced the National Shellfish Initiative earlier this year. The DEIS should conclude that not only will failure to issue a special use permit to Drakes Bay Oyster Company cause a major adverse impact to California's shellfish market, but it will result in a major adverse impact on the entire United States shellfish industry as well as shellfish consumers.

Finally, shellfish companies like Drakes Bay Oyster Company are committed to the communities in which they are located. Beyond their role in the local economy, they are vocal advocates for clean water initiatives, are environmental stewards of the tidelands and are dedicated to protecting the environmental resources on which they rely. They donate significant amounts of time, money and shellfish to environmental causes, fundraisers and public education. These are factors the DEIS did not but must take into account.

PCSGA members are disappointed by the results-oriented manner in which the National Park Service has approached evaluating Drakes Bay Oyster Company's proposal under NEPA. In particular, the DEIS obscures or summarily dismisses scientific evidence demonstrating shellfish aquaculture operations are environmentally benign or beneficial to Drakes Estero. NOAA's aquaculture policy requires making management decisions based on the best scientific information available. Without fully and fairly disclosing and discussing all of the science on shellfish aquaculture, a management decision based on the best scientific information available simply cannot be made. In light of the concerns raised by various commenters regarding the scientific adequacy of the DEIS and considering the inconsistency of the National Park Service's actions with NOAA's national aquaculture policy, the National Park Service must revise the DEIS to provide a full and fair discussion of the science and applicable law and policies. Thank you for your attention to these comments.

Sincerely,

Margaret Pilaro Barrette
Executive Director

CORRESPONDENCE ID: 52029

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DEC 0 9 2011

December 9, 2011

Point Reyes National Seashore
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1 Bear Valley Road
Point Reyes Station, CA 94956

Re: Comments from Pacific Coast Shellfish Growers Association on the National Park Service Draft Environmental Impact Statement for Drakes Bay Oyster Company Special Use Permit

Dear Sir/Madam:

On behalf of the Pacific Coast Shellfish Growers Association ("PCSGA"), thank you for providing an opportunity to comment on the Draft Environmental Impact Statement ("DEIS") prepared for the Drakes Bay Oyster Company Special Use Permit. PCSGA, founded in 1930, represents over 150 shellfish growers in Alaska, Washington, Oregon, California and Hawaii. Members of PCSGA grow a wide variety of healthful, sustainable shellfish including oysters, clams, mussels, scallops and geoduck. Representing both private and tribal shellfishing interests, PCSGA submits the following comments on the DEIS.

I. INTRODUCTION.

As stewards of the tidelands, shellfish farmers fundamentally understand that the presence of shellfish improves water quality and multi-dimensional habitat, thereby contributing to the health of bays and estuaries in which shellfish farms are located. As filter feeders, shellfish remove bacteria, excess nutrients and suspended sediment from the water, resulting in improved conditions for sub-aquatic vegetation. The three-dimensional structure created by shells and shellfish aquaculture gear provides important habitat for other aquatic species. And the mosaic of habitats provided by a combination of shellfish aquaculture gear, shells, sub-aquatic vegetation and mudflats is superior to any one of those features alone. These ecological

realities are not only observed by shellfish farmers on a daily basis, but are acknowledged in the growing body of science on shellfish aquaculture.

The purpose of the National Environmental Policy Act ("NEPA") is to ensure federal agencies are fully aware of the impact of their decisions on the environment. *Oregon Environmental Council v. Kunzman*, 817 F.2d 484, 492 (9th Cir. 1987). A proper NEPA analysis fosters both informed decision-making and informed public participation. *League of Wilderness Defenders Blue Mountains Biodiversity Project v. Allen*, 615 F.3d 1122, 1137 (9th Cir. 2010). The DEIS for the Drakes Bay Oyster Company Special Use Permit does not fully disclose the environmental consequences of the proposed action or its alternatives. By utilizing an environmental baseline consisting of the no-action alternative instead of existing environmental conditions, the DEIS improperly inflates the adverse consequences of continued aquacultural operations and minimizes the negative side effects of removing the existing Drakes Bay Oyster Company farm. Further, although the DEIS gives a nod to some of the ecosystem services provided by shellfish farming, it inappropriately discounts the value of those services.

The true environmental consequences of issuing or not issuing a Special Use Permit to Drakes Bay Oyster Company cannot be known from the information provided by the DEIS. Worse than providing no information to decision-makers, the DEIS provides misleading and incorrect information to decision-makers. Rather than be well-informed regarding the environmental consequences of the various options before them, decision-makers will be misinformed. This outcome is not the intent of NEPA. The DEIS must be revised to address the deficiencies identified in the following comments.

II. THE DEIS IS INADEQUATE BECAUSE IT FAILS TO EVALUATE THE ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED PROJECT AND ITS ALTERNATIVES RELATIVE TO THE EXISTING ENVIRONMENT.

Under NEPA, decision-makers must have sufficient information to understand the potential effects of a proposed action and its alternatives on the existing environment. Without this information, decision-makers cannot make a reasoned choice between alternative courses of action presented to them. To determine what effect a proposed action and its alternatives will have on the environment, they each must be evaluated against existing environmental conditions. The alternatives, including the proposed action and the no-action alternative, must then be compared with one another.

The National Park Service's evaluation of the proposed action and its alternatives is fundamentally flawed. Instead of using existing environmental conditions as the baseline against which the alternatives are measured, it uses theoretical environmental conditions assuming the absence of aquaculture operations that have existed in Drakes Estero for over 70 years. The DEIS does this by using the no-action alternative to establish the baseline conditions against which the other alternatives will be measured. The DEIS states: "In other words, the analysis of the action alternatives may be documented by contrasting the expected future conditions under each action alternative to the expected future conditions under the no-action alternative." DEIS, p.234. This methodology is highly speculative, does not comport with applicable regulations guiding NEPA implementation, and does not ensure that a decision regarding the proposed action will be fully informed and well-considered. Moreover, it skews the discussion of environmental consequences throughout the entirety of the document.

A. NEPA Requires the Environmental Consequences of Alternatives Be Measured Against Existing Environmental Conditions.

The regulatory guidelines established by the Council on Environmental Quality ("CEQ") to implement NEPA establish how the proposed project and its alternatives are to be evaluated.[1] "The heart of the environmental impact statement" is a description of project alternatives. 40 C.F.R. § 1502.14. This description must include the proposed action[2] and all reasonable alternatives, including the no-action alternative. *Id.* The EIS must then describe the area that may be affected by the alternatives. 40 C.F.R. § 1502.15. The description of the affected area establishes the baseline against which the alternatives are to be measured. This baseline consists of the existing conditions of the affected environment. Once the affected environment has been identified, the potential environmental consequences of the alternatives must be analyzed. This discussion is to include the environmental impacts of the alternatives and the proposed project. After the potential impacts of the alternatives and the proposed project are analyzed, the EIS is required to compare the various alternatives to one another. 40 C.F.R. § 1502.14. The comparison must be based on the potential environmental consequences of each alternative.

What is clear from these guidelines is the effects of each alternative on existing environmental conditions must first be determined. Only then can the effects of each alternative be compared with one another. This evaluation protocol is consistent with the Department of Interior's NEPA regulations. Those regulations state:

> The analysis of the effects of the no-action alternative may be documented by contrasting the current condition and expected future condition should the proposed action not be undertaken with the impacts of the proposed action and any reasonable alternatives.

43 CFR § 46.415(b)(1). This regulation explains how the no-action alternative should be examined for projects under the authority of the Department of Interior. The no-action alternative may compare the existing environmental conditions – the existing baseline – with projected future conditions. Next, this comparison may itself be compared to the impacts of the proposed action and any reasonable alternatives on the existing baseline. Thus, it is clear the impacts of each alternative on the *existing* environment, including the proposed action and the no-action alternative, must first be determined before the impacts of the alternatives are compared to each other. The DEIS does not do this, although it must.

Further CEQ guidance regarding the distinction between an analysis of environmental consequences and an analysis of alternatives reinforces this point. The CEQ explains that the environmental consequences section of an EIS should be devoted largely to a scientific analysis of the direct and indirect environmental effects of the proposed action and each alternative. This section "forms the analytic basis for the concise comparison" required in the alternatives section of the EIS. 46 Fed. Reg. 18026-01, 18028 (1981). The comparison must be performed only

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[1] These regulations were made binding on administrative agencies by Executive Order No. 11991. 3 C.F.R. 124; *League of Wilderness Defenders Blue Mountains Biodiversity Project v. Allen*, 615 F.3d 1122, 1135 (9th Cir. 2010).

[2] The DEIS fails to define the proposed action, described by Drakes Bay Oyster Company in its scoping comment letter, dated November 24, 2010. This inadequacy is further discussed in Section IV of this letter.

after the environmental consequences of each of the alternatives vis-à-vis the existing environmental baseline is determined.

The DEIS for the special use permit does not follow this prescribed protocol. Rather, it turns the concept of the environmental baseline on its head. The DEIS, on page 234, states:

> The action alternatives, on the other hand, are generally assessed using the no-action conditions as the baseline condition. In other words, the analysis of the action alternatives may be documented by contrasting the expected future conditions under each action alternative to the expected future conditions under the no-action alternative.

Under this methodology, the DEIS speculates as to the environmental conditions of Drakes Estero and the adjacent areas in the absence of existing aquaculture operations, and uses those speculative future conditions as the environmental baseline against which the other alternatives are compared. Therefore, the environmental consequences of each alternative are not measured against existing environmental conditions as required by NEPA.

This flawed methodology is rooted in an apparent confusion between an appropriate environmental baseline and the no-action alternative required under NEPA. NEPA requires an EIS include an analysis of the environmental consequences if a proposed project is not approved. This is the no-action alternative. However, as described by both the CEQ and Department of Interior NEPA regulations, the purpose of the no-action alternative is to compare alternatives, not to establish a baseline. The description of the no-action alternative will vary based on the nature of the project. For some projects, the existing environment will not change if the project is not approved, and the no-action alternative and the environmental baseline will be the same. For other projects, denial of a proposed project will not preserve existing environmental conditions, and the no-action alternative will be different from the environmental baseline. Here, as described in the DEIS, the no-action alternative does not preserve existing environmental conditions. Therefore, it cannot represent the environmental baseline against which the environmental consequences of the action alternatives are determined.

The Ninth Circuit Court of Appeals considered the issue of an appropriate environmental baseline in *American Rivers v. Federal Energy Regulatory Commission*, 201 F.3d 1186 (9th Cir. 1999). In *American Rivers*, the Federal Energy Regulatory Commission ("FERC") evaluated under NEPA the proposed re-licensing of two hydroelectric power facilities located in Oregon along a 25-mile stretch of the McKenzie River. The license under review would authorize the continued operation of the two projects for 40 additional years. The EIS for the project used as a baseline the existing facilities as operated under the terms and conditions of their original licenses as the environmental baseline. Several conservation and environmental organizations objected, arguing that the re-licensing proposal should be measured "against a baseline embodying a theoretical reconstruction of what the McKenzie River basin would be like today" had the two projects "not been in place for the greater part of this century." *Id.* at 1195. The court disagreed. The court found it would defy "common sense and notions of pragmatism" to require FERC to recreate a 50-year-old environmental baseline against which to measure the environmental consequences of continued operations. *Id.* at 1197. It further found it was appropriate for FERC to utilize "today's environment" as the environmental baseline, rather than

"the world as it existed 50 years ago." *Id.* at 1198. The court ultimately held that use by FERC of existing environmental conditions at the hydroelectric facilities to evaluate proposed re-licensing of the facility was the proper baseline, rather than a "theoretical reconstruction" of the environmental conditions of the river basin had the facility never existed.

This interpretation of the appropriate environmental baseline as existing environmental conditions is consistent with other environmental statutes. For example, under the Endangered Species Act ("ESA"), the environmental baseline must include the past and present impacts of all federal, state or private actions and other human activities in the action area. 50 C.F.R. § 402.02. This regulation is grounded in the fact the baseline must be definable; setting a baseline that relies on a speculative future condition renders an assessment of actual project impacts virtually impossible. *See, e.g., Confederated Tribes and Bands of the Yakama Nation v. McDonald*, 2003 WL 1955763 (E.D. Wash. 2003) (holding existing dam and associated environmental issues must be included in environmental baseline in ESA consultation regarding failing dam). The logic behind establishing an environmental baseline based on existing conditions under the ESA is identical to the purpose of establishing a baseline under NEPA. Because agencies must prepare an EIS concurrently with, and must integrate the EIS with, any other required related surveys and studies to the fullest extent possible, the environmental baseline for NEPA analysis and ESA consultation should be the same. 40 C.F.R. §1502.25. Here, the DEIS must use existing environmental conditions as a baseline for its analysis of potential environmental consequences of the proposed action and its alternatives.

B. <u>Use of a Speculative Future Environmental Baseline Does Not Inform Decision-makers Regarding the Environmental Consequences of the Proposed Action or Its Alternatives</u>.

The failure of the DEIS to use existing environmental conditions as the environmental baseline against which to measure environmental consequences of the proposed action and its alternatives distorts the entire environmental consequences analysis, rendering the DEIS inadequate to inform decision-makers and the public of the true environmental consequences of removing shellfish aquaculture from Drakes Estero. First, attempting to reconstruct the environmental conditions of Drakes Estero as though shellfish aquaculture never existed is highly speculative. Second, attempting to determine the environmental consequences of the proposed action using a theoretical baseline will render unlikely and unrealistic results. Finally, using an environmental baseline that ignores the ecosystem services rendered by the existing shellfish farm improperly minimizes the negative consequences of removing the farm. The DEIS must be revised to utilize the appropriate environmental baseline of existing environmental conditions.

1. The DEIS speculates regarding future environmental conditions in Drakes Estero without scientific support.

The theoretical future environmental baseline utilized in the DEIS is based on assumptions and speculation as to environmental outcomes. The baseline is not supported by data, and the DEIS arbitrarily concludes the theoretical future baseline is superior to the actual baseline comprised of existing environmental conditions which include shellfish aquaculture. A more appropriate assumption would be to recognize the excellent ecological health of Drakes Estero (which the DEIS does in Chapter 3) and accept that this ecological health is present with,

and potentially because of, existing shellfish and shellfish aquaculture. In fact, given the complexity of interactions between the myriad physical processes and species present in Drakes Estero, the *presumption* that removal of a major component of the system (shellfish aquaculture) would be anything but deleterious to a healthy status quo is erroneous and must be corrected.

The DEIS suggests that removal of aquaculture gear and apparatus influencing "approximately 5 linear miles (or 7 acres)" would alleviate the potential for erosion associated with those structures. But the DEIS does not provide any analysis of how these structures currently influence sediment dynamics or how sediment dynamics would be affected by their removal. The DEIS cites Harbin-Ireland 2004 as support for the conclusion that erosion would be reduced by removal of the aquaculture structure. However, the 2009 National Academy of Sciences ("NAS") report summarizes this same study and concludes the "resulting change in size composition of sediments is minor." The DEIS cites to this study with no additional analysis to define a potentially inaccurate and speculative future condition. The DEIS must be revised to change this unsupported conclusion.

The DEIS also concludes with no analysis that the removal of aquaculture gear would not increase erosion. Although scour has been documented around the individual posts supporting the shellfish racks, no data is presented with respect to sediment accumulation surrounding the rack structures as whole units. The erosion around the rack support poles may simply be depressions in sediment accumulation associated with the larger rack structure, which also acts to slow water velocities. It could instead be argued that the aquaculture gear may stabilize sediments and removal of the gear may in fact increase erosion, thereby destabilizing entire areas where aquaculture gear is currently established. The DEIS does not include empirical data to support speculative future environmental conditions that allegedly benefit from shellfish aquaculture removal. The DEIS must be revised to change this unsupported conclusion.

Similarly, the DEIS does not provide any data regarding upland activities and associated nutrient input from streams and other runoff in the watershed to substantiate the conclusion that excess nutrient load from the watershed is unlikely to lead to eutrofication without the existing shellfish due to the high rate of tidal flushing relative to stream inputs. Instead, it relies on unpublished data from over 20 years ago on nutrient input (cited as Hagar 1990 unpublished in Anima 1990, 1991) to minimize the beneficial effect of shellfish water filtration on eelgrass distribution. In contrast, the 2009 NAS report concludes, "filtration by the cultured oysters could provide additional benefits to eelgrass production by lowering turbidity and adding nutrients because these limit eelgrass distribution and production even in relatively oligotrophic estuaries." The NAS report goes on to state, "the oysters in Drakes Estero could add ecosystem resilience in the event of a phytoplankton bloom or a high-turbidity event like sedimentation during run-off of stormwaters." The DEIS selectively uses information from the scientific literature to form speculative conclusions about future conditions while failing to provide data supporting those conclusions. The DEIS does not provide a full and fair description of the scientific literature inconsistent with its conclusions.

In evaluating numerous ecological metrics, it is clear Drakes Estero, including existing shellfish aquaculture, represents one of the healthiest estuarine systems on the West Coast (NPS 2007). Conversely, there is no scientific consensus on the implications of removal of shellfish aquaculture from Drakes Estero. The DEIS does not contain adequate analysis to reach conclusions regarding environmental conditions absent existing shellfish aquaculture. An EIS

that erroneously depicts positive environmental consequences poses as significant an obstacle to informed decision-making as one that inadequately assesses adverse circumstances. *Sierra Club v. Froehlke*, 816 F.2d 205, 211 n.3 (5th Cir. 1987). Here, it is inappropriate to assume future conditions without the shellfish farm will be environmentally superior to existing conditions, particularly given the present superb health of Drakes Estero. This assumption must be changed.

2. The use of existing environmental conditions, including existing aquaculture operations, as an environmental baseline is required to provide an adequate analysis to inform decision-making.

Without establishing baseline conditions that exist prior to a proposed project, "there is simply no way to determine what effect the [project] will have on the environment and, consequently, no way to comply with NEPA." *Half Moon Bay Fishermans' Marketing Association v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988). Here, use of a hypothetical baseline involves speculating regarding the environmental consequences of removing existing shellfish aquaculture from Drakes Estero. The DEIS then uses that hypothetical baseline to determine the environmental consequences of adding shellfish aquaculture back into Drakes Estero. Not only is this exercise illogical, but it consists of layer upon layer of speculation. Rather, an analysis should begin with actual existing environmental conditions to provide a realistic assessment of environmental consequences resulting from removing Drakes Bay Oyster Company operations, or allowing them to continue. By ignoring existing environmental conditions, the DEIS underemphasizes the adverse environmental consequences of removing existing shellfish operations, and overemphasizes adverse environmental consequences of continuing or expanding existing shellfish operations.

An EIS must include a discussion of adverse impacts that does not improperly minimize negative side effects. *Western Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 491 (9th Cir. 2011) (citing *Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1159 (9th Cir. 2006)). Here, the removal of shellfish aquaculture from Drakes Estero is likely to result in adverse effects on the physical and ecological functioning of the Estero not adequately considered in the DEIS. The appropriate existing baseline condition includes the structure, biota, and filtering capacity associated with 600,000 pounds of shellfish. This ecosystem has included shellfish aquaculture for over 70 years and the physical processes which interact with both the aquaculture structural components as well as the ecosystem services provided by the shellfish create and maintain the Estero in its current condition.

Currently, shellfish aquaculture provides a multitude of functions, without which Drakes Estero could change dramatically. These functions include hard structure in the form of shell and aquaculture gear serving as a substrate for the colonization of organisms, including prey for sensitive species and species managed under state and federal regulation. Additionally, water filtration provided by existing cultured shellfish removes particulate matter from several millions of gallons of water per day, improving water quality and water clarity upon which other resources such as eelgrass are dependent. Both of these valuable aspects of shellfish aquaculture are discussed further below. The DEIS concludes the impacts of removing shellfish and shellfish culture gear will be temporary. This conclusion is incorrect, speculative, and inadequately supported by the data and analyses presented. By summarily dismissing these beneficial ecosystem services, the DEIS inappropriately minimizes the negative side effects of removing shellfish aquaculture from Drakes Estero. This erroneous conclusion must be changed.

At the same time the DEIS discounts ecosystem services that will be lost from existing shellfish aquaculture, it double-counts existing environmental conditions. The DEIS describes existing conditions as though they will be newly introduced to Drakes Estero, a fundamental flaw in using a hypothetical future environmental baseline. Instead, the analysis of environmental consequences must take into account existing conditions resulting from existing shellfish aquaculture, including existing eelgrass densities, eelgrass scarring, diversity of benthic macro-invertebrates under established beds, and natural fish species composition. Only then will the DEIS be able to reach any conclusions regarding the effect the project will have on the environment.

III. THE DEIS DOES NOT PROVIDE A FULL AND FAIR DISCUSSION OF THE ENVIRONMENTAL IMPACTS OF THE PROPOSED ALTERNATIVES.

Agencies are required to take a "hard look" at the potential environmental consequences of a proposed action. *League of Wilderness Defenders Blue Mountains Biodiversity Project v. Allen*, 615 F.3d 1122, 1135 (9th Cir. 2010). An EIS assists an agency in this "hard look" requirement, the purpose of an EIS being to provide a "full and fair" discussion of significant environmental impacts. 40 C.F.R. §1502.1; *Western Watersheds Project v. Kraayenbrink*; 632 F.3d 472 (9th Cir. 2011). The EIS must be supported by evidence that the agency has made the necessary environmental analysis. 40 C.F.R. § 1502.2. Agencies must ensure the professional integrity, including the scientific integrity, of the discussions and analysis in an EIS. They must identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the document. 40 C.F.R. § 1502.24.

The DEIS does not engage in a full and fair discussion of the environmental consequences of either continuing existing shellfish aquaculture operations in Drakes Estero or removing the existing Drakes Bay Oyster Company farm. It selectively cites evidence appearing to support conclusions that continuing operations will have adverse environmental consequences, while ignoring evidence supporting conclusions that (1) continuing operations will *not* have a significant adverse impact on the existing environment, or (2) removing existing operations *will* have a significant adverse impact on the existing environment. Many conclusions of environmental harm made in the DEIS simply are not supported by data. Other conclusions of environmental harm are made at the expense of obfuscating contradictory evidence. As drafted, the DEIS does not comport with NEPA standards, and must be revised.

A. Inclusion of Shellfish Aquaculture Provides a Mosaic of Habitats Superior to Single Source Habitat.

Eelgrass is an ecologically valuable habitat type frequently protected by regulatory oversight. However, in a setting where eelgrass is highly abundant and inter-annual variability is high as in Drakes Estero, it is inappropriate to assume the limited eelgrass disturbance associated with shellfish aquaculture results in environmental degradation. The DEIS does not present data suggesting any physical process or species reliant or associated with eelgrass is being limited by the current abundance of eelgrass. In simple terms, the DEIS assumes that some eelgrass damage from aquaculture operations is bad, and the existence of more eelgrass following the removal of aquaculture gear is good. In fact, the opposite may be true; the diversity of habitats existing in the baseline condition, including both shellfish and shellfish culture apparatus,

represents an improved condition over any of these habitats alone.[3] The DEIS must reflect this fact.

The results of numerous studies establish the value of shellfish habitat and oyster culture in terms of their beneficial role in water quality and clarity, physical processes, and nursery and refugia habitat for juvenile fishes, shrimps, crabs, and other invertebrates (Ambrose and Anderson, 1990; Doty, Armstrong and Dumbauld, 1990; Breitburg and Miller, 1998; Dumbauld, Armstrong and McDonald, 1993; Eggleston and Armstrong, 1995; Simenstad and Fresh, 1995; and Dumbauld, 1997). Similarly, numerous studies establish the abundance and diversity of nekton (fish, crab, and shrimp), epibenthic meiofauna, and benthic macrofauna found in shellfish aquaculture (Simenstad et al. 1991; Clynick et al. 2008; Erbland and Ozbay 2008; Powers et al. 2007). Perhaps most importantly, west coast studies establish that species abundance and diversity are comparable in oyster and eelgrass habitats, both of which are higher than mudflat, sand and several other habitats sampled (Hosack, 2003; Ferraro and Cole, 2001; 2003; 2007). Most recently, Ferraro and Cole (2011) published a study establishing that measurement of benthic macrofaunal species richness, abundance, biomass, abundance of deposit, suspension, and facultative feeders, as well as a dominance and diversity indices, can be ranked by habitat type in the following manner: eelgrass $\approx$ oysters > mud shrimp > ghost shrimp $\approx$ subtidal. This study presents a "periodic table" of habitat types in multiple west coast estuaries with eelgrass and oyster habitats providing similar ecological values, both of which provided greater value than the other habitat types evaluated.

A study published in *The Journal of Shellfish Research* (Dealteris et al., 2004) investigated the habitat value of shellfish aquaculture gear compared with eelgrass and non-vegetated areas. Abundance of marine organisms and species diversity was used to compare habitat value. The study finds aquaculture gear provides habitat for many species throughout the year as compared to eelgrass. The study also indicates species abundance and richness in habitat consisting of shellfish aquaculture gear is higher during all times of the year; species diversity is also higher but not significantly so in aquaculture gear as compared to eelgrass. Habitat value for both aquaculture gear and eelgrass were significantly higher than non-vegetated areas. The study concluded that "shellfish aquaculture gear has substantially greater habitat value than a shallow non-vegetated seabed, and has habitat value at least equal to and possibly superior to submerged aquatic vegetation." Similarly, a study completed by the Western Regional Aquaculture Center (WRAC 2004) found the "overall similarity of the invertebrate communities among the oyster long line and eelgrass reference sites provides evidence that oyster long line culture activities are not particularly stressful to the benthic infaunal communities of Arcata Bay." This study further found the highest invertebrate biomass in the oyster sites and that more species were present in eelgrass and oyster habitat than in open mud.

These conclusions are confirmed in other studies. Generally, while oyster habitat and eelgrass habitat have similar values, there is substantial evidence that both eelgrass and oyster areas have higher habitat value in terms of species abundance and diversity than mudflats or sand. Escapa et.al. (2004) found that most epifaunal organisms have higher densities inside oyster beds compared with areas outside of the beds. This study also found that numerous species of birds exist at higher densities within oyster beds. Similar results were also

[3] See also the discussion in Section III.D below regarding managed species.

documented for benthic macrofauna with oysters and eelgrass providing equivalent value in terms of diversity and productivity (Ferraro and Cole 2007; 2011). These scientific studies lead to a conclusion that, even if some amount of eelgrass is displaced by Drakes Bay Oyster Company operations, the habitat value of that eelgrass is at least replaced by the habitat value of the shellfish and shellfish gear, resulting in no net loss of habitat or loss of sensitive species. This conclusion must be reflected in the DEIS.

Much of the ongoing shellfish aquaculture in Drakes Estero occurs in areas devoid of eelgrass. For example, oyster bags are located on mudflats and not placed on top of eelgrass. The prey resources and three dimensional structure created by oysters and oyster bags provide more habitat components than sandy or mud flat areas for numerous species. Just as the DEIS suggests that increases or decreases in eelgrass in Drakes Estero would represent an ecological consequence, the removal of shellfish and shellfish culture gear needs to be recognized as detrimental action threatening the resources of Drakes Estero currently reliant on the associated prey, refugia, and other habitat features provided. The scientific evidence cited above fully supports a finding that shellfish aquaculture in these non-vegetated areas produces a substantial increase in habitat value over non-vegetated areas and similar habitat value to eelgrass areas. Based on these studies, Drakes Bay Oyster Company operations in the aggregate represent an increase in prey resources and habitat diversity for species over projected environmental conditions in Drakes Estero without the farm. This conclusion must be reflected in the DEIS.

In the evaluation of potential impacts to biological resources, it is also important to consider impacts at a variety of scales from local (<1 to tens of meters) to landscape (100 to thousands of meters) and even larger scales (embayments and estuaries). The regulatory (ESA and MSA) context of the proposed action focuses primarily on fish species, including salmonids, coastal pelagic, and groundfish species and the habitats upon which they depend (designated critical habitat and essential fish habitat). The highly mobile nature of the ESA listed and MSA managed species, which routinely move tens to thousands of meters and much farther, is significant. When comparing one eelgrass area to another, studies investigating abundance of faunal assemblages generally indicate species abundance is positively correlated with the plant canopy and the root-rhizome mat (*see* Orth et al. 1984 (literature summary)). These parameters often have been translated by resource managers into percent cover and shoot density in subsequent mitigation policies (*see, e.g.*, Southern California Eelgrass Mitigation Policy). However, evaluating change in eelgrass habitat value using only two parameters without consideration of scale or regard to the surrounding environmental context (i.e., abundance or limitation of eelgrass habitat) is narrow and does not follow an ecosystem or watershed approach recommended in regulatory guidance (*see* Consultation Handbook, "Making Endangered Species Act Determinations of Effect for Individual or Grouped actions at the Watershed Scale," NMFS, 1996; "The Habitat Approach," NMFS, 1999).

Such a narrow analysis is particularly problematic in the context of Drakes Bay Oyster Company operations. The DEIS identifies potential reduction in eelgrass associated with shellfish aquaculture as a long-term negative consequence. Scientific evidence substantiates that shellfish aquaculture provides habitat value in and of itself. Determining which habitat has higher "value," or attempting to ascribe loss or gain in habitat value, is dependent on each species and its many life history stages. To summarily determine that a reduction in eelgrass

equates to a long-term adverse impact for all species is unsupported and overly simplistic. The conclusion reached in the DEIS on this issue must be changed.

The problem with focusing on eelgrass increase alone is illustrated by discussions presented in Orth et al. (1984), which show several species of fish are found in higher densities in patchy eelgrass beds than in continuous dense beds of eelgrass. Holt et al. (1983; as reported in Orth et al. 1984) suggests that this is because some species of fish require open feeding areas as well as areas for protection from large predators and that patchy vegetation with a high percentage of edges therefore may support higher densities of some mobile foraging species. Thus, it could be argued that modest displacement of eelgrass resulting in some patchiness may be beneficial for certain species, provided an abundance of eelgrass is present in the surrounding environment, as it is in Drakes Estero, to ensure none of the other ecological functions provided by eelgrass are reduced.

There are several other issues that should be considered when evaluating the impacts of potential localized reductions in eelgrass from shellfish aquaculture activities in the context of Drakes Estero:

- Drakes Estero contains some of the most robust and healthy eelgrass beds on the West Coast (NPS 2007). Although there is ample evidence documenting the dramatic reduction in eelgrass over the last 50 years in the majority of estuaries along the West Coast and elsewhere, this is not the case for Drakes Estero. In fact, eelgrass beds in the Estero are expansive, with over 700 acres of eelgrass of various densities. These beds are thriving despite (or perhaps partially as a result of) ongoing shellfish aquaculture operations over the last 70+ years.

- Interannual variability exhibited in eelgrass coverage in Drakes Estero is dramatic. The DEIS reported a doubling of eelgrass habitat between 1991 and 2007. The large changes in eelgrass coverage, which naturally occur from year to year, are important when considering the thresholds for ecological relevance to listed and managed species. It is also important to consider this natural variability when determining what amount of change rises above the threshold of significance. The DEIS inappropriately uses terms such as "detectable" and "noticeable" in defining intensity and concludes moderate adverse impacts to eelgrass without any consideration of natural variability.

- Eelgrass exhibits large seasonal variability, with larger areas of coverage, greater shoot density, and higher biomass occurring in the spring and summer as compared with winter and fall. Shellfish aquaculture and gear as well as its associated habitat are present year-round. Although aquaculture habitat is reduced during harvest, this change in habitat value occurs at a frequency between 18 and 36 months in comparison to the seasonal reductions exhibited every 6 months by eelgrass. The combination of the two habitat types is complimentary in that one or the other habitat is likely to be present in the Bay during any given time of the year.

Shellfish aquaculture provides a diversity of beneficial habitat within Drakes Estero. The presence of both eelgrass and oyster culture in a patchy structure throughout the Estero provides robust heterogeneous habitats both spatially and temporally. This increased habitat diversity makes the entire system more resilient to disturbance from both natural and anthropogenic

causes. The DEIS analysis should not myopically focus on which habitat type is "better" or more "valuable." Rather, it must evaluate the mosaic of habitats provided by the combination of eelgrass, shellfish, shellfish aquaculture gear and mudflats and the value those combined habitats provide to listed and managed species and Drakes Estero as a whole.

The value of varied habitat is also exhibited by bird use of shellfish aquaculture areas. Wild and cultured shellfish are an important source of food for many species of marine birds (Dankers and Zuidema 1995; Norris et al. 1998; Lewis et al. 2007). Studies evaluating shellfish aquaculture interactions with birds have not identified significant negative impacts on bird use. In fact, such studies often show increases in species richness and abundance due to increased foraging opportunities. Food resources are provided by the shellfish themselves and by the community of organisms attached to the shellfish and shellfish gear (Dankers and Zuidema 1995; Hilgerloh et al. 2001). The DEIS suggests shellfish aquaculture in Drakes Estero has a long-term moderate adverse impact on birds because the habitat underneath shellfish rack and oyster bags is unavailable to probing seabirds and eelgrass reductions remove a primary food resource for black brandt. However, no data are presented to suggest there are inadequate foraging opportunities or other habitat values important to bird species available in Drakes Estero in its current condition. In order for a change in available food resources to have an impact on a species, there needs to be a relationship between that resource and the species in terms of nutritional value, energy demands or outright availability; none of these is the case for avian species in relationship to the prey and habitat resources in Drakes Estero. To reiterate a point made previously, it is not true that more of a certain habitat type (e.g., eelgrass) necessarily translates into increased habitat value. Here, a diverse composition of habitats provides more value to a diversity of species and more resilience to perturbations. This conclusion must be included in the DEIS.

B. <u>The DEIS Summarily Dismisses the Filtering Influence of Existing Oysters on Drakes Estero Water Quality Without Supporting Data</u>.

The DEIS fails to recognize the role water filtration from shellfish plays in eelgrass distribution. Instead, the DEIS suggests because the pelagic primary productivity of Drakes Estero is dominated by tidal import of phytoplankton derived from coastal upwelling and tidal flushing rates are high, water filtration by shellfish would have a limited effect on water clarity. At the same time, the DEIS suggests (in numerous sections) that turbidity from the operation of two boats would result in an adverse impact to eelgrass. Water filtration benefits provided by 600,000 pounds of shellfish greatly outweigh the turbidity generated by limited use of two boats in the bay, most of which use is not turbidity generating.

Ecosystem modeling and mesocosm studies indicate that restoring shellfish populations to even a modest fraction of their historic abundance could improve water quality and aid in the recovery of seagrasses (Newell and Koch 2004; Ulanowicz and Tuttle 1992; Peterson and Heck 1999). The NAS (2009) review concludes that "filtration by the cultured oysters could provide additional benefits to eelgrass production by lowering turbidity and adding nutrients because these limit eelgrass distribution and production even in relatively oligotrophic estuaries." The NAS report goes on to state that "oysters in Drakes Estero could add ecosystem resilience in the event of a phytoplankton bloom or a high-turbidity event like sedimentation during run-off of stormwaters." As Rice (2008) summarizes, bivalves are an essential component of estuarine systems in that they: exert "top-down" control of phytoplankton populations by filter feeding, or

grazing; exert "bottom-up" control through biodeposition and promotion of nutrient removal (i.e., burial and denitrification); sequester nitrogen in the form of proteins in meets and shells; and stabilize phytoplankton growth dynamics through moderation of ammonia cycling in the water column. The DEIS arbitrarily excludes this information from its analyses and conclusions when it must be included.

The analyses in the DEIS are lacking and oversimplified, resulting in a dismissal or undervaluation of the filtering services shellfish are playing in Drakes Estero. In a system where upland land uses include cattle ranching, and in which the California Department of Public Health has documented nutrient and pathogen loading in the upper reaches of Drakes Estero, the important role of shellfish for water filtration, denitrification, and biosequestration cannot be understated. The value of the services provided by cultured shellfish is especially important in the upper reaches of Drakes Estero where tidal flushing is greatly reduced and upland nutrient inputs are likely to be highest. For example, the water residence time in Schooner Bay is 20 days (NAS 2009). On average, oysters can filter between 15-55 liters/day (Powell et al. 1992). Even some basic calculations would suggest oyster filtering capacity is important in areas with water residency similar to Schooner Bay. In these settings excess phytoplankton, stimulated by nutrient input from uplands and other sources, could reduce water clarity and in turn result in diminished eelgrass distribution and abundance. The DEIS instead focuses only on the areas of the Estero which are rapidly exchanged with ocean waters. The DEIS authors are willing to examine, speculate, and overstate localized topics when they are characterized as a negative consequence related to shellfish aquaculture operations (e.g., erosion around racks, turbidity generated by propellers and other harvest activities), yet oversimplify, dismiss, or ignore similar topics when they would represent an ecological benefit resulting from shellfish aquaculture. The DEIS must further analyze this issue consistent with these comments.

C. Eelgrass Proliferates in Drakes Estero with Existing Shellfish Aquaculture and Displacement and Scarring by Existing Aquaculture Operations is Below Inter-Annual Variability.

As previously noted, eelgrass abundance in Drakes Estero exhibits a high degree of inter-annual variability, with eelgrass habitat doubling between 1991 and 2007. The existing populations of species dependent on eelgrass either are adapted to such inter-annual fluctuations or limited by this natural variability. The existing distribution of eelgrass related to shellfish aquaculture is described as up to one percent displacement (by oyster culture) and seven percent partially scarring (by boat transits) (NAS 2009), and as 8.5 linear miles in the DEIS. With such a range of natural variability, 100 percent change between 1991 and 2007, it is difficult to understand how maintaining the status quo, which occupies an area similar in scale to the underlying natural variability, can be characterized as significant. This inflation of environmental consequences is especially true in a setting where the health and distribution of eelgrass is robust throughout the bay, has been dramatically increasing over the last 20 years, and where no data are presented to suggest eelgrass abundance and distribution are limiting factors for any species in the Drakes Estero system.

Propeller damage to eelgrass is described in the DEIS and characterized as a long-term unavoidable impact. The DEIS does not acknowledge, however, that this mechanism of impact to eelgrass could be reduced or avoided. The propeller damage to eelgrass is assumed to continue to occur into the future, although it could be avoided by or minimized with operational

protocols. At most, the photo interpretation of propeller scarring represents a static snapshot of eelgrass distribution at one point in time, with no information presented as to the duration or persistence of these impacts. The DEIS's conclusion of long-term unavoidable impact fails to acknowledge that much of the areas identified in the photos recovers in a relatively short time-frame (weeks to months). Damage to eelgrass as evidenced in the aerial photos is predominantly surficial damage to eelgrass blades. The plant rhizome-root complex (which is within the sediment) remains intact and regrowth occurs rapidly. Damage to the sub-surface rhizomes and roots is unlikely given that such interactions would also cause significant damage to boat propellers and outboard motors.

The DEIS combines the mischaracterization of the duration of impacts (short-term versus long-term) and the extent of impacts (within the range of natural variability) and erroneously concludes shellfish aquaculture operations result in a long-term unavoidable impact. A more accurate characterization would acknowledge the short-term nature of eelgrass blade removal and present the photo-interpreted extent of the impacts in the context of the natural variability seen in Drakes Estero.

D. Managed Species Benefit from Varied Habitat and May Be Adversely Affected by the Elimination of Shellfish Habitat in Favor of Additional Eelgrass.

The DEIS fails to adequately analyze numerous federal and state managed species. For example, the Southern Distinct Population Segment Green Sturgeon, listed as Threatened under the ESA, is omitted from discussion in the DEIS while it is clearly identified in the species list provided by USFWS. These long-lived fish are primarily found in bays and estuaries during their marine residency and the nearby Sacramento River represents a core spawning population. Kelly et. al. (2007) found adults and subadults within San Francisco Bay foraging in water less than ten meters in depth. Undoubtedly, green sturgeon utilize a shallow water estuary like Drakes Estero for foraging and rearing. Moser and Lindley (2007) hypothesized that green sturgeon optimize their growth potential in summer by foraging in the relatively warm, saline waters of estuaries. Molluscs, such as clams, worms, crustaceans, and small fish, are primary prey resources (Adams et al. 2002). Telemetry studies in Willapa Bay, WA (Moser and Lindley 2007) and the San Francisco Bay estuary, CA (Kelly et al. 2007) indicate that green sturgeon utilize shallow waters and forage in channels and over mudflats. As a large species with adult reaching up to seven feet in length, channels and open areas are likely the primary areas for feeding and residency. Dense areas of eelgrass would be limiting to green sturgeon foraging opportunities. The current variety of habitat types including the open spaces created by shellfish aquaculture and associated activities would be more appropriately suited for green sturgeon and provide valuable prey resources. Conversely, eliminating this varied habitat could adversely affect the species, particularly given the recent natural proliferation of eelgrass in Drakes Estero. The DEIS must evaluate the impacts on green sturgeon of removing the farm and any other alternatives.

The DEIS erroneously assumes that a "natural state" (i.e., an estuary without the oyster farm) represents a beneficial impact to managed fish species. In the modern context where anthropogenic modifications are the dominant factors in the decline of managed species, simply allowing some aspects of an estuary to return to a "natural state" may not be enough to support populations which have declined due to habitat loss in the larger geographical context in which they reside. And in an estuary where other anthropogenic influences, such as stormwater runoff

and cattle ranching, are actually being counterbalanced by the filtration provided by the oyster farm in parts of the estuary, the removal of the oyster farm would likely have a negative overall impact on the estuary. In the case of the large variety of fish species, structural habitats like those provided by shellfish aquaculture are preferred or even essential as compared with eelgrass (especially in a setting where eelgrass is already readily abundant). Numerous restoration activities across the nation and internationally recognize the values provided by shellfish and include shellfish as a primary component of habitat features created, including projects along the West Coast, East Coast and Gulf region (Coen and Luckenbach 2000; Lotze et al. 2006).

Other ESA-listed species include pacific salmonids such as coho and steelhead. Juveniles and adults of these species utilize various types of habitat within estuaries. Chinook salmon and coho salmon utilize deep and shallow tidal channels, tidally-influenced freshwater creeks and sloughs, and streams and rivers that discharge to the bay. Pacific salmon adults are primarily piscivorous, feeding on small fish. Pacific salmon juvenile prey resources in the bay consist of invertebrates and small fishes. Eelgrass as well as shellfish aquaculture and associated gear provide cover and foraging opportunities for rearing juvenile salmonids (Phillips 1984; Barnhart et al. 1992; Dealteris 2004). The DEIS only recognizes eelgrass as providing feeding opportunities and sheltering from predators, while clearly the prey resources attached and associated with shellfish and shellfish gear provide similar resources. The presence of both of these habitat types establishes a more robust ecological setting than just one habitat type alone. The DEIS assumes more eelgrass would be better without taking into account there is no evidence eelgrass habitat is a limiting factor for these species. The DEIS must re-analyze this issue.

Northern anchovy and Pacific sardine, coastal pelagic species likely present in Drakes Estero and managed under the Magnuson-Stevens Act (MSA), utilize habitats such as deep and shallow tidal channels as well as structures such as piers and jetties. Prey resources of importance to northern anchovy and sardine include benthic copepods, crustaceans and diatoms. All of these prey resources are found in and amongst shellfish aquaculture and the diversity of these prey resources is increased by virtue of presence of shellfish aquaculture. The DEIS must recognize the consequences of removing this prey resource from Drakes Estero on anchovy and sardine.

Of the 83 species of groundfish managed under the MSA, 32 have life history stages associated with estuaries. *See* Attachment 1, Habitat Associations for Managed Groundfish Species as Reported by NMFS (1998). Groundfish utilize habitats such as sand, gravel, cobble, deep and shallow tidal channels, mudflats, kelp, eelgrass, rock reef areas and structures such as piers and jetties. Based on species descriptions prepared by NMFS (1998), of the 33 groundfish species associated with estuaries, most species have been identified as utilizing multiple habitat types as described in Attachment 1 with soft bottom habitats (sand and or mud) being used by the most species (20), followed by rocky reefs and/or pier and jetty (13), kelp (8), eelgrass (7), and gravel/cobble (3). The DEIS assumes that more eelgrass would represent a long-term beneficial impact to these managed species, while clearly a complex mosaic of habitat, like that which exists under the existing baseline condition (which includes shellfish aquaculture), provides the appropriate habitat types for a greater number of managed species. The conclusions reached in the DEIS on this issue are incorrect and must be revised.

E. The DEIS Does Not Present Evidence Indicating *Didemnum* Was Introduced By or Will Spread by Shellfish Aquaculture in Drakes Estero.

The DEIS suggests shellfish culture activities led to the introduction and continued threat of increased dispersal of the non-native tunicate *Didemnum.* However, *Didemnum* has established itself in numerous west coast estuaries both with and without shellfish aquaculture. No data support the assertion that the shellfish industry or existing shellfish aquaculture operations have caused the introduction of these tunicates. The DEIS suggests there is the risk of "smothering habitats and inhibiting normal biological functions in the benthic fauna" from the spread of *Didemnum,* but fails to acknowledge this species cannot grow on the sandy and muddy unconsolidated sediments that predominate in Drakes Estero (NAS 2009). Contrary to what is presented in the DEIS, the removal of hard substrate may encourage further colonization of eelgrass and reduce the ability to monitor and remove the existing tunicate populations (Shumway, pers. comm. 2011). Moreover, invasive species management generally requires a detailed knowledge of the locations of established or establishing populations and extensive labor hours for their physical removal. Operational protocols, in depth knowledge of the Estero, and labor resources are likely the best solution to the existing problem and its control. As sufficient data supporting the DEIS's conclusion on this issue does not exist, it must be revised.

F. Benthic Fauna Associated with Shellfish Aquaculture Gear Serves a Valuable Function as a Food Source.

The DEIS reports the relative abundance of certain benthic organisms was found to be lower directly beneath oyster rack than in nearby eelgrass habitat. This decreased abundance is suggested to be due to exposure to increased predation by fish and lack of eelgrass cover. The DEIS uses this information to substantiate its conclusion that shellfish aquaculture would have negative effects on benthic fauna. It is at best misguided to conclude a situation which allows predators (fish) to feed on their prey (benthic infauna) is somehow a negative consequence to prey species without at the same time recognizing the same effect as a beneficial effect to the predatory species. Yet the DEIS does this. Similarly, the negative characterization of disturbance of benthic organisms associated with oyster bag maintenance fails to recognize the disturbed organisms either become prey and serve a valuable function as a food resource or are reduced and consumed in the detrital-microbial food web. For the benthic faunal species in question (i.e., those influenced by shellfish aquaculture activities), it is important to recognize their trophic role as prey resources, their rapid re-colonization rates, and overall high abundance in Drakes Estero. Because of these factors, the effects from shellfish aquaculture would be more accurately characterized as minimal and even beneficial to the species utilizing the benthic fauna as a prey resource. The DEIS must be revised to reflect this conclusion.

G. Existing Data Do Not Support the Conclusion Harbor Seals Are Significantly and Adversely Affected by Existing Aquaculture Operations in Drakes Estero.

The data collected and reviewed to date do not establish a causal relationship or even a correlation between harbor seal populations and existing shellfish aquaculture operations. However, the DEIS relies on this limited data and proffers statistical analyses stretched to their limit to support the conclusion of negative effects from DBOC operations. Moreover, the DEIS selectively excludes information on a variety of settings where harbor seals and anthropogenic activities such as shellfish aquaculture co-exist without detriment to seal populations (Jeffries

2010). Despite the NAS conclusion that "it would be challenging to design a study that could demonstrate whether or not short-term responses to disturbance have long-term population consequences for harbor seals, and no studies of this kind have yet been conducted anywhere," the DEIS attempts to reach such conclusions without suitable studies. This over-interpretation of the data in the DEIS is also affirmed by the 2011 Marine Mammal Commission (MMC) report, which, while recognizing that El Niño southern oscillation events, a 2003 elephant seal event, annual oyster harvest, and loss of a subsite *may* have influenced the distribution of seals between Drakes Estero and neighboring colonies, concludes that "the data and analyses are not sufficient to demonstrate a causal relationship" (MMC 2011). The conclusions reached by the DEIS on the issue of harbor seal disturbance are not adequately supported by evidence and must be revised.

IV. THE DEIS FAILS TO DEFINE THE PROPOSED ACTION AND ALTERNATIVES BASED ON BIOMASS RESTRICTIONS ARE UNREASONABLE.

The proposed action is never defined in the DEIS, although the proposed action is required to be defined under Department of Interior NEPA regulations. 43 CFR § 46.30. In a situation involving an application submitted by a private party for a permit, approval or other entitlement, the proposed action is defined by the applicant. Here, the proposed action is described by Drakes Bay Oyster Company in its scoping comment letter, dated November 24, 2010, and should be included in the DEIS.

After the proposed action is defined, alternatives to the proposed action must be established. The alternatives section is "the heart of the environmental impact statement." 40 C.F.R. §1502.14. This section is required to rigorously explore and objectively evaluate all reasonable alternatives to the proposed action. 40 C.F.R. §1502.14(b). Reasonable alternatives are those that meet the purpose and need of the proposed action. 43 CFR § 46.415(b). The DEIS presents four alternatives, the no-action alternative and three action alternatives. However, as the proposed action is never defined, it is not clear whether any of these alternatives meet the purpose and need of the proposed action. The DEIS must include such an analysis.

Production rates are not indicative of the environmental consequences of operating a shellfish farm. Notwithstanding whether production rates are high or low in any given year, efforts expended on raising the crop remain the same. That is, the same amount of gear will be used, the same amount of boat trips will be made, and the same amount of acreage will be farmed. Alternatives should be designed to avoid and mitigate the potential environmental consequences of a proposed action. The alternatives presented in the DEIS fail to do that.

Moreover, the three action alternatives are not reasonable because they impose production limits on the farm. Although Drakes Bay Oyster Company can provide historical production figures for the farm, it cannot predict what its production will be in any given year. There are numerous variables over which the company has no control, such as seed availability, disease, ocean acidification, weather conditions and natural disasters. While one year may yield a bumper crop, the next may make not yield enough product to result in a profit. The company needs the flexibility to have good production years to offset poor production years to remain viable as a business. Further, if Drakes Bay Oyster Company has to manage its farm to ensure it does not exceed production limits, it would necessarily have to seed the farm to under capacity.

Such a practice, however, may instead cause financial duress in a year where a crop does not fare well. The alternatives must be revised to eliminate production limits on the farm.

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Any one of the above-identified deficiencies render the DEIS inadequate under NEPA. Cumulatively considered, these deficiencies raise the question whether the DEIS's conclusions were carefully constructed to support a pre-determined outcome. The DEIS does not engage in a full and fair discussion of the environmental consequences of either continuing existing shellfish aquaculture operations in Drakes Estero or removing the existing Drakes Bay Oyster Company farm. It selectively cites evidence supporting conclusions that continuing shellfish aquaculture operations will have adverse environmental consequences, while ignoring or dismissing contradictory evidence. The DEIS does not comport with NEPA's standards, and does not reflect well on the National Park Service. The National Park Service must address the DEIS's legal and scientific deficiencies.

In light of the deficiencies identified in these comments, the DEIS must be revised to analyze potential environmental consequences against a baseline of existing conditions, include the evidence cited in this comment letter, and reach scientifically-supported conclusions. The DEIS must subsequently be recirculated. Thank you for your consideration of these comments.

Sincerely,

Plauché & Stock, LLP

By: _____
Laura C. Kisielius

CONFLUENCE ENVIRONMENTAL COMPANY

By: _____
Chris Cziesla

ATTACHMENT 1

Habitat Associations for Managed Groundfish Species as Reported by NMFS (1998)

Groundfish Species	Soft Bottom (Sand or Mud) (20)	Hard Structure (Rocky reef or piers/jetties) (13)	Gravel/ Cobble (5)	Kelp (8)	Eelgrass (7)
Leopard Shark	X	X		X	
Soupfin Shark	X				
Spiny Dogfish					
Big Skate	X				
California Skate	X				
Ratfish		X	X		
Lingcod		X			X
Cabezon		X		X	X (secondary)
Kelp Greenling	X	X		X	
Pacific Cod	X		X		
Pacific Whiting (Hake)					
Sablefish	X				
Jack Mackerel		X			
Black Rockfish		X		X	X (juvenile)
Blue Rockfish		X		X	
Bocaccio				X	X
Brown Rockfish	X	X		X	X (juvenile)

Groundfish Species	Soft Bottom (Sand or Mud) (20)	Hard Structure (Rocky reef or piers/jetties) (13)	Gravel/ Cobble (5)	Kelp (8)	Eelgrass (7)
Copper Rockfish	X	X		X	
Quillback Rockfish	X	X			X (juvenile)
Grass Rockfish					
Redstripe Rockfish		X			
Vermilion Rockfish					
Yellowtail Rockfish	X	X	X		
Butter Sole	X				
Dover Sole	X				
English Sole	X				X (secondary)
Pacific Sanddab	X				
Petrale Sole	X				
Rex Sole	X				
Rock Sole	X		X		
Sand Sole	X				
Starry Flounder	X		X		

ATTACHMENT 2

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STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY EDMUND G BROWN, JR , GOVERNOR

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105- 2219
VOICE AND TDD (415) 904- 5200
FAX (415) 904- 5400

December 12, 2011

Melanie Gunn
Public Outreach Coordinator
Point Reyes National Seashore
1 Bear Valley Rd.
Point Reyes Station, CA 94956

RE: **Comments on the Draft Environmental Impact Statement for the Drakes Bay Oyster Company Special Use Permit**

Dear Ms. Gunn:

Thank you for the opportunity to provide input on the Draft Environmental Impact Statement (EIS) for the Drakes Bay Oyster Company (DBOC) Special Use Permit. DBOC's proposal to obtain a new Special Use Permit to carry out 10-years of aquaculture operations within Drakes Estero beginning on November 30, 2012, will require a coastal development permit and certification from the Coastal Commission under the federal Coastal Zone Management Act that the operations will be carried out consistent with California's certified Coastal Management Program (CCMP). As such, the Coastal Commission (Commission) will use information contained in the EIS (as well as DBOC's pending coastal development permit application materials and consistency certification) in its evaluation of the project's conformity with the resource protection and use policies of the CCMP.

Thank you for your consideration of the following comments.

General Comments

1. *Project Description:* The EIS does not describe clearly DBOC's proposed project. Please describe in detail DBOC's proposed activities including level of operation/production; the species that would be cultivated; the number and size of cultivation areas; the type and scale of any proposed modifications to onshore facilities and operations; etc.

2. *Mitigation Measures:* Chapter four of the EIS, Environmental Consequences, describes a variety of adverse impacts to the natural resources of Drakes Estero that are anticipated to occur as a result of the proposed aquaculture operation. Please consider including in the EIS a discussion of relevant terms and conditions that could be added to the new Special Use Permit (SUP) to help avoid, minimize, and/or mitigate each of these adverse impacts.

Specific Comments

3. *Executive Summary (page iii):* Please describe in detail the "National Park Service authorized onshore and offshore operational requirements" noted at the conclusion of the first paragraph.

4. *Executive Summary (page iii):* Please provide additional details about the substance of the "request for the issuance of a new permit" referenced in the final sentence of the second paragraph - see General Comment 1 above. Please include the request and any supporting documents submitted with it as an appendix to the EIS and describe how this request relates to each of the action alternatives discussed in the EIS.

5. *Table ES-2 (page xiii):* The discussion of the "Vegetation" impact topic does not describe whether or not the proposed project involves the continued use and maintenance of the leach-field and leach-field pipeline near the onshore DBOC facility. Please discuss if the proposed 10-year SUP for DBOC would affect this infrastructure and the potential for the use and maintenance of the leach-field to result in adverse impacts on terrestrial vegetation.

6. *Table ES-2 (page xvi):* Regarding the discussion included in the "Archeological Resources" impact topic, please note whether or not a consultation with the Federated Indians of Graton Rancheria was carried out during development of the EIS. In addition, please provide additional information about the protection that would be provided to the archeological site near the onshore facility by excluding this area from the SUP boundary. This proposed measure appears to be limited to a change in the designation of the site that may not adequately address the potential disturbance of sensitive archeological resources that may occur as a result of the proximity of the DBOC facility residences and commercial operations to the site. The EIS notes that in the worst case, disturbance could take the form of digging or looting. Such activities may result in a permanent loss or destruction of archeological resources that may warrant further consideration as a potentially significant impact. Additional information about the current status of the site and whether or not disturbance has been known to occur in the past due to the development of informal trails across the site, digging, increased erosion, and/or looting activities may also benefit the analysis of this issue.

7. *Executive Summary (page xxiv):* Regarding the vessel transit plan described in the first bullet point on this page, please clarify if adherence to this plan would be a requirement of the proposed new 10-year SUP. In addition, please also describe any proposed techniques that would be used to facilitate compliance with this vessel transit plan (such as the use of markers in Drakes Estero, GPS devices on vessels, mooring buoys, etc.).

8. *Executive Summary (page xxiv):* Regarding the proposed repair and replacement of five percent of existing rack structures per year discussed in bullet number seven, please clarify whether or not such activities would be authorized under the proposed new SUP. Please also describe the proposed method of these repair and replacement activities, the proposed materials to be used, the timing and location of such repairs, as well as any potential adverse impacts to coastal and/or marine resources that may occur as a result of these activities and the protocols and protections that would be in place to avoid, minimize, and or mitigate for such impacts. In addition, please provide a more detailed description of the proportion of racks in Drakes Estero

that are currently in use compared to those that are in need of repair and/or replacement and the approximate area represented by five percent of existing racks.

9. *Executive Summary (page xxiv):* Regarding the proposed one-time dredging event at the main dock described in bullet number eight, please include additional information about the protocols, methodology, and equipment that would be used for this work as well as any protective measures that would be in place to reduce potential adverse effects on water quality and marine biological resources during dredging.

10. *Executive Summary (page xxiv):* Regarding the proposed removal of all DBOC property and equipment at the termination of the SUP term, please clarify if such removal activities would be authorized by the new SUP or would be subject to additional review and approval by NPS.

11. *Executive Summary Figures ES-7, ES-9, and ES-11:* Please note that under the terms and conditions of the current SUP, the DBOC boat travel route shown in the lateral channel is only authorized to be used outside the March 1 to June 30 harbor seal pupping season.

12. *Executive Summary (page xxxi):* Please provide additional information about the tiered planning process that is described for the approval/compliance of future development proposed under Alternative D. Specifically, please describe whether or not an additional SUP or other approval would be required for DBOC to carry out these activities. In addition, please describe the process that would be used to evaluate, guide, and regulate the proposed removal activities.

13. *Table 2-5 (page xxxviii):* Regarding the proposed installation of a gate to "limit recreational access to Drakes Estero during harbor seal pupping season," please clarify that additional review and approval of this proposed activity would be required by all relevant agencies, including the Commission.

14. *Chapter 1 (page 1):* Paragraph two notes that "in the event that a new SUP is issued, it would incorporate all of DBOC's National Park Service (NPS) authorized onshore and offshore operational requirements." Please describe each of these requirements as it relates to the various alternatives and adverse impacts discussed in the EIS.

15. *Chapter 1 (page 2):* The final sentence of the third paragraph notes that for some alternatives and some issues, information and plans are not sufficiently available to carry out more than a conceptual level of impact analysis. Please provide additional information on the specific issues and alternatives that have been limited to only this conceptual level of analysis.

16. *Chapter 1 (page 8):* Regarding the proposed inclusion of "certain provisions of the state water bottom lease directly in the new SUP," please specify all particular provisions of the state lease that are proposed to be carried over into the SUP in this way.

17. *Chapter 1 (page 21):* Please include in the first paragraph on this page additional information about the fact that while the Manila clams were moved out of the harbor seal protection area, they currently remain within Lease 438-01.

18. *Chapter 1 (page 32):* Given the proximity of a known archeological site to the DBOC onshore facility, please revise this section to *require* the use of a qualified archeologist or approved Native American monitor during ground disturbing activities on the onshore portion of the project site.

19. *Chapter 1 (page 32):* Regarding the discussion of ethnographic resources and sacred sites, please clarify the position of the Federated Indians of the Graton Rancheria regarding these resources and the apparent lack of proposed protective measures for the archeological site near the onshore facility. Based on the discussion included in this section, it appears that the Graton Rancheria has expressed concern over the issuance of a new SUP and the continuance of a commercial operation in close proximity to a known archeological site. Please explain the apparent conflict between these concerns and the conclusion of this section which dismisses this impact topic from further consideration and analysis.

20. *Chapter 1 (page 41):* Please include the following specific modifications for the first and second paragraphs on page 41 (suggested additions are noted by underline and deletions are noted by ~~strikethrough~~): "The CZMA provides states with the ability to review federal activities and federally permitted activities, and ensure that such activities are consistent, to the maximum extent practicable, with their coastal zone management plans. The processes used to implement this requirement ~~is~~ are called 'consistency determinations' and 'consistency certifications.' … NOAA also directed NPS not to issue an SUP until CCC concurs with the consistency certification ~~determination~~."

21. *Chapter 1 (page 47):* Please clarify whether or not any additional protective measures or conditions would be included in the proposed SUP as a result of the NAS report and analysis summarized in this section.

22. *Chapter 2 (page 57):* Please describe the specific request submitted by DBOC as part of its new 10-year SUP application and clarify which of the proposed alternatives reflect this request.

23. *Chapter 2 (page 92):* Please revise the first sentence of the third paragraph of this section to note that NPS may only authorize DBOC's proposed use of tidal and subtidal lands within Drakes Estero once the Commission has concurred that the proposed activity is consistent with the California Coastal Management Program.

24. *Chapter 2 (page 94):* As previously noted in comment number 10 regarding proposed repairs to existing racks, please provide additional information regarding the proposed method of these repair and replacement activities, the proposed materials to be used, the timing and location of such repairs, as well as any potential adverse impacts to coastal and/or marine resources that may occur as a result of these activities and the protocols and protections that would be in place to avoid, minimize, and or mitigate for such impacts.

25. *Chapter 2 (page 94):* Regarding the proposed vessel transit plan and revised water quality sampling protocols, please clarify if these would be required terms and conditions of the proposed new 10-year SUP. In addition, please describe and evaluate the current vessel transit

plan required as section 3.2.5 of Commission Consent Cease-and-Desist Order No. CCC-07-CD-11 and discuss any modifications that may be proposed to help ensure and facilitate compliance.

26. *Chapter 2 (page 96):* Regarding the "detailed operation and maintenance plan for currently unpermitted activities" described in the second paragraph of this section, please describe each of the unpermitted activities referenced here and consider whether or not a completed version of such a plan would be more appropriately included within and evaluated in the EIS.

27. *Chapter 2 (page 106):* As described, aspects of Alternative D would require additional review and authorization by NPS. Please describe the proposed process and mechanism that would be used for these reviews and authorizations.

28. *Chapter 2 (page 106):* Please clarify whether or not the proposed expansion of the SUP permit area would result in the development of additional growing/cultivation areas by DBOC or if the growing areas under this proposal would be limited by the SUP to previously existing aquaculture beds.

29. *Chapter 3 (page 175):* Please include a citation for the reference to Olympia oysters as a designated special status species.

30. *Chapter 3 (page 176):* Please specify whether or not DBOC currently makes use of triploids or clutchless juveniles for its clam and/or oyster stocks.

31. *Chapter 3 (page 175-176):* Please include an evaluation of the potential effect of sea surface temperature rise on the ability of cultivated oyster and clam species to become naturalized in Drakes Estero.

32. *Chapter 3 (page 188):* Please describe whether or not red-legged frog surveys have been carried out at the DBOC onshore facility site, specifically in and around the pond area.

33. *Chapter 4 (page 250):* Please clarify whether or not accumulated oyster shell debris would be removed from beneath aquaculture racks during decommissioning.

34. *Chapter 4 (page 253):* Please describe any best management practices, protection protocols, and/or mitigation measures that would be required during proposed dredging activities as well as the potential for these measures to prevent or minimize adverse impacts to water quality and marine resources that may occur as a result of dredging.

35. *Chapter 4 (page 254):* Recent events have suggested that fugitive aquaculture materials may be accumulating in Drakes Estero and surrounding areas as marine debris. Please evaluate this potential adverse impact to wetland resources in this section of the EIS.

36. *Chapter 4 (page 259):* Please specify whether or not the elevated production levels considered in Alternative D would require the use of additional aquaculture beds beyond the 22 acres of annual use assumed for Alternative B and C. If additional acreage would be required,

please describe the amount of this additional acreage as well as the likely location of new and/or expanded aquaculture beds that may be also be required.

37. *Chapter 4 (pages 249-259):* Please describe the size of the current buffer distance that is present between existing onshore facilities and structures and onshore wetlands such as the pond area.

38. *Chapter 4 (page 263):* Regarding the re-colonization of benthic habitat by eelgrass upon removal of the rack structures, please acknowledge the presence of accumulated oyster shell debris beneath rack structures and the potential for this shell material to serve as a potential impediment to eelgrass re-colonization.

39. *Chapter 4 (page 272):* Please include an estimate or assessment of the actual level of anticipated increase in vessel traffic and vessel use of Drakes Estero (number and duration of trips) associated with the increased production levels proposed in Alternative D.

40. *Chapter 4 (pages 260-272):* Regarding the adverse impacts to eelgrass that are anticipated to result from the proposed action alternatives, please describe the level of expected reduction in these impacts that would result from the development and enforcement of the proposed vessel management plan.

41. *Chapter 4 (page 277):* Please provide additional information regarding the potential effect of bottom bag culture on sediment chemistry and any influence that this may have on the suitability of that sediment to support native fauna.

42. *Chapter 4 (page 278):* Regarding naturalization of cultivated non-native shellfish species, please include an evaluation or discussion of the potential effects of sea surface temperature rise and climate change related alterations to oceanic conditions that may affect the ability of cultivated clam and oyster species to form self-supporting populations within Drakes Estero and surrounding areas.

43. *Chapter 4 (page 279):* Regarding purple-hinged rock scallops, please include additional information about DBOC's proposed cultivation method, location, production numbers, and harvest/planting/maintenance activities as well as a more comprehensive evaluation of the potential resource impacts associated with this proposal.

44. *Chapter 4 (page 281):* Please estimate the proposed acreage of bottom bags and racks that would be required to achieve an annual production level of 600,000 pounds as well as the estimated production acreage used in 2008, and the anticipated difference in acreage required to achieve the production levels described in Alternatives B-D.

45. *Chapter 4 (page 298):* Please describe and evaluate the seasonal and area harbor seal protection strategies included in the current SUP and whether or not modification or amendment to these strategies may be warranted to help ensure/facilitate compliance and protection of harbor seals and sensitive harbor seal habitat areas.

46. *Chapter 4 (page 302):* Please provide an estimate of the level of increased boat traffic that would result from the increased production levels proposed in Alternatives B-D. Specifically, please include the number of additional boat trips that would be required as well as any increase in the duration of these trips and corresponding aquaculture maintenance and harvest activities.

47. *Chapter 4 (pages 294-303):* Please evaluate the potential adverse impact to marine mammals in Drakes Estero associated with the release and accumulation of fugitive aquaculture materials and plastic marine debris.

48. *Chapter 4 (page 309):* Various sections in this chapter provide conflicting estimates for the number of acres used for bottom bag culture on an annual basis. These estimates appear to range from 84 to 89. Please clarify which of these numbers is the most accurate.

49. *Chapter 4 (page 317):* Please specify if and when surveys for Coho salmon have been carried out in Drakes Estero.

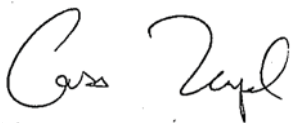
50. *Chapter 4 (page 318-319):* Please specify if and when surveys for western snowy plover and California least tern have been carried out in Drakes Estero.

51. *Chapter 4 (page 332):* Please include an evaluation of the recent storm event and flooding that occurred at the DBOC onshore facility in April of 2010 and any bearing that this event may have on the question of the susceptibility of this area to such events in the future.

52. *Chapter 4 (page 345):* Please provide additional information about the characterization of plankton removal from the waters of Drakes Estero as a water quality benefit. Please specify whether or not phytoplankton levels and accumulation has been recognized or designated as a water quality issue or concern in Drakes Estero.

Thank you for your consideration of these comments. Please feel free to contact me at 415-904-5502 if you have any questions.

Sincerely,



CASSIDY TEUFEL
Environmental Scientist
Energy, Ocean Resources and Federal Consistency Division

CORRESPONDENCE ID: 52031

DEC 0 9 2011

Kenneth J. Fox

[redacted]

RECEIVED
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POINT REYES NS

Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956
C/O PRNS Superintendent

RE: Draft EIS DBOC SUP

To Whom It May Concern:

I support a renewable Special Use Permit for Drakes Bay Oyster Company and the Collaborative Management Alternative proposed by Drakes Bay Oyster Company.

DBOC should be allowed to continue the existing uses under the existing California Department of Fish and Game leases and regulatory authority. The National Park Service lease that is being considered here is outside of the proposed wilderness area as well as the currently designated wilderness. As such, it is patently unfair for the park service to leverage its authority, especially considering the lack of evidence of the environmental damage from the aquaculture operations that the park service has been claiming.
(It would actually be more logical to reconsider the lease extension within the DFG lease timelines.)

The dEIS's claim that removing the oyster farm would benefit harbor seals is conjecture and not supported by the facts. Furthermore, the dEIS alludes to impacts on endangered species that clearly will not and could not be adversely affected by the aquaculture operations. This indicates that the dEIS is biased and therefore suspect on its face. The final document should reconsider all wildlife issues and provide a data based assessment instead of the loosely mentioned "potentials" that are clearly based on a prejudiced position.

Importantly, the dEIS fails to provide a "No Change" alternative as required by law. While the NEPA process mandates the consideration of a "no-action alternative," there are no alternatives presented in the dEIS that qualify as "no-action." The current set of "alternatives" is insufficient. This needs to be corrected.

Impact of replacing a local food source of roughly 35,000 pounds of oysters by similar amounts imported from Asia each week to compensate should be evaluated. A comparison of the carbon footprint of the existing food source with the replacement food source must be analyzed in the final EIS.

The dEIS does not analyze the impacts of eliminating one of the largest employers in West Marin. The socioeconomic impacts are not properly addressed, nor is the historic importance. The final document must assess and address the economic impacts of eliminating the production of nearly 40% of California's oysters and the subsequent impact on the economy.

Impacts of shutting down the DBOC to local and nearby habitat restoration efforts and endangered species are not addressed,

> e.g.: The oyster shell byproduct from the Drakes Bay Oyster Farm cannery is the sole, critical resource for reestablishing native oyster beds and for restoring CA Least Tern and Western Snowy Plover habitat in San Francisco Bay. The California Least Tern is a U.S. federally listed endangered species and Snowy Plover is in decline due to habitat loss. If Drakes Bay Oyster farm were shut down, these restoration operations could be threatened.

The EIS must address this oversight and the importance of these restoration efforts included.

The current General Management Plan for Point Reyes National Seashore, adopted in 1980, strongly supports the continued operation of the oyster farm, as do all of the relevant Marin County planning documents. The d EIS does not include any justification for, or discussion of ignoring the existing General Management Plan and Local Coastal Program.

Thank you for addressing these concerns. Sincerely,

Kenneth J Fox

Dec 9-2014

Dear Superintnedent Muldoon,

In support of Wilderness;

I have been living in West Marin for over 40yrs. I walk about five hundred miles a year on park trails. What enamors me the most about Point Reyes National Park is the raw and uncluttered beauty of the lands. Drakes Estero and the lands that contain it are some of the most Powerful and wild coastal waters I have ever witnessed. There are few places on the west coast quite like it. What makes places FEEL wild is the lack of human presence on the land and waters.
I urge you to support Alternative A- no action that will help restore Drakes Estero to its wilder state. Do it for our grandchildren who may visit wild lands without having the option to go shopping while they are doing so.
I love to eat oysters but I love to be able to witness a coastal sanctuary more. I do not think they can co-exist.

Sincerely,
Terry Nordbye
Inverness

Terry Nordbye

Sorry for late response - been out of towne!
Terry

on mailroom Console 5pm Dec 9 - put under ~~door~~ Supt door for processing on Monday -
B-9/14

CORRESPONDENCE ID: 52033

DEC 09 2011
RECEIVED
2011 DEC 12 PM 1:08
POINT REYES NS

My Internet was not working so I am hand delivering this at 11:55 pm

Thank You,

Marj Stone
[redacted]

December 8, 2011

Point Reyes National Park
Point Reyes Station, CA 94956

Dear National Park Staff,

I have waited many months to write to you regarding the future of the Drakes Bay Oyster Company, mainly because I wished to avail myself of as much information as possible before giving you my opinion. I only wish that the National Park Service had availed its self to our community with all its information at an open meeting. I think that would have given me a truer picture.

After going through much information I must return to my original premies that the DBOC should stay for all of us including the wildlife which makes it their home.

I have lived in Inverness since 1963...The Johnson Oyster Company although they were not always the best stewards of good housing for their many workers, brought about a substainable food source to an area that was prone to silting etc..,the oysters as you know help keep the water clean. From that time (almost 50 years) these little vacume cleaners seem no more than nature its self responsible for the changes in the wildlife which surrounds and lives within the oyster farm area. If anything they have contributated to the health of that bay beside providing a food which requires no pesticides, no antibiatics, no cloning, relatively little processed resouces, etc.. Plus their shells also have uses without much conversion. Certainly there are changes everywhere during a fifty year period but I as many others who have lived in this area have not seen any huge changes there other than a huge infestation of elk (which is another story).

The Drakes Bay Oyster Company has been very good stewards of the farm, not only to the buildings which house both the many workers and the oyster operations, but also to the surounding grounds and entry road. They also provide information about the oyster operation to all who ask including groups of school children learning about the souces of food. Kevin Lunney and his family have cetainly been more cognizent regarding how the operation effects the wildlife particularly having grown up on an adjcent ranch. No one that I know of that has been priviledged to the DBOC operation can say they have done a poor job of farming within a very senstive area. If one thinks about this, all the other farming operations could be considered within the sensitivety of the Park

I was very fortunate to be one of the founding members of the Environmental Action Committee of West Marin (EAC). At that time we were very concerned about the whole West Marin Area from the Pt. Reyes National Recreation Area, to the Marin County Wide Plan, the Williamson Act, the possible increase of One Hundred Fifty Thousand people on the Marshall side of Tomales Bay, the proposed 4 lane hiway from east to wast Marin, the strip development between all of our west Marin villages, the possible large developments of farmlands, and a number of other projects which would

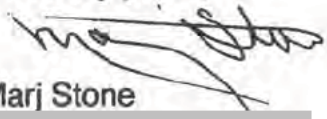
really have changed the beautifull caricature of West Marin.

The EAC felt that one of the most important ways to save this caricature was to preserve the family farms in their habitat not only from deveolpment but also within the PT. R. N. R. A.. The Oyster farm was a farm as it produced food. Under the title of Recreation Area the Oyster farm would become a marina, with resturant, etc.. (so much for the poor sea mammels). Luckly we were in part, a help to push for the change from Recreation Area to Park status, thus eliminating the rape of the oyster farm. The EAC in earlier times was focused on the whole of West Marin. Because of the worlds growing population and our closeness to large large populated areas, we felt a keen sense of responsibility to keep this rural caricature so that people that came to visit could experience its special qualities.

By the way, when the EAC looked at the Park's area plan we were at a loss to find more than six thousand acres that officially would qualify for a Wilderness Area. Please Park Officials, take a look at Emma Marris's take on the return to nature.

Thank you for giving me this opportunity to express my concerns.

Sincerely yours,



Marj Stone

[redacted]

P.S. I have not been a member of the EAC for a number of years.

copies to:
West Marin Citizen
Point Reyes Light

SSL
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LLP

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business@sslawfirm.com

December 9, 2011

VIA FIRST CLASS MAIL

Draft EIS DBOC SUP c/o Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: SSL Law Firm's Comments on the National Park Service Draft Environmental Impact Statement for Special Use Permit

Dear Superintendent Muldoon:

The SSL Law Firm ("SSL") takes this opportunity to comment on the National Park Service ("NPS" or "Service") Draft Environmental Impact Statement ("DEIS") reviewing the Drakes Bay Oyster Company's ("DBOC") request for issuance of a Special Use Permit ("SUP") to continue to use the land and facilities it has long used within the Point Reyes National Seashore ("PRNS" or the "Seashore").

We are most concerned with the Service's insistence upon compliance with the National Environmental Protection Act ("NEPA") and the Service's preparation of this DEIS in light of the clear direction that Congress provided to the NPS with regard to this SUP. By adopting Section 124 of Public Law 111-88 ("Section 124"), Congress clearly instructed the Service to grant the SUP "notwithstanding any other provision of law." The plain language of this catch-all phrase can only be interpreted to mean that the Service must issue the SUP, despite other laws, like NEPA, which may have otherwise affected the Service's issuance of the SUP.

The Supreme Court has explained that "the use of such a 'notwithstanding' clause clearly signals the drafter's intention that the provisions of the 'notwithstanding' section override conflicting provisions of any other section. Likewise, the Courts of Appeal generally have interpreted similar 'notwithstanding' language . . . to supersede all other laws, stating that a clearer statement is difficult to imagine." *Cisneros v. Alpine Ridge Group*, 508 U.S. 10, 18 (1993) (internal citations and quotations omitted).

In the environmental context, the phrase "notwithstanding any other provision of law" has been interpreted to mean that the agency need not comply with otherwise applicable environmental laws. *Oregon Natural Resources Council v. Thomas* 92 F.3d 792, 796 (9th Cir. 1996). The court explained, "'notwithstanding any other law'" is best interpreted as requiring the disregard only of environmental laws . . . ." In that case, the court ultimately rejected a claim of violation of the National Forest Management Act because the proposed federal action complied with the Congressional directive specifying that the action was "notwithstanding any other provision of law". *See also Consejo De Desarrollo Economico De Mexicali, A.C. v.*

United States, 482 F.3d 1157, 1169 (9th Cir. 2007) (NEPA challenge moot where federal action taken without NEPA review was permitted by the inclusion of "notwithstanding any other provision of law" in the enabling legislation).

The Service's insistence upon applying the provisions of another law—here, NEPA—violates the fundamental tenet of statutory interpretation, in which statutes "should be read to give effect, if possible, to every clause." *Heckler v. Chaney*, 470 U.S. 821, 829 (1985). NPS cannot simply ignore the plain language of the Congressional directive set forth in Section 124.

Because Section 124 requires the Service to grant the SUP "notwithstanding any other provision of law," the Service need not have, and indeed, should not have, conducted NEPA review or prepared this DEIS. Section 124 directs the Service to issue an SUP "with the same terms and conditions as the existing authorization, except as provided herein, for a period of 10 years from November 30, 2012." Nothing in Section 124 sanctions NEPA review.

NEPA requires the preparation of EIS documents so that the decisionmaking agency can adjust its ultimate action pursuant to the analysis, public input, and documentation created by the EIS process. *See, e.g.*, 40 C.F.R. 1502.5 ("The statement shall be prepared early enough so that it can serve practically as an important contribution to the decisionmaking process and will not be used to rationalize or justify decisions already made"); DO-12 Handbook at 4 ("all analysis, public input, and documentation must be completed in time to be a useful part of decision-making").

This iterative process has no role where, as here, Congress has directed the agency to take certain defined action "notwithstanding any other provision of law." In other words, because the Service's authority is defined by Congress, it lacks the discretion to disregard the Section 124 Congressional mandate. Therefore, NEPA review serves no purpose: even if the Service were to uncover changes it wanted to make to the proposed action, such changes would contravene Congress' directive for the Secretary to exercise his discretion to issue or deny a SUP "with the same terms and conditions as the existing authorization."

The NPS rightfully acknowledges that Section 124 is "notwithstanding any other provision of law," yet nonetheless enigmatically states, "although the Secretary's authority under section 124 is 'notwithstanding any other provisions of law,' the Department has determined that it is appropriate to prepare and EIS and otherwise follow the procedures of NEPA, as amended." DEIS at 21. The DEIS does not explain how or why the Department made such a determination in clear violation of Congress' directive. In any event, the Service's determination cannot stand because it is premised on the Service's (nonexistent) ability to override Section 124.

The Service's erroneous election to conduct NEPA review also needlessly puts the agency between a rock and a hard place. If, during the course of NEPA review, NPS selects a course of action other than issuing the SUP "with the same terms and conditions as the existing authorization," and that decision is based on a source of information other than the 2009 "National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore" (Section 124), then arguably NPS will violate Section 124. On the other hand, to the extent that NPS conducts NEPA review but ignores the results of its analysis, and agency and public comments, then NEPA would be violated and millions of dollars wasted.

The DEIS bears out this conflict. For instance, the Service has failed to include the kind of clear, definitive mitigation measures that would satisfy NEPA. To the extent that the Service intends to require mitigation that would modify the terms of the existing authorization, it lacks the authority to do so under Section 124 unless that those mitigation measures were based on the National Academy of Sciences Report.

Congress specified that the Service issue an SUP "notwithstanding any other provision of law." The only reasonable interpretation of this mandate was that the Service need not conduct environmental review. This EIS serves no point and should not have been prepared.

Thank you for this opportunity to submit these comments, and your attention to this important issue. Please feel free to contact us if you have any questions.

Very truly yours,

SSL LAW FIRM, LLP

Corinne I. Calfee

Comment on Draft Environmental Impact Statement, Drakes Bay Oyster Company Special Use Permit of September 2011

Melanie Gunn, Public Outreach Coordinator
Point Reyes National Seashore
1 Bear Valley Road,
Point Reyes Station, CA 94956

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Wilderness is mostly an idea.

There is no gold standard of nature to which we can return, no pristine state to which we can point and state with certainty, "then it was wild". It may be difficult to define as a thing, yet no matter how it is defined, as a society we recognize it and know its value. Wilderness holds an important place for humanity as a counterbalance to the world of culture; it is a place where nature is allowed to run her course without intervention on behalf of pre-ordained outcomes; it is a place where we can gain perspective of and unwind from the pressures of daily life; it is a place where we can undertake adventures using our bodies or human-powered vessels, learning about our own limits, and stretching them, and it is a place where we experience the natural and soothing soundscape of nature. Wilderness offers a place that is not human-centered, one which firmly places us in the heart of life on this planet, remembering for some stretch of time that we occupy a home of interlocking species, that despite our ability to dominate and extract, we sometimes choose not to.

But we are indeed a part of nature; human hands have interacted with these Bay Area lands for tens of thousands of years. To glorify a "pristine" nature

ignores that past and at our peril threatens to keep us apart from the land we hope to protect. Using land, working with it as stewards, finding gentle ways to harvest with least harm, these are goods we should encourage whole-heartedly. I am not against using the land as a part of a balanced approach to conservation. But in this case I hold out for a higher value. I hold out for wilderness.

I have nothing against mariculture, if practiced on a scale commensurate with the surrounding environment. If Drakes Bay had not been slated to become wilderness, then I might support the Drakes Bay Oyster Company's continued cultivation of oysters in the estero—if they had proved or could prove to be good stewards. In this case, the oyster enterprise claims to be that good steward, but all I have to go on is the public record, which in opposition to that idea shows multiple violations of their legal agreements, documented on many levels, all of which display disregard for the environment as well as the agencies meant to safeguard it. To allow them another ten years in this fragile place when they have proven that they do not respect the agreements they have made is a risk we should not take.

In this case, where the path has been mandated by Congress to threshold an incredible estero ecosystem into wilderness, the only federally designated marine wilderness on the California coast, our course ought to be obvious. We should embrace it. Not as a victory over a small farmer, surely nobody "has it in" for family farms. But purely as a celebration at setting aside one more small tract of land—only 2 1/2 % of the lower continental United States has been set aside as wilderness—adding in a very small but

significant way to the humble buy joyful enterprise of conserving for the future. Respecting the possibility of the place. Respecting both the idea of wilderness as well as the plant and animal life making their home within these shores.

Wilderness is an idea. But there would be concrete results beyond the idea if we get on with the work of setting aside this land as wilderness. It would mean allowing the eel grass to heal from propeller scars; it would mean that *Didemnum vexillum*, the invasive tunicate's encroachment would begin to recede; it would mean a return to the motor-free quiet that birds and other marine life should receive inside a national park; it would mean cessation of the plastic debris emitted from the oyster operation and into the surrounding marine environment; and it would mean removing non-native species of oysters and clams from this pivotal habitat. The realization of the wilderness designation for Drakes Estero would mean a revitalization of many species, as the eelgrass recovers from the wear and tear of motorized boats and retakes the areas where oyster beds had been. It would mean healthier habitat for endangered steelhead and other fish who feed on invertebrate species which thrive when eelgrass is abundant and healthy. Since Drakes Estero is surrounded by protected land on one hand, and a vast protected Marine Area on the other, the opportunity exists to allow an extensive marine ecosystem to become whole. Simply by creating a natural sanctuary, then stepping out of the picture except as stewards and witnesses, who can predict what species' recovery or return we may behold, just as porpoises and dolphins have returned to the San Francisco Bay in recent years.

I ask today that you forward the agenda set forth by Congress when it declared this estero "potential wilderness" with the clear mandate that it become Wilderness in 2012: surely a stunning legacy for future generations.

Thank you for your consideration,

Lisa Thompson

[redacted]

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Rick W. Johnson
[redacted]

December 8, 2011

Draft EIS DBOC SUP
c/o Superintendent,
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

RE: DBOC SUP EIS - reasonably foreseeable actions

Dear Cicely:

I was a stakeholder on the California MLPA North Central Coast Project Regional Stakeholder Group (NCCRSG), and ended up being a co-lead of cross-interest proposal team 1, and then the merged 1-3 Team. By cross-interest, I mean a team that worked with all stakeholder points of view to try to reach a consensus. In fact, there were many areas of consensus, one of which is the subject of this comment letter.

Please add this paragraph to the end of the Past, Present, and Reasonably Foreseeable Actions section on DEIS Page 242 regarding the CDFG Marine Life Protection Act Initiative.

> It is a reasonably foreseeable action that CDFG and the California Fish and Game Commission (FGC) will upgrade Drakes Estero to be a fully protected, no-take State Marine Reserve (SMR) once Drakes Estero is converted to wilderness and mariculture ceases. CDFG and FGC review requests to change existing MPAs. There is broad based stakeholder interest in seeing the upgrade to SMR status which would end recreational shellfish harvest in Drakes Estero, too. Given this broad support and the value placed on SMR designation by the MLPA Science Advisory Team, it is likely that such a change will occur.

Background and explanation

The MLPA process for defining the boundaries and regulations for California's MPAs in this region involved a lengthy public process with a dedicated group of regional stakeholders representing a cross section of interests including recreational and commercial fishing, conservation, education and resource management. One stakeholder does recreational clamming in Drakes Estero. The Science Advisory Team (SAT) placed a high value on fully protected reserves, and representation of all habitat types, especially eelgrass habitat, in fully protected reserves. The SAT also favored larger SMRs, and Drakes Estero SMR would be contiguous with the reserves in Limantour and around Point Reyes Headlands. All stakeholder planning groups desired SMR status for Drakes Estero when possible, but it was not possible in Drakes Estero as long as the mariculture operation continues. The stakeholders felt it was fair to allow recreational shellfish harvesting while the mariculture operations continued. If and when mariculture ceases in Drakes Estero the stakeholders recommended converting the Estero to a State Marine Reserve. There were three stakeholder work groups who prepared proposals that were submitted to the FGC for evaluation and selection. The oversight body for the stakeholders, the MLPA

Blue Ribbon Task Force, prepared an integrated proposal based on the stakeholders' work that was adopted by FGC as the preferred alternative, and it was implemented. Following is the wording from these different MPA proposals; all four proposals recommend SMR status following the end of mariculture in Drakes Estero. Based on that strong support, it is a reasonably foreseeable action that Drakes Estero will be upgraded to a fully protected, no-take State Marine Reserve (SMR) once Drakes Estero is converted to wilderness and mariculture ceases.

Excerpts from the Blue Ribbon Task Force and Stakeholder Proposals

California MLPA North Central Coast Project
Integrated Preferred Alternative Marine Protected Area (MPA) Proposal
(adopted by the MLPA Blue Ribbon Task Force on April 23, 2008)
Revised April 30, 2008

Future Proposal for Drakes Estero:

> **If at any time, it becomes feasible to create an SMR at Drakes Estero, this proposal recommends doing so.**

[Note that when the Integrated Preferred Alternative was later adopted as the North Central Coast Project Alternative by FGC, this future action was omitted. I believe this is standard practice of the Commission where regulations are not written with contingencies like this one]

California MLPA North Central Coast Project
Regional Stakeholder Group (NCCRSG) Marine Protected Area (MPA) Proposal 1-3
(March 19, 2008 version) Revised March 27, 2008

Future Proposal for Drakes Estero:

> **The proposal recognizes the unique ecosystem of the estuary and recommends that this MPA be given full SMR protection when the leases/reservations of use expires in 2012.**

California MLPA North Central Coast Project
Regional Stakeholder Group (NCCRSG) Marine Protected Area (MPA) Proposal 2-XA
(March 19, 2008 version) Revised March 27, 2008

Future Proposal for Drakes Estero:

> **It is recognized that the aquaculture lease currently in use may expire in 2012 and it is the intention of this proposal to respect whatever outcome is resolved. Should the leases expire, it is the intention of this proposal to create a full SMR consisting of the Drake's and Limantour Esteros extending to the mouth of the Esteros. The recreational harvest of clams will then be prohibited in accordance with SMR regulations.**

California MLPA North Central Coast Project
Regional Stakeholder Group (NCCRSG) Marine Protected Area (MPA) Proposal 4
(March 19, 2008 version) Revised March 27, 2008

Future Proposal for Drakes Estero:

Purpose is to move to an SMR throughout Drakes and Limantour Esteros in 2012 when the mariculture reservation of use expires.

Designated as an SMCA allowing mariculture until existing mariculture reservation of use expires in 2012. Recommend that once mariculture reservation of use expires, it not be renewed.

Thanks for considering my comments.

Best regards,

Rick Johnson

CORRESPONDENCE ID: 52037

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Rick W. Johnson
[redacted]

9 December 2011

Draft EIS DBOC SUP
c/o Superintendent,
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

RE: DEIS DBOC SUP, Comments on Impacts to Harbor Seals

Dear Cicely:

Alternative A, by converting to Wilderness in 2012, best protects harbor seals and their habitats in Drakes Estero, and I strongly recommend adopting Alternative A.

The DEIS should be updated with the findings of the Marine Mammal Commission and should include the information presented by Paul Thompson to the MMC study panel. Dr. Thompson is a harbor seal scientist who was also a NAS study panelist, and I believe the only independent scientist who participated in both studies. His maps of tracking data from free ranging harbor seals suggest that seals will make widespread use of the whole lower and middle Estero under Alternative A. In particular, seals will likely use the western third of the lateral channel and adjacent flats that are denied to them under Alternatives B, C, and D.

I ask that the Secretary of Interior to implement Alternative A.

Thank you for the opportunity to comment.

Best regards,

Rick W. Johnson

Rick W. Johnson

Impacts on Harbor Seals

Please add these paragraphs:

MMC (2011) states: "In the Commission's view, the information examined during the course of this review is sufficient to conclude that, from time to time, mariculture activities in the estuary do disturb harbor seals. The Commission also believes that the data provide reasonable evidence of a correlation between mariculture activity and seal haul out use, but that evidence is not sufficient to conclude causation."

The MMC conclusions are consistent the NAS study committee. NAS (2009) states: "The activities of the oyster culturists can disturb wildlife such as harbor seals, which are of particular concern because they use the estero for resting, mating, pupping, suckling, molting, foraging, and sheltering from oceanic predators." NAS (2010) states: "Displacement from key areas may also result from disturbances attributable to the activities of mariculture workers (Becker et al., 2009). This disturbance may be caused directly by the presence of workers on intertidal areas or by boats associated with mariculture activity. In addition, marine mammals may respond to noise from mariculture-related boat traffic."

One of the NAS study committee members, Paul Thompson, was also a presenter to the MMC Drakes Estero meeting in February 2010. Thompson (2010) stated that research in Drakes Estero does not conclusively prove population level effects or lack of effects. Thompson (2010) summarizes what effects can be reasonably inferred from research conducted in similar ecosystems:

- Mean flushing distance in eight studies ranges from 80 to 500 m
- Harbor seals are closely associated with haul out sites during early lactation.
- Disturbance both on land and in water may influence haul out sites.
- Disturbance may occur at relatively long range - both in air or water
- Many disturbance events therefore go undetected

Thompson (2010) found higher dispersion of seal counts at UEN in Drakes Estero in high oyster production years which may indicate higher disturbance. Do over dispersed count distributions result from undetected disturbances? This observation is another suggestion that there may be a causal link.

MMC (2011) concluded that Figure 4 of Becker et al. (2011) depicts a statistically significant relationship between acres of mariculture equipment and annual oyster harvest. The amount of acreage and location of bags may be a causal link, but there is no complete proof of that. All of the action alternatives involve some variation of this limit: "DBOC would continue to conduct bag culture in up to 84 acres of Drakes Estero (in the past 2 years, for example, approximately 22 acres of bags were planted annually)." It sounds like actual usage of 84 acres will exceed what has been used in recent years. If so, then the EIS should plan for impacts based on the 84 acres.

Brown and Becker (2007) observed bag locations in 2007 and showed plots indicating bags close to and within the current seal protection line. On April 26, 2007 a field observer trip report indicates that bags were located in a traditional haul out for seals.

Also on April 26, 2007, people in a boat disturbed seals and handled bags of shellfish. "The Commission considers the information sufficient to document a disturbance related to mariculture, but does not conclude that it was related to Drakes Bay Oyster Company." (MMC 2011)

On 29 April 2007, two observers working together noted two disturbance events involving boats and handling of shellfish bags. "The Commission also considers the available information sufficient to document that harbor seals were disturbed by activities related to mariculture, but not to ascribe the disturbance to Drakes Bay Oyster Company." (MMC 2011)

Displacement from Suitable Habitat

NAS (2009) states "Some oyster rack and oyster bag areas within Drake Estero are located within 500 m of sand flats used by harbor seals as haul-out sites. Based upon the findings in the studies outlined above and the informal observations of biologists who study seals, visits to these areas by oyster farm workers can be expected to lead to the short-term disturbance of any seals using these haul-out areas at the time. Depending upon visibility and wind conditions, disturbance may also occur at greater distances. Furthermore, the work by Brasseur and Reijnders (2001) suggests that seals could be disturbed before they come ashore if boats pass through haul-out areas at high tide."

"Displacement may follow an immediately preceding disturbance event, but does not necessarily require such disturbance. A seal may avoid an otherwise preferred haulout site based on experience or the presence of an object perceived to be a possible threat. The propensity for displacement is uncertain, dependent on a range of variables, and difficult to predict." (MMC 2011)

MMC (2011) accepted an historical map marking seal haul outs at the west end of the lateral channel. Currently, DBOC uses the western third of the lateral channel to access bags on flats adjacent to haul outs during the harbor seal pupping season. No seals now haul out in this area of active mariculture, a site where seals were recorded hauling out in 1991. MMC (2011) cannot prove whether or not seals would use that area if mariculture is removed in 2012 in Alternative A.

Thompson (2010) provides maps of tracking data showing dynamic use of the whole width of an estuary by harbor seals including haul out at the edge of narrow channels and on the mainland. This tracking data suggests that seals in Drakes Estero would use the full lateral channel if available for their use.

NPS made suggestions to CDFG in an exchange of letters in 1991 (posted on the MMC website). On June 27, 1991, Superintendent Sansing wrote: "we believe that oyster operations should not be allowed on the mud flats. As indicated on the map some of the flats include oyster beds as well as harbor seal haul out and pupping areas. The remainder of the mud flats are used as feeding areas by a multitude of shorebirds including the Black Brant."

Size of buffer zone

In Alternatives B, C and D, the proposed 91 meter (100 yd) buffer for the harbor seal protection zone seems arbitrarily low, not science based. NRC (2009) indicates larger buffers have been set in reserves elsewhere: "The mean distance at which seals are flushed into the water by small boats and people ranges between 80 m and 530 m, with some disturbances recorded at distances of over 1,000 m (Appendix D). These empirical studies have been used to underpin zonation of marine protected areas, for example where a 1.5-km buffer exists around harbor seal haul-out sites in the Dutch Wadden Sea to exclude recreational disturbance (Brasseur and Fedak, 2003) and where a 500-m exclusion zone around

breeding and molting haul-out sites has been included in the mariculture industry's best practice guidelines in Shetland, United Kingdom."

Conclusions

As MMC (2011) points out there is no proof that seals will use the whole lateral channel and adjacent flats in Alternative A, but the tracking data provided by Thompson (2010) suggest harbor seals would use this area. That likely expansion may have population effects that could be highly noticeable (based on the correlation analysis) and would substantially influence natural resources and processes. Alternatives B, C and D result in a major adverse impact of denying harbor seal access to this suitable habitat.

NAS (2009) states "It would be challenging to design a study that could demonstrate whether or not short-term responses to disturbance have long-term population consequences for harbor seals, and no studies of this kind have yet been conducted anywhere. This would require long-term study of known individuals, and high-quality data on those individuals' exposure both to disturbances and to other potential environmental stressors. In the absence of additional research, **a precautionary approach to management would seek to reduce types of disturbance that affect behavior during the breeding season to avoid potential population effects that would only be evident with long-term monitoring."**

The DEIS comments from The Marine Mammal Center provide compelling reasons why Alternative A is preferred.

- Removal of the oyster operation will provide more safe, nursery space for our local, native seals that have lost so much of their natural habitat.
- The adverse impacts (particularly displacement of harbor seals to nursery habitat of less quality) from alternatives B, C, or D could be described as major,
- since the isolated sand bars in Alternative A provide a safe refuge in the event of harm or drop in the regional population.

(TMMC DEIS Comments dated December 9, 2011)

Additional reference - not cited in DEIS

Thompson, P. 2010. Understanding the potential impacts of disturbance on harbor seals. Presentation to the Marine Mammal Commission.
http://www.mmc.gov/drakes_estero/meeting_ppt.html

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Maria Straatmann
Rick W. Johnson
[redacted]

December 9, 2011

Draft EIS DBOC SUP
c/o Superintendent,
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

RE: DEIS DBOC SUP Comments

Dear Cicely:

We fully support Alternative A, the plan to implement wilderness in 2012. The area around the mouth of the Estero, now fully protected, is one of the wildest places in Point Reyes. It is a favorite hiking destination for our family, offering us restoration and inspiration. We look forward to seeing the rest of the Estero restored, and allowed to function under natural conditions.

We believe the potential impacts described in the DEIS and in comments by the Environmental Action Committee of West Marin and others who have pointed out adverse impacts offer more than sufficient reasons to deny the DBOC SUP. We would like the final EIS to consider these additional topics.

The EIS should estimate the investment value of the Drakes Estero watershed owned and restored by the federal government. The reason for including the whole watershed is that the environmental health of Drakes Estero is attributable to the protection and restoration of the shoreline and watershed of the Estero.

The people who supported creation of Point Reyes National Seashore showed great foresight in establishing the park to save and preserve a valuable part of the coast to be protected forever. It would be virtually impossible to purchase this property today, and developments since 1962 would have ruined the Point Reyes Esteros' environment.

Now the owners of DBOC have requested a "re-do". They want to be paid more for the property that was sold in 1972 to the federal government. They want to be paid more in the form of a new 10 year lease, renewable according to their website. **DBOC has referred to this as a right but it is more like an undeserved privilege at the expense of a much larger public population. We strongly oppose this further degradation of a priceless wilderness for the benefit of the few.**

Rick estimated the present value to purchase a landscape like Drakes Estero and its watershed at $530 million in today's dollars (see attachment 1). Such an astronomical cost reflects the value of California coastline property and reflects the human desire to live and develop near coastal bays.

The EIS should assess DBOC claims about benefits to food security and protein source for the Bay Area. Are DBOC oysters a low cost source of protein for the Bay Area and what proportion of Bay Area food is supplied by DBOC?

We have seen and heard public relations information from DBOC talking about supplying affordable protein and helping food security of the San Francisco Bay Area. The EIS should provide a critical assessment of those claims. DBOC supplies a negligible amount of food and protein to the Bay Area and it is expensive. We would put oysters into the luxury food category – far too expensive to be a primary source of protein when one is putting food on the table to feed one's family.

How much does it cost to supply protein for a family?

Food source		Prices	grams per unit	total grams weight	protein grams	Cost per gm protein
Milk	price per gallon	$3.00	244 g/cup	3904	117.12	$0.03
Eggs	price per dozen	$2.79	60 g/ egg	720	72.00	$0.04
Chicken breast	price per pound	$3.69	454 gm/lb	454	108.96	$0.03
Hamburger	price per pound	$1.99	454 gm/lb	454	108.96	$0.02
Organic Tofu	price per 14 oz package	$1.29	397 gm/pack	397	40.20	$0.03
Organic milk	price per gallon	$7.00	244 g/cup	3904	117.12	$0.06
Organic eggs	price per dozen	$4.50	60 g/ egg	720	72.00	$0.06
Organic chicken breast	price per pound	$5.00	454 gm/lb	454	108.96	$0.05
Organic hamburger	price per pound	$4.00	454 gm/lb	454	108.96	$0.04
Oysters	Price per dozen medium in shell	$14.00	85 g/oyster	1020	96.90	$0.14

Oysters are not an affordable source of food and protein to feed a family.

If the DBOC supply of food and protein was removed from the SF bay area the effect would be negligible - - infinitesimal.

DBOC Oysters consumed in SF Bay area		
DBOC production	shucked weight lbs	450000
Bay area population		7500000
DBOC Pounds per capita per year	Assumes none shipped out of Bay area	0.06

Pounds per capita consumption estimates for SF Bay Area

	All Foods lbs. per capita			Protein lbs per capita	
	Est. Consumer weight	From Dietary survey	Protein percent	Est. Consumer weight	Dietary survey
Total all foods	1423	794		416.00	87.00
DBOC production	0.06	0.06	10%	0.006	0.006
% contribution	0.004%	0.008%		0.001%	0.007%

A range is shown because estimates of consumer weight purchased exceed estimates from dietary surveys. Both estimates are shown above from *Food Consumption in San Francisco and the Bay Area*, Chapter 3 of the San Francisco Foodshed Report, at farmland.org

http://www.farmland.org/programs/states/ca/Feature%20Stories/documents/Chapter_3_foodshed.pdf

With either estimate the DBOC food and protein contribution is very small. When Drakes Estero oyster production was low in 2000-2004 consumers did not complain. Probably no one noticed.

The EIS should describe the therapeutic value of spending time in wilderness and experiencing the natural soundscape. The denial of this experience for ten years is a major adverse impact of Alternatives B, C and D.

Sincerely,

Maria Straatmann

Rick Johnson

Attachment 1 The investment value for the Drakes Estero wilderness and State Marine Reserve as its replacement cost.

The value should include not just the acreage of the estero, but the open space nearby, the protected streams and watershed, restoration costs, and the siting with Federal protection services. A replacement site would have comparable features to Drakes Estero such as:

- An estero with limited amounts human structures on adjacent land. Drakes Estero is in a 19,840 acre watershed within a 172 square mile National Seashore, protected by the National Park Service.
- Ocean inlet open year round, near a major headland in the California current, connected to a proposed State Marine Reserve.
- A salmonid stream with federally protected Steelhead and a potential for Coho. At Drakes Estero, East Schooner Creek is a such a protected stream, and its road crossings were recently improved by the National Park Service.

It would be a formidable task to acquire, gain approvals, and restore a replacement site because estuaries have attracted humans for water front property, docks, mariculture, motor boats, fishing and hunting, and establishing near-by communities among other uses. "Estuaries are considered the most human-altered ecosystems on earth, because human population growth, industries, and harbors are often focused on these productive, sheltered land-sea interfaces." Kerstin Wasson, UC Santa Cruz

For example, Tomales Bay illustrates the mixed use common to most estuaries on the Pacific Coast. Both the need for a marine reserve and the difficulty in setting aside an area for natural processes is reflected in the fact that the closest pristine reference site for Olympia oysters that the NAS study committee could find is on the west coast of Vancouver Island.

Table 1 provides a capital cost estimate and a structure for the analysis. Although cost is probably the least of the issues in acquiring a replacement site, the price estimate is significant at $534 million, due to the costs of coastal property along the central California coast and the costs of restoration, regulatory approvals, and property management. Table 2 provides some comparable costs for conservation acquisitions in the region.

Table 1: Estimated cost to acquire and restore a replacement for Drakes Estero and its watershed.

Area Assumptions:

		Acres
Area of Drakes Estero	2.55 Sq Miles	2270
Shoreline span	6 miles	
Shoreline property: A natural buffer of 1500 feet along the shoreline span with removal of human structure, revegetation and a small access location	1.6 sq miles	1024
Salmonid stream	3 miles	360
Ranch land		7250
Open space reserve		8936
Total water and watershed area	31 sq miles	19840

Acquisition and site conversion/restoration costs	Acres	Cost per acre	Total cost ($ million)	
An estero and wetlands	2270	18000	41	Buy rights, remove human structure, restore
Shoreline property	1024	200000	205	Buy title, remove human structure, restore vegetation
Salmonid stream	360	100000	36	Buy title, remove human structure and bottlenecks, restore vegetation
Ranching conservation easements	7250	4000	29	Conservation easement with NPS quality protection services
Open space reserve	8936	25000	223	Buy title, remove human structure, restore vegetation with NPS quality protection services
Total cost ($ millions)			534	

Table 2: Examples of acquisition costs and restoration costs

Wetlands		Acres	Cost $ millions)	Cost/acre
Giacomini wetlands restoration	acquisition	563	4.50	7993
	restoration	563	6.00	10657
Giacomini wetlands restoration	total			18650
Drakes Estero Coastal Watershed Restoration Project	replaced existing road-crossing facilities on East Schooner Creek, a freshwater stream used by steelhead trout		2.44	
wetland habitat and agricultural land at the heart of the Watsonville Sloughs	purchase	95	3.10	32632
Ranchland conservation easements				
Panfiglio Ranch	purchased the development rights	810	1.16	1432
Poncia Ranch	prevent any nonagricultural development	750	2.00	2667
Tomales Farm and Dairy	purchased the development rights	243	1.00	4115
Crayne Ranch	purchased the development rights	291	1.00	3436
Open space acquisition				
Rancho San Vicente	imminent purchase agreement	966	unknown	
	value of prior sale in 1998	966	16.00	16563
two properties in Santa Clara county near open space properties				
	purchase	74	0.25	3378
	purchase	118	0.40	3390
Toto Ranch	purchase price	952	3.00	3151
	appraised value	952	7.00	7353
	difference is donation			
Site on Skyline Ridge connecting two open space areas	purchase	32	0.65	20313
Ocean front bluff near Pillar Point	purchase	17	1.85	108824
Jenner Headlands	purchase	5630	36.00	6394

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POINT REYES NS

Rick W. Johnson
[redacted]

8 December 2011

Draft EIS DBOC SUP
c/o Superintendent,
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

RE: DEIS DBOC SUP, Comments on Impacts to Birds

Dear Cicely:

Alternative A, by converting to Wilderness in 2012, best protects birds and their habitats in Drakes Estero, and I strongly recommend adopting Alternative A.

The DEIS is good as far as it goes regarding impacts to birds, but omits policy considerations and specific species information that indicate major adverse impacts for certain species (Brant and Pelicans), all species in certain areas (waters, intertidal area, and shores of Schooner Bay), and many species at certain times (Spring migration for staging, feeding and resting).

I ask that the Secretary of Interior implement Alternative A.

Thank you for the opportunity to comment.

Best regards,

Rick W. Johnson

Rick W. Johnson

1

Effects Of Shellfish Mariculture On Birds

Executive Summary Comments pages xlviii - xlix

Please add these paragraphs:

Continuation of mariculture in Drakes Estero, is likely to result in major adverse impacts for certain species (brant and pelicans), all species in certain areas (waters, intertidal area, and shores of schooner bay), and many species at certain times (spring migration for staging, feeding and resting). "Boat travel by the mariculturists is likely to disturb and flush seaducks, shorebirds, and other waterbirds." (NAS, 2009, p. 69) Foraging birds are prevented from accessing the sediments directly underneath mariculture bags (NAS 2009). Only Alternative A protects the Estero during the Spring migration with a closed access gate and no oyster operations. In comparison, Alternatives B, C and D result in major adverse impacts during Spring migration. These impacts, certainly in the case of Brant, are noticeable and affecting natural processes.

Through Executive Order 13186 and NPS Management Policies 2006, NPS has a strong commitment to regional planning to protect migratory bird species. Drakes Estero represents an important site for overwintering and seasonally migrating shorebirds and waterfowl, with special significance as a feeding and staging site for migrating black brant geese. (NAS, 2009) Alternatives B, C and D, fail to protect Drakes Estero for ten years adding to long term cumulative major adverse impacts on water and shorebird species in the Pacific Coast region.

Alternatives B, C and D violate Executive Order 13186 and NPS' MOU with USFWS which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.

Policy summary page 45
Modify and extend this paragraph:
Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds
This executive order directs executive departments and agencies to take certain actions to further implement the MBTA including actions to support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. In partial fulfillment of that Executive Order NPS entered a MOU with the Fish and Wildlife Service on April 12, 2010 which "requires that the NPS develop the capability to identify, plan for, and mitigate actions adversely affecting migratory birds within park boundaries, and to collaborate with others throughout the birds' ranges to increase awareness of migratory bird issues. This MOU encourages the NPS to partner with Federal agencies, States, Tribes, local governments, and non-governmental organizations for the benefit of migratory birds."

Policy (DEIS pages 38-39, 303-304)

Please add these paragraphs:

The responsibility of the National Park Service to protect migratory birds and their habitat extends

beyond the minimum definition of "take" in the Migratory Bird Treaty. NPS has a commitment to regional conservation planning.

NPS Management Policies 2006 states in 4.4.1.1 **Plant and Animal Population Management Principles**,
"In addition to maintaining all native plant and animal species and their habitats inside parks, the Service will work with other land managers to encourage the conservation of the populations and habitats of these species outside parks whenever possible. To meet its commitments for maintaining native species in parks, the Service will cooperate with states, tribal governments, the U.S. Fish and Wildlife Service, NOAA Fisheries, and other countries, as appropriate, to ... - participate in local and regional scientific and planning efforts, identify ranges of populations of native plants and animals, and develop cooperative strategies for maintaining or restoring these populations in the parks."

NPS is required by **Executive Order 13186 to to protect migratory birds** and these responsibilities are expressed in detail in a Memorandum of Understanding (MOU) between the National Park Service (NPS) and the U.S. Fish and Wildlife Service (FWS) (April 2010). This MOU is establishes how the NPS and FWS will jointly promote the conservation of migratory birds by incorporating bird conservation measures into agency actions and planning processes - including support for regional conservation plans such as:

Pacific Flyway Management Plan for Brant (Pacific Flyway Council, 2002):
This plans calls for protection of critical habitats and mitigation for impacts, including loss or degradation of eelgrass beds, grit and loafing sites; disturbance of wintering flocks; and exclusion of brant from traditional use sites.

Southern Pacific Shorebird Conservation Plan (Hickey et al.,2003). The Southern Pacific Shorebird Conservation Plan is one of 11 regional plans associated with the US Shorebird Conservation Plan.

- Tidal flat is the primary foraging habitat of many of the region's most abundant shorebirds
- Various oyster culture practices affect shorebird access to potential food resources in species-specific ways.
- Increase migratory and wintering populations of all key shorebird species in the region using protection, restoration, enhancement, and management strategies.
- Restrict further development of tidal flats for oyster culture.

Impact Analysis -Mariculture boat trips - page 305

Add these sections:

Oyster operation boat trips are a known risk factor for water and shore birds in the Estero. "Drakes Estero represents an important site for overwintering and seasonally migrating shorebirds and waterfowl, with **special significance as a feeding and staging site for migrating Black Brant geese**. Boat travel by the mariculturists is likely to disturb and flush seaducks, shorebirds, and other waterbirds." (NAS, 2009, p. 69)

For alternatives B and C, the DEIS uses the phrase "Continued boat traffic". However, there is no limit

placed on the number of DBOC boats or daily trips. For B and C the EIS should at least use the current maximum daily disturbance levels: 12 round trips which is 24 disturbance passages to and from per day (amounting to up to 3700 trips per year). The past estimated level of operation of 1500 trips per year is unaudited. Lacking vessel tracking systems, there is no way to verify how often the boats pass the sand bars and transit the eelgrass beds. If business conditions warrant, there is no reason that DBOC could not make more trips and add boats if they need them. Also, according to the DEIS, DBOC desires to run experiments on native species cultivation which will require additional vessel traffic.

Please change the assumption to a higher level of 3700 trips per year, and replace the lead phrase with "Boat traffic will continue and increase as warranted by business and operational needs of DBOC"

Impact Analysis - Brown and American White Pelicans - page 305

Please add these paragraphs:

Gerry McChesney, a scientist with the US Fish and Wildlife Service, was on the Scientific Advisory Team (SAT) for California's MLPA planning in the North Central Coast Region, which includes Drakes Estero. In his report for the SAT he states: "Many other species, such as most pelicans, cormorants, and gulls, come to shore on a daily basis to rest, preen, or bathe. For pelicans and cormorants, trips ashore are essential for survival because their wettable plumage must be dried to avoid hypothermia." "Pelicans also serve as a good indicator species for roosts because of their high sensitivity to disturbance (Anderson and Keith 1980, Jaques et al. 1996, Jaques and Strong 2002, Rodgers and Schwikert 2002). In the recovery plan for the endangered California Brown Pelican, protection of roost sites was identified as a primary objective (USFWS 1983)."

The isolated upper bars and tidal flats of Drakes Estero are desirable rest sites for American White Pelicans. With workers tending bags on these flats and frequent boats trips, oyster operations are likely to disturb and flush pelicans - 24 times per day during work hours. Most likely, the pelicans will expand their use of these isolated flats in the absence of oyster operations.

Impact Analysis - Brant- page 305

Please add these paragraphs:

Brant is a California species of special concern which may be displaced by disturbance of mariculture operations. (Classified as a California Bird Species of Special Concern (wintering, staging), priority 2 in Davis and Deuel, 2008, p. 82) "Because Brant do not dive, they can usually access Eel-grass only at low tides. Still, they tend to feed in the deepest possible areas permitted by tides and close to large tidal channels and other areas where Eelgrass biomass and protein content are higher." (Davis and Deuel, 2008, p. 82) Furthermore, the presence of lines of oyster bags on the intertidal flats, and the tending of those bags, is likely to diminish the feeding and grit gathering opportunities for Brant in Drakes Estero. "Brant often feed in areas close to gritting sites which are intertidal mudflats, sandbars, or spits, where the birds ingest grit necessary for food digestion." (Davis and Deuel, 2008, p. 82)

Davis and Deuel (2008) summarize Brant's seasonal status in California: "Occurs in the state primarily as a spring and fall migrant and winter visitor; passes mainly far offshore in fall and close inshore in

spring, when staging birds are numerous in isolated coastal estuaries." Facing the strong NW winds of spring, the staging area at Drakes Estero will be beneficial for Brant. Brant may be one of the native species most likely to benefit significantly from Alternative A with the access gate closure during Spring migration (preventing kayak access) and the absence of mariculture disturbance.

According to the Pacific Flyway Management Plan for Brant (Pacific Flyway Council, 2002), protection in Drakes Estero will help reduce a high cumulative threat to the species:

- Drakes Estero Migration counts -1000-3000 current; 25,000 Historical
- Coastal habitats of highest importance to Pacific brant includes California estuaries: Spring Staging/Winter ~50-60% of Pacific flyway, Winter ~2% of Pacific flyway, **Cumulative threats - High**
- Human activities which have the greatest potential for physically degrading migration and wintering habitats include aquaculture.

"Historically, Tomales Bay, Drake's Estero, and Bodega Harbor supported large wintering populations [of Brant], but since the 1950s numbers there have declined substantially." (Shuford et al., 1989). Brant are now "a rare summer visitant, an uncommon fall transient and winter resident, and a very common spring transient." (Shuford et al., 1989).

Most likely, Brant will expand their use of the eelgrass beds and adjacent flats in the absence of oyster operations, especially in the critical spring migration when the access gate is closed in alternative A.

Impact Analysis - all water and shore birds - page 305

Drakes-Limantour Esteros are part of a group of interrelated coastal wetlands identified as wetlands of hemispheric importance (Harrington and Perry 1995). This network of habitats holds more total shorebirds in all seasons than any other wetland in the conterminous U.S. Pacific coast (Stenzel et al. 2002). The proximity adds to the value of each site within this network of wetlands.

In a formal comment letter to the NAS study committee, Kelly (2009) stated "Strong consideration for the effects of mariculture on species' habitat values is appropriate to conservation planning and management—even if population effects are unknown. The U.S. Shorebird Conservation Plan emphasizes three major goals at different spatial scales for developing effective management practices. Goals for maintaining shorebird populations are considered at national and hemispheric scales. At the regional scale, the primary conservation goal is to identify and maintain adequate quantity and quality of habitat to support shorebirds that breed, winter in, and migrate through each region. Accordingly, evidence of significant effects on shorebird use of habitat areas should be acknowledged as an important basis for addressing regional shorebird conservation goals in Drakes Estero."

The Southern Pacific Shorebird Conservation Plan (Hickey et al.,2003), recommends for Drakes Estero: "Prohibit further alteration of tidal flats for oyster culture". This report was written during a low point in oyster production when a stake culture method was used on the tidal flats. DBOC has since expanded using more intense bag culture methods on those flats representing a further alteration of shorebird habitat. The Plan also calls for better prevention of kayak disturbances in Drakes Estero. Only Alternative A restores tidal flat habitat for use by shorebirds and provides an access gate closure to better prevent kayak disturbance during the important spring migration period.

All of the action alternatives involve some variation of this limit: "DBOC would continue to conduct bag culture in up to 84 acres of Drakes Estero (in the past 2 years, for example, approximately 22 acres of bags were planted annually)." It sounds like actual usage of 84 acres will exceed what has been used in recent years. If so, then the EIS should plan for impacts based on the 84 acres which will increase adverse impacts on birds and seals that use the flats.

Impacts of oyster operations on birds are especially high in Schooner Bay in the proximity of the land operations. In addition to vessel traffic, noise is also a factor. DBOC operates motor boats in the Estero and uses percussive, pneumatic equipment to shuck oysters. Also, there often is loud radio music at the facility. "At Drake's Estero, if it weren't for the motor boats (run by the mariculture interest) and blaring 'music', the waters would be teeming with grebes, loons and waterfowl particularly Brant Geese." (Stallcup, pers.comm.)

Impacts on Western Snowy Plover

Consider the potential impacts of the oyster operations, discards, picnic and grilling areas which attract nuisance native species (corvids, gulls) that have a detrimental effect on a Special Status native species, Western Snowy Plover.

Some advocates for the DBOC SUP (Alternatives B, C, or D), have stated that the Least Tern and Western Snowy Plover restoration projects in San Francisco Bay will shut down if Alternative A is approved. This is unlikely to happen since these restoration projects started well before the DBOC acquisition of the RUP rights, and there are other sources of shell if they need them (see comments on impacts to native Olympia Oysters.) Also, DBOC has a substantial inventory of shells which they can donate to these projects if they desire to continue helping these projects.

Bird Section Impact, Cumulative Impact and Conclusion Statements

Modify Alternative A Conclusions page 307:
"... commercial operations would result in up to 88 additional acres of foraging and resting habitat for resident and migratory birds. Alternative A provides the best protection during spring migration due to the access gate closure, a time that is especially important for brant in Drakes Estero."

Add to end of Alternative A Conclusions page 307:
"Alternative A would be consistent with Executive Order 13186 and the NPS MOU with the Fish and Wildlife Service which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions."

Alternative B - modify page 310
"As described above, alternative B would result in long-term moderate and major adverse impacts on birds and bird habitat for an additional 10 years because noise disturbances from DBOC motorboats and the displacement of natural habitat by shellfish racks and bags within Drakes Estero would be clearly detectable and could significantly affect natural processes. Lacking the access gate closure of alternative A, alternative B has major adverse impacts on brant and other birds during spring migration.

Pelicans may experience major adverse impacts from disturbance while trying to rest on sand bars. Major adverse impacts are likely to occur in Schooners Bay, close to many of the noise sources."

Modify on page 310
"... when combined with the long-term major adverse impacts of alternative B, would result in a long-term major adverse cumulative impact on birds and bird habitat. Alternative B would contribute an appreciable adverse increment to the cumulative impact."

Modify Alternative B Conclusions page 310-311
"Alternative B would result in long-term major adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities within Drakes Estero for an additional 10 years. Because of Drakes Estero's importance to regional shore bird and Brant conservation, failure to protect these species from mariculture disturbance, and preventing the access closure in Spring, adds to long term cumulative major adverse impacts on water and shore birds."
"... such as predator avoidance. The impacts of alternative B would be highly noticeable and could substantially affect certain birds and bird habitat within the project area: major adverse impacts for certain species (brant and pelicans), all species in certain areas (waters, intertidal area, and shores of schooner bay), and many species at certain times (spring migration for staging, feeding and resting). The cumulative impact would be long-term major adverse, and alternative B would contribute an appreciable adverse increment to the overall impact."

Add to end of alternative B conclusions page 311
"Approval of alternative B violates NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations (4.4.1), and to participate in regional protection (4.4.1.1): specifically NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant and Southern Pacific Shorebird Conservation Plan. Furthermore, approval of an SUP will violate Executive Order 13186 which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions; and NPS's commitment in its MOU with USFWS to incorporate bird conservation measures into agency actions and planning processes."

Alternative C - modify page 311
"As described under alternative B , alternative C would result in long-term moderate and major adverse impacts on birds and bird habitat for an additional 10 years because noise disturbances from DBOC motorboats and the displacement of natural habitat by shellfish racks and bags within Drakes Estero would be clearly detectable and could significantly affect natural processes. Lacking the access gate closure of alternative A, alternative C has major adverse impacts on brant and other birds during spring migration. Pelicans may experience major adverse impacts from disturbance while trying to rest on sand bars. Major adverse impacts are likely to occur in Schooners Bay, close to many of the noise sources."

Modify on page 312
"... when combined with the long-term major adverse impacts of alternative C, would result in a long-term major adverse cumulative impact on birds and bird habitat. Alternative C would contribute an appreciable adverse increment to the cumulative impact."

Modify Alternative C Conclusions page 310-311
"Alternative C would result in long-term major adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities within Drakes Estero for an additional 10 years. Because of Drakes Estero's importance to regional shore bird and Brant conservation, failure to protect these species from mariculture disturbance, and preventing the access closure in Spring, adds to long term cumulative major adverse impacts on water and shore birds."
"... such as predator avoidance. The impacts of alternative C would be highly noticeable and could substantially affect certain birds and bird habitat within the project area: major adverse impacts for certain species (brant and pelicans), all species in certain areas (waters, intertidal area, and shores of schooner bay), and many species at certain times (spring migration for staging, feeding and resting). The cumulative impact would be long-term major adverse, and alternative C would contribute an appreciable adverse increment to the overall impact."

Add to end of alternative C conclusions page 311
"Approval of alternative C violates NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations (4.4.1), and to participate in regional protection (4.4.1.1): specifically NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant and Southern Pacific Shorebird Conservation Plan. Furthermore, approval of an SUP will violate Executive Order 13186 which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions; and NPS's commitment in its MOU with USFWS to incorporate bird conservation measures into agency actions and planning processes."

Alternative D - modify page 313
"As described under alternative B , alternative D would result in long-term moderate and major adverse impacts on birds and bird habitat for an additional 10 years because noise disturbances from DBOC motorboats and the displacement of natural habitat by shellfish racks and bags within Drakes Estero would be clearly detectable and could significantly affect natural processes. Lacking the access gate closure of alternative A, alternative D has major adverse impacts on brant and other birds during spring migration. Pelicans may experience major adverse impacts from disturbance while trying to rest on sand bars. Major adverse impacts are likely to occur in Schooners Bay, close to many of the noise sources. These adverse impacts would be greater than those associated with alternatives B and C due to the likely increase in DBOC boat traffic in Drakes Estero, and some impacts are still expected to be major in intensity and would remain highly noticeable."

Modify on page 313
"... when combined with the long-term major adverse impacts of alternative D, would result in a long-term major adverse cumulative impact on birds and bird habitat. Alternative D would contribute an appreciable adverse increment to the cumulative impact."

Modify Alternative D Conclusions page 313-314
"Alternative D would result in long-term major adverse impacts on birds and bird habitat due to the continuation of commercial shellfish operations and the associated human activities within Drakes Estero for an additional 10 years. Because of Drakes Estero's importance to regional shore bird and Brant conservation, failure to protect these species from mariculture disturbance, and preventing the access closure in Spring, adds to long term cumulative major adverse impacts on water and shore

birds."
"These adverse impacts would be greater than those associated with alternatives B and C due to the likely increase in DBOC boat traffic in Drakes Estero associated with increased production (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), and would remain highly noticeable and could substantially affect certain birds and bird habitat within the project area: major adverse impacts for certain species (brant and pelicans), all species in certain areas (waters, intertidal area, and shores of schooner bay), and many species at certain times (spring migration for staging, feeding and resting). The cumulative impact would be long-term major adverse, and alternative D would contribute an appreciable adverse increment to the overall impact."

Add to end of conclusions page 314
"Approval of alternative D violates NPS policies to preserve and restore natural abundances, dynamics, distributions, habitats, and behaviors of native bird populations (4.4.1), and to participate in regional protection (4.4.1.1): specifically NPS would not be meeting its responsibilities to the Pacific Flyway Management Plan for Brant and Southern Pacific Shorebird Conservation Plan. Furthermore, approval of an SUP will violate Executive Order 13186 which directs agencies to avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions; and NPS's commitment in its MOU with USFWS to incorporate bird conservation measures into agency actions and planning processes."

Additional references, not in DEIS

McChesney, Gerard J. 2008. Evaluations Of Benefits To Seabirds And Waterfowl From Proposed Marine Protected Areas And Special Closures In The MLPA North Central Study Region, California, MLPA Master Plan Science Advisory Team, California Department of Fish and Game. http://www.dfg.ca.gov/mlpa/pdfs/binders/b4dm.pdf

NPS FWS. 2010. Memorandum Of Understanding Between The U.S. Department Of The Interior National Park Service And The U.S. Fish And Wildlife Service To Promote The Conservation Of Migratory Birds April 12, 2010
http://www.fws.gov/migratorybirds/Partnerships/NPSEO13186Signed%204.12.10.pdf

Pacific Flyway Council. 2002. Pacific Flyway Management Plan for Pacific Brant. C/o U. S. Fish and Wildlife Service, Portland, Oregon. http://pacificflyway.gov/Documents/Pb_plan.pdf

CORRESPONDENCE ID: 52040
DEC 09 2011
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POINT REYES NS

NONA B. DENNIS
[redacted]

Superintendent Cicely Muldoon
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956
By internet: http://parkplanning.nps.gov/pore

Re: EIS – Issuance of Special Use Permit for DBOC within Drakes Estero

Dear Superintendent Muldoon:

I appreciate the opportunity to submit comments concerning the adequacy of the Draft EIS for the subject Special Use Permit (SUP) and to voice my support for Alternative A, as it is described and analyzed in the EIS. My support is based on abundant evidence presented in the EIS that only Alternative A would result in long-term beneficial impacts in every impact category except one. The three "Action" Alternatives have subtle differences among them, but in all cases the environmental consequences would be long-term in duration, varying in their major, moderate, or minor adverse effects – again with a single exception.

My comments focus on three general areas that stand out as critical to a decision by the Secretary of the Interior whether or not to extend the permit of Drakes Bay Oyster Company (DBOC): 1) the legislative, legal, and policy history of the Philip Burton Wilderness Area in Drakes Estero; 2) the ecological and long-term significance of converting the Estero to full wilderness at the earliest possible time (2012); and 3) the adverse consequences on the estuarine ecological system of deferring full wilderness and continuing mariculture in the Estero.

1. **The conversion of Drakes Estero to full wilderness in 2012 is fully supported by the record.**

For Drakes Estero to become full wilderness in 2012 would mean fulfillment of a Congressional promise to the leaders and thousands of citizen activists who were responsible for its designation!

History attests to the extraordinary efforts of national and local environmental organizations and ordinary citizens to gain authorization of Pt. Reyes National Seashore (Seashore) in 1962. These same organizations and individuals actively engaged in studying and recommending areas of wilderness in the Seashore and urging Congress in 1976 to designate the maximum possible amount of wilderness within the Seashore, far greater even than the areas initially recommended by the National Park Service (NPS). The Draft EIS (Chapter 1: Purpose and Need) presents a summary of this history of citizen action. The Purpose and Need Chapter goes on to

document in detail the subsequent legislative, legal, and policy history that created wilderness in Drakes Estero and has guided the Seashore's management actions. A few salient points are summarized below.

Drakes Estero and several other areas were designated as "potential wilderness." That the Estero was designated as "potential" was due only to the existence of the non-conforming use of the existing Johnson Oyster Company (JOC), whose 40-year term, authorized as a Right of Use and Occupancy in 1972, was scheduled to expire in 2012. The JOC permit contained a clause that lies at the heart of current controversy:

> "Upon expiration of the reserved term, a special use permit may be issued for the continued occupancy of the property . . .provided, however that such permit for continued use will be issued in accordance with National Park Service regulations in effect at the time the reservation expires."

The clear mandate of the Seashore for the future management of the JOC permit as a non-conforming use, including the extension clause, was captured in 1976 as follows:

> ". . . it is the intention that those lands and waters designated as potential wilderness additions will be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these lands and waters to wilderness status." (H. Rep. No. 94-160, September 24, 1976)

This mandate was reflected in various Seashore and NPS management policies that are presented in the EIS Purpose and Need Chapter. The obligations of the Seashore were confirmed in 2004 by a legal opinion of the Department of Interior Solicitor's Office regarding the meaning of the 1976 legislation designating Drakes Estero as potential wilderness. In effect, the opinion affirmed that the Seashore did not have the legal authority to extend the JOC permit on its expiration in 2012, based on provisions in the 1964 Wilderness Act and the House Report cited above.

With full knowledge of the impending permit expiration, DBOC purchased the operation in late 2004, and determined to seek extension of the permit, notwithstanding its legal restrictions. Since that time, the Seashore has continued to pursue its legal obligations, i.e., when the RUO and SUP of DBOC expire on November 30, 2012, the Seashore will begin the process of converting the Estero and the shellfish production facilities to a condition consistent with the terms of the wilderness designation.

In 2009, through political intervention, the discretionary authority to extend the permit for a period of ten years was granted to the Secretary of the Interior, pursuant to Section 124 of Public Law (PL) 111-88. That action has prompted the preparation of an EIS, which analyzes the environmental consequences of four alternatives, the first of which (Alternative A) accurately represents an environmentally preferred alternative. *In my view, the record is clear, and it is within the legal and policy framework described in the Purpose and Need, and the assumptions that flow from it, that I support Alternative A.*

2. **The conversion to full wilderness in Drakes Estero recognize its unique ecological qualities as a marine wilderness, as well as the long-term importance of wilderness.**

The fundamental tenet of the 1964 Wilderness Act is to preserve wilderness in its natural condition. The Act stresses the importance of wilderness areas as places for the public to enjoy, but at the same time restricts their use in ways that would impair their value as wilderness for the enjoyment of future generations.

The term "natural" has a multitude of meanings and must be qualified. No one will argue that Drakes Estero is a "pristine" coastal lagoon; the ecosystem reflects too many active and passive influences of human populations both past and present. And no one disagrees that many of these influences would continue after the oyster farm is closed and equipment removed in either 2012 (or 2022, if the permit is extended).

For purposes of this EIS the most appropriate definitions of wilderness are those found in the Wilderness Act: where "man himself is a visitor;" "which is protected and managed so as to preserve its natural conditions;" where "the imprint of man's work (is) substantially unnoticeable;" "has outstanding opportunities for solitude;" "is of sufficient size as to make practicable its preservation and use in an unimpaired condition;" and "may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value." These are values that can be attributed to Drakes Estero, regardless of continuing human influences. They are values that will be enhanced, however, by its conversion to full wilderness.

In its analysis of impacts, the Draft EIS discusses the attributes of the oyster farm that currently detract from these qualities in the Wilderness Act: the presence of human structures and facilities that represent permanent human presence; the use of mechanized equipment the noise that detract from the opportunity for solitude and render "man's work" as inescapably present; the continued presence of non-native species and threat of further invasions that run counter to preserving natural conditions; and other threats to the ecological health of the estuary, discussed below.

There is a wider significance to wilderness in contemporary society that must not be overlooked. The people who came together to establish the Wilderness Act in 1964 were responding to an expanding national consciousness of the need to preserve resources for the benefit of present and future generations. Aldo Leopold, in Sand County Almanac (1949), found values of wilderness as reservoirs of natural biological diversity of scientific value, as life support systems, as areas of historic and cultural value, as areas offering aesthetic and educational experience of nature in a natural form. These values are not inconsistent with an area that has been touched by human influences. To the extent possible, however, wilderness also belongs in an ecological/geological timeframe that goes far beyond the limited term of human generations and immediate human demands. As Leopold also said: "Wilderness is a resource which can shrink but not grow . . .the creation of new wilderness in the full sense of the word is impossible" (Sand County Almanac).

1. **Deferring designation of full wilderness will have adverse ecological consequences.**

Much of the controversy surrounding the DBOC operations centers in concern the compatibility of the oyster operation with the native wildlife populations and ecological resources in the estuary. Would an additional ten years of oyster harvesting in the Estero damage, compromise these resources? The Draft EIS responds to this question systematically and finds that while some consequences would be relatively minor, there is sufficient evidence to conclude that key components of the ecosystem would experience moderate to major adverse impacts. Two key members of the estuary ecosystem identified in the Draft EIS are of particular importance.

Effects of mariculture activities on eelgrass in the Estero. The Draft EIS documents and maps the distribution of eelgrass in Drakes Estero, and recognizes the critical importance of maintaining healthy populations of eelgrass for habitat and ecosystem functions. Eelgrass, in addition to being a major source of primary productivity in subtidal areas, also provides vital invertebrate and fish habit and is an important structural element in the estuarine subsrate. The impact analysis finds that mariculture activities, particularly boat traffic, can adversely impact eelgrass biomass and abundance because plants are uprooted or otherwise physically damaged by boat propellers (NAS 2009). Propeller damage (also referred to as propeller scarring) of seagrasses is a common occurrence in shallow estuarine habitats. Continued activities of the oyster farm, particularly under the more intense operation envisioned in Alternative D, would perpetuate the threat to this important component of the ecosystem.

Effects of mariculture on shorebirds. The EIS and related studies confirm that mariculture operations reduce habitat quality for foraging shorebirds. For further details, refer to letter from Dr. John Kelly, research biologist for Audubon Canyon Ranch, who has documented "a significant net decrease in total shorebird use of foraging areas developed for aquaculture" in Tomales Bay (Kelly et al. 1996). Dr. Kelley attributes these reductions to such features as the introduction of racks, bags, or other structures that block the uninterrupted visibility shorebirds need for group (flock) foraging and the detection of approaching raptors; altered foraging substrates associated with foot traffic by oyster growers, maintenance of stakes and bags, and other mariculture-related activities; and avoidance of oyster bags or racks as foraging substrates. Mariculture-related loss of foraging opportunities may be substantial at particular tide levels--even if the overall extent of mariculture excludes shorebirds from only a portion of the overall habitat. Alternative A would restore tide-dependent foraging opportunities for shorebirds, who must move routinely across and among available feeding areas as intertidal substrates are sequentially exposed and inundated by advancing and receding tides.

In conclusion, two important points:

First, extending the SUP would set a dangerous precedent favoring short-term commercial uses in wilderness. To ensure that future generations are able to enjoy the full and extraordinary benefits of wilderness, it is necessary, although politically painful, not to succumb to short-term opportunistic commercial interests that are contrary to the clear intent of Congress. Granting an exception in this case, would encourage other agencies to do the same, and Congress will

hear repeatedly in the future, "you did it in Drakes Estero, so you can do it." The wrong decision here will haunt the National Park Service and other federal land management agencies throughout the nation. This would, indeed, do a grave disservice to the nation's wilderness areas and to Drakes Estero.

Second, Drakes Bay Estero is unique as the only marine wilderness on the West Coast of the United States Congress. The nation understood and embraced the idea that California, the West Coast, and the nation lacked a true marine wilderness. As a consequence, Congress designated the waters of Drakes Estero as potential wilderness, to become full wilderness at a date-certain. With its many biological qualities and ecosystem services described in the Draft EIS, Drakes Estero is a place to demonstrate that the Wilderness Act matters and will be honored; and that money and political influence and distortions of the record cannot be used to undermine it.

Thank you for this opportunity to comment.

Sincerely,

Nona B. Dennis

Nona B. Dennis

USDA

United States Department of Agriculture

Research, Education, and Economics
Agricultural Research Service

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12-08-2011

Draft EIS DBOC SUP c/o Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Dear Superintendent,

I write to register some comments on the Drakes Bay Oyster Company Special Use Permit Draft Environmental Impact Statement. My comments are restricted primarily to portions (eelgrass, wildlife, and wildlife habitat) of Chapter s 3 and 4 because my scientific expertise is with the role and effects of shellfish aquaculture in the estuarine environment. My general sense from reading the document is that the authors have gone to extreme length to describe potential "negative" consequences of the proposed action when in fact most of the effects are only "negative" if viewed in light of the NPS goal of establishing a wilderness area. The authors point this out repeatedly, but the fact that any oyster aquaculture or other human activity is clearly "negative" and likely incompatible with general guidelines in the U.S. Wilderness Act which seek to preserve areas "untrammeled by man, where man himself is a visitor" seems immediately clear with very little further description. The detailed and seemingly biased description of the "negative" consequences of oyster aquaculture to the Drakes Estero seem unnecessary if they are merely to inform the decision of whether or not the proposed extension of the permit will have impacts at this broad level. My comments are therefore designed to improve the treatment of these sections with regard to the science itself, so that the consequences are more accurately depicted, because the document itself and actions taken in this estuary could reflect on similar decisions made in other estuaries where maintaining a wilderness is clearly not the primary management goal. Other NPS policies for maintaining and preserving native species and/or restoring their "natural abundances diversities, dynamics, distributions, habitats, and behaviors" and "minimizing human impacts on native plants, animals, populations, communities, ecosystems and the processes that sustain them" are also restrictive, but at least leave some latitude for human activity and thus could be comparable and compatible with some aquaculture management goals. My specific comments are as follows:

Chapter 3

Impact topic: eelgrass

P 170 para 2 line 8 - Eelgrass beds form the base of the food web….. While eelgrass beds are very important and certainly structure the benthic food web, I would argue that they do not form **the** base of the food web themselves. Although eelgrass is directly fed upon by black brant, other waterfowl and a few invertebrates, there are probably more organisms that feed directly on phytoplankton and benthic algae and diatoms in west coast estuaries. The food web is largely based on detritus and eelgrass detritus is likely a very significant carbon source in Drakes Estero, but I suspect that pelagic and benthic phytoplankton are as or more important. There are no studies on this in DE, but there are some in other west coast estuaries. Thus I would change this sentence to say that eelgrass helps structure the food web and contributes to primary production and would also change the last sentence in para 3 on page 161 to emphasize the dominant role that both eelgrass and phytoplankton play.

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Impact topic: Wildlife and wildlife habitat

P 173 para 3 line 5 – delete Dumbauld 1997 – it's just an abstract and instead cite Dumbauld et al. 2001 here
P 175 para 2 line 1-4 – this gives the impression that the eight species of bivalves listed here are all native – *Gemma gemma* and *Musculista senhousia* are not
P 175 para 3 lines 12-17 – Dumbauld et al 2009 is a review paper. We did not do research in DE and recent work in Willapa Bay – stated as Wheat et al in prep in the 2009 review, suggests that bivalves can at least influence the phytoplankton both across the tidal flat and even over the estuarine gradient in that estuary (see page 203-4 in that review). Due to the lesser scale of operations in DE, I would agree that oysters probably have only local effects there and perhaps very limited effects on nutrients in the sediments, but this general statement that they have limited influence in all estuaries is perhaps misleading and does not necessarily apply- especially with regard to filtration capacity. Perhaps modify the sentence to read " most of these broad ecosystem level influences"
P 176 para 3 line 1 – I would cite a different reference here – e.g. Ruesink et al 2005
P 177 para 2 line 5 – Though the oyster industry provides a mechanism for spread, *Didemnum vexillum* was not introduced by the oyster industry, especially to Drakes Estero and the references you cite even say so. Accordingly, this statement appears to be scientifically incorrect so delete the second half of this sentence
P 177 par 3 line 4 - I do not see how this reference to discarded *Mya arenaria* applies to anything here. The next sentence is also not necessary as it simply emphasizes that hard structures enable fouling organisms to settle (presumably both native and non-native) and this will be amply covered in Chapter 4.

Chapter 4

Impact topic: eelgrass

Impacts of Alternative A – In most cases I only comment on Alternative B, since the "beneficial" effects of Alternative A would presumably be opposite to the "negative" effects of Alternative B, however this might not always be the case because background conditions and not aquaculture could be limiting eelgrass or benthos and therefore removal of aquaculture might have no observable effect.

Impacts of Alternative B

P 265 para 2 last sentence This reference documents the influence of typhoons and floods on 1000 m^2 areas devoid of seagrass in Australia – a scenario that appears highly unlikely and not relevant to smaller propeller scars in DE. It seems unlikely and certainly can't be documented that scars in DE cause increased resuspension of sediments.

P 266 second para line 8 – While the premise of increased turbidity causing a loss in seagrass biomass is fine, the ability of passing boats to cause this is not substantiated by the references listed. Koch 2002 concludes that "the negative impact of boat wave generated waves on seagrass habitat quality was minimal" and that "boat generated waves were very small when compared to naturally generated waves at the study site" in Chesapeake Bay. This appears to be a misuse of the scientific literature.

P 267 para 4 – I do not see scientific evidence that supports the conclusion that there would be long term moderate adverse impacts . These are defined as "clearly detectable and appreciably affecting individual plants, beds, and natural processes" as well as "measurable changes to eelgrass system health" on page 261. In contrast, the data seem to argue that effects will be minor adverse which is defined as "localized and slightly detectable, but not affecting the overall structure of the natural community" or eelgrass ecosystem health at the local or regional scale. No effects on "ecosystem health" are documented here.

P 268 para 3 line 8 – aside from the cultured animals themselves, there is no evidence for current "shellfish mariculture-related introductions of non-natives and no real evidence for long term adverse effects on eelgrass either (*Didemnum* is present and clearly cause for concern, but there is no evidence yet that it is causing a long term negative effect) . This sentence should be either deleted or re-written to say" increase the potential for expansion of non-native species due to hard substrates provided, which may have a long – term effect on eelgrass.

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Impacts on Benthic Fauna

Impacts of Alternative A

Page 274 para 3 line 14 – I would say reduce the risk of continued naturalization if these clams are already there.

Page 274 para 4 line 3 – again I would say reduce the potential for additional colonization by invasive tunicates

Page 275 para 4 – line 5 – delete last 2 sentences – It's not clear to me what potential dredging is being referred to here and the term beneficial alone is subjective in the last sentence – beneficial to some species and not to others, which is already described above and further described under alternative B.

Page 276 para 3 line 9 – Where are these "beneficial" effects on bivalves, polychaetes, and ostracods documented? This is not discussed above and just appears here in the conclusion without any supporting documentation.

Impacts of Alternative B

Page 277 para 2 line 1 – this is a very one sided description of the very limited effects observed by Harbin Ireland in a rather limited study. "Certain" benthic invertebrates that were found to be lower in abundance were limited to the tanaid *Leptochelia* for example which is a tube builder, but also highly mobile and the abundance of several others (amphipods) was actually enhanced. The seasons sampled in the Harbin-Ireland study were not ideal and implications of these small scale and perhaps only seasonal changes are not really known.

Page 277 para 3 line 1– again, it is not accurate to report similar reductions since Harbin-Ireland didn't really see overall reductions in DE. Furthermore results from elsewhere are actually mixed and depend on existing habitat and other factors like the density of culture and current flow. Some researchers like those cited here, reported reductions particularly where shellfish are densely cultured or in areas with low current flow such that biodeposits cause nutrient enrichment (neither of which is the case in DE) but others found little effect and increased species diversity and sometimes abundance – especially compared to areas with no structure present (e.g. cite Dumbauld et al 2009 for review or cite De Grave et al. 1998, Chamberlain et al. 2001, Malet et al 2006) . Therefore we might not expect big differences between the benthic community under culture racks in DE and areas nearby because density of cultured organisms is relatively low, tidal current flow relatively strong, and comparisons are being made with structured habitat in the form of eelgrass.

Page 277 para 4 line 9 – higher in oyster beds than adjacent unstructured.....

Page 277 para 4 line 12 – Hosack et al. 2006 results showed lower density but not diversity in on-bottom oyster beds than in eelgrass habitat – diversity was not distinguishable at the class level. Hosack found similar patterns for epibenthic invertebrates.

Page 278 paras 1and 2 - These seem like good arguments for suggesting no aquaculture occur in wilderness areas, but they do not require further embellishment.

Page 278 para 3 line 2 – I would cite Ruesink et al 2005 here again not Trimble et al. 2009

Page 278 para 3 lines 4-11 – the general arguments for species displacement are valid, but it seems fair to point out the nature of the examples being pointed out here = areas where shellfish culture is extremely dense with a long history of total replacement e.g. Venice Lagoon where manila clams have been intentionally planted and shellfish culture encouraged to the extent that they occupy most of the area in a very small estuary – clearly not comparable to DE (Pranovi reference) and even Willapa Bay where 20% of the tideflats are occupied by shellfish aquaculture.

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Page 279 para 3 line 11 - This is another direct misuse of the literature – although aquaculture was found to be important, the Herberg et al reference in fact lists barge movement as the most likely vector for transport in British Columbia. While aquaculture will clearly influence its spread within DE, this implies that aquaculture contributed most to its introduction and spread along the west coast – not true. Movement from estuary to estuary is certainly possible, but movement of adult oysters is restricted, unlike the movement of other vessels which are more likely culprits. This should be changed because the wording suggests a conclusion that is not supported by the relevant science.

Page 279 para 4 – not sure how this is relevant to the next ten years.

Page 280 para 2 – The science suggests that effects on benthos **could** be moderate adverse, particularly if non-native organisms like colonial tunicates or perhaps the shellfish themselves expand greatly in 10 years where they could "appreciably affect groups of species, communities , or natural processes, but there is no documentation to suggest this is occurring yet. Once again adverse is only adverse relative to NPS regulations and management goals and not to the benthos or system per se.

Impacts on Harbor Seals

No comments here since I have little direct expertise with pinnipeds

Impacts on Fish

Impacts of Alternative A

Page 287 Para 3 lines 2-3 – studies including Weschler's 1996 study in DE have shown structured habitats like eelgrass to be more important than open mudflat for many species which utilize this habitat for protection and/or for feeding. In most cases however, no detectable differences have been seen between abundance of fish in eelgrass or aquaculture as structured habitat. Although some fish, like bay pipefish and tubesnouts and perhaps even juvenile coho salmon may be primarily associated with eelgrass, juvenile groundfish like English sole and ling cod have not. The claim that the removal of oyster aquaculture will be beneficial for these species is simply unfounded and not supported by the scientific literature. While estuaries in Washington and Oregon have been shown to be important for juvenile English sole this may not be the case for DE and Weschler did not sample any there. Instead he found another flatfish - speckled sandab to be more abundant there and more abundant in DE than in Estero de Limantour. The next sentence refers to some secondary benefit to larger piscivorous fish and birds that might feed on these juvenile groundfish – with no supporting information except the general PFMC groundfish management plan. Based on Weschler's data, I would suggest that the eelgrass in DE might be more important for baitfish like top smelt and jacksmelt that at least birds are more likely to use. While the claim is at least qualified with ""may benefit" in the last sentence of this paragraph, it should not be made at all without additional supporting documentation.

Page 288 Para 4 line 1 – Concluding that this alternative would result in long-term beneficial impacts on fish and especially focusing on fish in the Groundfish Plan is simply not supported by any existing data as noted above.

Impacts of Alternative B

Page 289 para 2 line 5 – claiming an adverse impact on fish habitat, particularly as it relates to the PFMC groundfish plan and Pacific herring is not supported by the literature as noted above. Pacific herring do however spawn on eelgrass, but the authors do not mention this nor cite any supporting information that herring spawn in DE. The next two sentences are also not supported by the literature as noted above under alternative A.

Page 289 para 5 line 1 – long-term minor adverse impacts with localized changes to the natural species composition seems appropriate here. It's not clear to me why impacts to eelgrass (as noted above) would not be the same.

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Impacts on Birds

Impacts of Alternative A

Page 305 para 2 line 4 Kelly et al. 1996 do not report on operation staff causing biological disruption of feeding activities, but do report that some species avoided aquaculture plots. NAS 2009 do not speak to reduced fitness, but instead state that the presence and activity of mariculture workers on plots did not affect the distribution of shorebirds and that no movements in or out of the culture plots were associated with this activity correctly citing Kelly's results. This is a misuse of the literature and does not substantiate "beneficial impacts on bird populations in DE as claimed.

Page 305 para 3 – this entire paragraph relies on no information specific to DE and very little information that is even specific to coastal birds , let alone birds in DE exposed to motorboat traffic. The Barber et al reference is a very general paper on chronic noise exposure. While it is acknowledged that the following references are about multiple species and unrelated human activities, it seems unnecessary to cite papers about chronic exposure of ovenbirds to industrial noise and pronghorn antelope to military aircraft noise and expect the reader to assume that these relate in any way to occasional boat traffic and waterfowl and shorebirds in DE. The last sentence which discusses flushing and some potential disruption of activity seems sufficient.

Page 305 para 3 line 8 – there is information about foraging habitat but resting habitat is not mentioned in the references cited.

Page 305 para 3 lines 12 - 14 While it is true that there is no evidence the cultivation bags provide the only foraging opportunity for surface feeding birds, the same could be said for other probing species of birds cited above who would then not be expected to see beneficial impacts from removing the bags. Thus the authors go out of their way here to justify beneficial impacts of removing aquaculture and minimize negative impacts of this removal – neither of which is necessary.

Page 305 para 5 line 1 – long-term "beneficial" impacts on birds may occur, but can only be attributed to reduced human disturbance, because actual mechanisms and effects of this disturbance have not been demonstrated.

Impacts of Alternative B

Page 308 para 1 The references used here are at least for waterbirds and waders, but a comparison of personal watercraft and outboards in one case. The statement attributed to Kelly et al 1996 is not accurate – they do not present data on flushing or bird behavior and in fact document the lack thereof for some species. There is no discussion of sound from boats or wakes nor actual interruption of "critical behavior". There are unsubstantiated statements in the NAS report with regard to flushing, but also qualifications that population consequences are unknown.

Page 308 para 2 – Documentation of noise at the DBOC facility and the potential for disturbance from this seems appropriate, but the literature cited here again is from very different scenarios and appears to be taken out of context. The references describe the effect of chronic road noise on behavior of oak beech forest birds and passerines. The claim that this **could** reduce overall fitness of shorebirds and their ability to successfully reach migratory breeding habitats and breed successfully is a hypothesis at best, but cannot be substantiated. While it doesn't negate the value of maintaining DE as one relatively pristine and silent stopover location, given the other estuaries along the west coast which have much more significant sources of noise and still function as additional migratory stops for these birds – it seems like the impact of this one operation could at best have minor effects on these bird populations as a whole. My somewhat limited survey of the literature suggests that many birds (also mostly terrestrial species) have adapted to these human disturbances in ecological time.

Page 308 para 3 lines 11-15. The idea that shorebirds and waterbirds might be more susceptible to having their calls masked because they communicate at low frequency is a nice hypothesis as well, but the Douglas and Connor reference cited here actually speaks to the adaptations that coastal birds have made to natural low frequency sounds like waves that are present in the coastal environment. This could mean they are already able

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to communicate in the presence of artificial sounds like boat noise in this frequency. This seems like a good research topic, but citing "a potentially reduced capacity to communicate and carry out normal biological activities " is a stretch.

Page 308 para 4 line 1. The Lima 2009 reference cited here is a review of the ability of birds to assess and adapt to predators and predation risk by changing breeding and nesting behavior (again mostly terrestrial examples). I could find virtually nothing in it about the effects of sound and most of the birds in DE are not breeding at this location, though perhaps one could argue this for others in the marsh or uplands near the DBOC facility.

Page 309 para 1 The Rabin et al 2006 reference cited here focuses on the effects of noise from wind turbines on antipredator behavior of Califonia ground squirrels. Though bird and squirrel behavior might be similar, the authors do not make this distinction and thus this seems like a deliberate and deceptive stretch. I would agree there is potential that birds avoid habitats, but no documentation even suggests this is true and/or that it "reduces the availability of habitat containing the best cover and food".

Page 309 para 3 – this paragraph repeats some of the arguments made under alternative A that the benthic habitat for foraging shorebirds will be compromised. The Press 2005 reference is mis-cited here as it does not cover shellfish bags, but instead algal mats. The same algal material occurs in association with shellfish bags, but the reference to cite would be Kelly et al. 1996. There is no evidence for population effects so the wording should be changed to say …could be expected to have an adverse effect on the foraging habitat for some probing birds in DE". The last sentence is not necessary since a similar argument could be made that there is no evidence to suggest that the area under the bags provides the only foraging opportunity for probing species.

Page 309 para 4 – While there may be a negative impact to eelgrass and therefore black brant foraging area from the aquaculture there is no evidence that eelgrass isdeclining, nor that it limits or affects brant foraging since brant populations have been increasing. The statement about DBOC racks limiting access of water column feeders and altering prey species diversity by attracting structure oriented species is an interesting hypothesis, but again based on no available science.

Page 310 para 1 line 2 – none of these statements is based on any direct science and the last sentence here should be deleted or changed because implying there will be population level effects is simply unfounded.

Page 310 para 2 – The science suggests that there could be minor long term adverse effects on birds and bird habitat, but there is no evidence for appreciable and clearly detectable effects on individuals or groups of species, communities or especially natural processes.

Page 310 – para 6 – statements in the conclusion here also reflect long term moderate adverse effects, which I would argue will be difficult to detect and not be clearly detectable.

Impacts on Special-Status Species

Impacts of Alternative B

Page 322 para 4 line 5 – eelgrass is not directly fed upon by juvenile salmon nor even by most salmon prey items which usually feed on the algae and diatoms found on the eelgrass blades – change and simplify this to read … serve as habitat for salmon prey items and provide cover for predator avoidance.

Page 322 para 4 line 7-9 – agree that this might happen, but The Watershed Company reference is about docks in lakes

Page 322 para 4 line 9-12 – wow, all this to describe potential habitat – any evidence that these coho salmon ever utilized this small estuary and watershed??

Page 322 para 6 line 5 – same argument as above – neither steelhead nor most of their prey items feed directly on eelgrass.

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Page 323 para 3 – seems like evidence of actual use of the eelgrass in DE by leatherback turtles should be provided here before assuming impact.

Page 323 para 4 – line 7 – again – neither the NAS 2009 nor the Kelly et al 1996 references present data on flushing or bird behavior and in fact document the lack thereof for some species. There are unsubstantiated statements in the NAS report with regard to flushing, but nothing said about reduced fitness nor actual behavioral disruption and in fact only qualifications that population consequences are unknown. The Stillman et al 2007 reference for Europe is about how to use individual based models to get at these effects, but they are not documented in this reference. It seem like a more direct reference for snowy plovers should be made here. My understanding is that they are more likely to feed on open ocean beaches, very high tidal pans, and high intertidal areas and not as likely as other species to come in to contact with the aquaculture operations (USFWS recovery plan 2001), but I see they were observed in both DE and Estero de Limantour by Page and White 1999.

That is the extent of my individual comments which are primarily focused on Alternative B. Clearly they should reflect and be incorporated as necessary in the shorter sections covering alternatives C and D as well. In summary, the treatment of the effects of extended aquaculture operations in DBOC in this document, appears to emphasize and exaggerate negative impacts instead of fairly representing the albeit limited science available. It is not clear why this is necessary given that any impact of human activity would be viewed as adverse in relation to NPS policy for wilderness. I therefore argue for accurately depicting what are mostly minor impacts with the best available science instead of what appears in some cases to be a purposeful mis-representation, merely to suggest a more moderate impact intensity.

Sincerely,

Brett R Dumbauld

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[redacted]

9 December, 2011

Comment on
Draft Environmental Impact Statement, Drakes Bay Oyster Company
Special Use Permit (Draft of September 2011).

Melanie Gunn
Outreach Coordinator
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1 Bear Valley Road, Point Reyes Station, California 94956
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Dear Ms Gunn,

Please find below my considered comment on the Environmental Impact Statement (EIS) mentioned above.

I am Associate Professor of Microbial Ecology at the University of California, Berkeley. As a member of the Department of Environmental Science, Policy and Management I have focused my research and teaching for the last 17 years to the study and understanding of questions in microbial ecology that affect larger environmental scales. I am also a Senior Researcher at the Norwegian Center for Biosafety (GenØk), the world's only institution dedicated to the understanding of Gene Ecology, i.e. the ecological dynamics of human interventions in the environment at the genetic scale. My laboratory research has focused for the last twelve years on the question of genetic pollution, gene movement in the environment, and the processes driving the flow of genetic material across various taxonomic elements in ecosystems. Prior to Berkeley, I have also 15 years' experience working on environmental policy-making at the national and international levels, as well as experience in industry (pharma- and agrochemical discovery) and in the collaborative management of natural resources with indigenous communities in the Americas. The evaluation of the Environmental Impact Statement (EIS) relating the commercial cultivation of molluscs in Drakes Estero falls directly into my area of expertise, although I wish to make clear that I make these comments as a member of the public, and not in representation of my University or GenØk.

I have read the carefully prepared Environmental Impact Statement (EIS) commissioned by your office and although I find the aspects covered there of great importance, I also wish to point out a series of major omissions in the field of my expertise.

Disclaimer: (i) This comment is presented on a personal basis, and does not necessarily represent the position of UC Berkeley, the Department of Environmental Science, Policy and Management, or the Center for Biosafety, Norway. (ii) The comments made here are not exhaustive, and are meant to indicate areas of concern in the EIS which should be developed further with the appropriate expertise.

Abstract:

I consider several omissions from the EIS draft of September 2011. In particular, I address questions pertaining to the microbial ecology of Drakes Estero and the impacts existing and expected from an extended presence of a mollusc farming operation there (the Drakes Bay Oyster Company, DBOC).

Questions that one should expect from a complete EIS, yet are not addressed in its current draft, can be seen in three categories as follows:

I. Questions of Genetic Diversity and Microbial Ecology.
The Estero is a key link and support for a large area including a Marine Reserve and a Marine Conservation Area. Many key stages of organisms important to these three environments find refuge and sustenance in the Estero. Given this key role, what are the effects of DBOC's activities, in particular the importation of germplasm from distant marine environments? Such germplasm includes both intended (e.g. larvae, juveniles of commercial species) and unintended materials (e.g. pathogens, parasites and diseases of commercial and non-commercial species). Given the existing pressures in the commercial rearing of molluscs, what are the effects to be expected from possible new avenues that DBOC's commercial demands may exact? In particular, how would the local environment be affected by the mass-rearing of polyploids, transgenics and high-bred varieties? What are the known or expected effects of these developments on the genetic diversity within populations, and on the species diversity within the community in the Estero? What are the consequences of extractive practices implied in maintaining large volumes of mono-specific ("monoculture") biomass and in exporting them to markets away from the Estero watershed? Given the rapidly changing physical and biological dynamics of the ocean environment, how will this mass-production and extraction pressure the ecosystem towards known tipping-points (e.g. widespread mollusc population failures due to altered O_2/CO_2 and pH balances)?

II. Questions Relating to Parasites, Pathogens and Disease.
The history of commercial production of shellfish is marked by boom-bust dynamics due to predictable effects of monocultures of poorly known organisms in the context of complex and hardly understood environments. Parasites, pathogens and disease are main drivers of these dynamics. Given such a boom-and-bust ecology, what are the known and foreseeable effects of an extended lease to DBOC in the expected importation of pathogens, parasites and viruses affecting both the cultivated species as well as non-cultivated ones? How can one establish the risk of intentional releases of commercial species in the future of DBOC becoming themselves ecologically damaging?

III. Questions of Bioprospecting and Benefit Sharing.
In a rapidly changing world, and given enormous and growing pressure to utilize wild biological resources to address the very problems associated with the commercial exploitation of aquatic organisms, how is the public trust served by the presence of DBOC in Drakes Estero? Is the public losing precious and irreplaceable resources by the short-sighted and comparatively meager profits of one company, where in fact the future of a whole international industry could be at stake?

Conclusion and opinion: It is my considered opinion, based on my evaluation of the EIS draft as it stands and in addition to my analysis presented here, that neither the environmental nor the public missions of the Point Reyes National Seashore are served by the presence today of the DBOC. It may have been appropriate to suggest a commercial operation of its nature in this location a century ago, but given the real situation of this environment in the 21st Century, the proposal seems plainly anachronistic and unjustifiable. To suggest that this commercial operation should be extended and even augmented into the next decade seems to me antithetical to good common sense understanding, let alone to the balance of a sound ecological analysis.

The EIS under consideration deals almost exclusively with megafauna, and with the impacts effected by large perturbations of the physical environment, such as substrate quality, soundscape, chemistry, etc. Absent from consideration in this EIS, however, are two large areas of concern which are equally –if not more- important than the macroscopic effects associated with the oyster cultivation in Drakes Estero: First, all aspects of genetic diversity and genetic integrity of the biological community (permanent and temporary residents) seem totally overlooked; second, the microbial dimension of impacts stemming from the commercial cultivation of oysters and other molluscs in Drakes Estero is only tangentially mentioned in the case of a possible introduction of disease agents, but other aspects of this nature are left out of the current draft of the EIS. It is my considered opinion that such aspects should be included in a complete EIS, along the lines sketched below.

I. Genetic Diversity and Microbial Ecology

Oyster farming at Drakes Estero is presented in the EIS as a locally-contained operation, almost without links to the outside environment. This is a false assumption, since there are indeed important imports and exports of materials and information in- and out of the Estero farming ecosystem. Not only is the Estero, under natural conditions, a linking element between the terrestrial ecosystems of its watershed and the marine environment in Drake's Bay and beyond, but also significant inputs are brought in specifically by the mollusc farming operation in the Estero.

The importation of "informatic" inputs is of particular relevance: commercial cultivation of molluscs relies on the continuous importation of "seed" materials, the larval or juvenile forms of the animals which are generated in remote locations. The specific source of such material may change, but the important observation remains that genetic information ("germplasm") is being imported in massive amounts, intentionally and unintentionally, into the Drakes Estero ecosystem. Drakes Bay Oyster Company (DBOC) can change its source of seed depending on a variety of considerations, so I will take for example and to give an illustration of the questions raised, one of the companies from whom DBOC is known to have acquired seed material in the past, the Taylor Shellfish Farms near Seattle, Washington.

Taylor Shellfish Farms have operations, and thus *physical continuity* between sites in Washington, Mexico, British Columbia, Fiji and Hawaii. The biological implications of this continuity immediately raise questions such as: What are the known and the possible/probable risks of the movement of germplasm between such disparate and remote locations and into the ecosystem at Drakes Estero? To what extent introducing germplasm from allopatric populations/exotic species into the Estero can/will result in a decrease in diversity, both genetic diversity within populations as well as species diversity in the community of the Estero and beyond? What are the effects of germplasm brought into the Estero inadvertently as specific genotypes of the intended species, or as viral/microbial/microscopic species introduced along with them? These critical questions are not considered in the EIS as it stands.

A typical path for an oyster at DBOC would begin in the hatchery in Hawaii (chosen by Taylor Shellfish Farms as a remote and isolated location precisely in recognition of the risks associated with the mass cultivation of the mollusc), and then transported to growing tanks in Washington State before delivery to Drakes Estero. At least two evident impacts –or the potential for such impacts- emerge from this far-flung pathway, the impact on local biological diversity and the impact on local ecological health.

Commercial production of oysters, like any other production aimed at a mass-market, privileges homogeneity and reproducibility. These two qualities, which are necessary for the reliable management and marketing of the product, are directly counter-indicated when the aim is that of maintaining or increasing *diversity* in nearby populations or communities. Not only does the mass cultivation of a homogenous variety produce an inevitable genetic bottleneck, but the release of such a homogenous population into the environment leads to disturbed dynamics in the population genetics of its conspecifics as well as other species in the ecosystem. Commercial varieties -more robust, faster-growing and maintained by human support as dominant elements of the ecosystem- tend to physically, reproductively and competitively crowd-out members of the same ecological guild, particularly those of the same species

or genus as the cultivated species. The mechanisms for such crowding-out are varied, and range from direct competition for food, space or other resources, indirect support of predators, sexual competition and indirect competition through parasites and pathogens. Competition for food, space (in the water column, as well as on anchoring substrates) and other resources is relatively self-evident in the case of Drakes Estero and I will not further elaborate here, even though this question is hardly discussed in the current EIS draft.

Whether imported seed is used for the culturing of exotic species or locally obtained larvae are cultivated, the effects on diversity and health are still a source of objective concern, because the human-supported mass-rearing from a small sample of diversity will still drive the process in the Estero towards genetic bottleneck effects in the population genetics, crowding-out of diversity and competition effects as described above. Certainly, a different quantitative analysis would be required to consider in detail such concerns for each scenario, but the principles are indeed clear and should have been included, in my considered opinion, as an important part of the EIS. I note from the EIS as well as from news reports that DBOC has had an ambivalent position with regards to the balance between their production from exotic species as opposed to production from locally-harvested samples that are reared artificially. In some statements, DBOC seems to suggest a commitment to the cultivation from native stocks, while elsewhere DBOC shows an active pursuit of aggressive cultivation of exotic species (for sufficient examples see pp. 153-154 in the EIS). Because of this ambivalence, prospective scenarios would need to be considered in the EIS for both, or alternatively some strict assurance should have to be required from DBOC to use only the genetics and diversity scenario actually studied in the EIS. To stress the obvious point, none of these questions are included or even considered for inclusion and then dismissed in the EIS as it stands. The observation that European flat oysters have managed to establish a viable population in the Estero, surviving for at least 40 years (EIS, p. 177) should be taken as a serious cautionary tale.

Polyploids, Exotics and Transgenics

The shellfish industry is in a phase of both technological boom and environmental catastrophe. A very young industry (by comparison, for example, with agriculture), this is one where large transformations are still possible, but also where much ignorance still remains about the biology of the organisms involved. Among the most important technological transformations has been the emergence of polyploidization as a standard in the industry, and the continuous pressure to introduce transgenesis as a tool for further manipulation of the animals. Meanwhile, dramatic crashes in productivity have been increasingly reported over the last ten years, associated with both pathogens/parasites and changes in water quality at an oceanic scale. How DBOC influences the resilience of the ecosystem in the Estuary from both of these perspectives is left completely unaddressed in the EIS.

Artificial polyploidization (through chemical or physical means) has the advantage to the commercializer of producing larger individuals (more meat for market), as well as individuals for whom sexual reproduction is seriously hampered. The current emergence of triploids (resulting from crosses between tetraploids and diploids) as the standard in the oyster "seed" industry is equivalent in scope as well as biological significance as the emergence of F1-hybrids in crop plants, leading to a rapidly growing dependence on a much more industrialized way of producing seed and subsequently full-grown adult animals. Thus questions should be raised about the increased dependency generated by DBOC on outside sources of seed over time, with its concomitant risks, as well as the insertion into the Estuary population and community of a highly-manipulated form of mollusc with little or no precedent or equivalent in the local community. I could not find any suggestion that these important questions were considered in the elaboration of the EIS.

Because sexual reproduction is hampered in triploid oysters, it is also possible with them to produce oysters during summer months of the year when previously sexual reproduction resulted in unpalatable individuals at that time. It would also be easy to claim that sexually-impaired triploids reduce the competitive advantage of the introduced oysters compared with locals in the resident populations. However, the biological reality is that triploidization depresses the reproductive capacity of the organisms but only in a probabilistic way: through the process of genetic mosaic-formation, some individuals, or parts of individuals may retain or regain reproductive capacity and thus participate as competitors in the dynamics of sexual reproduction with the rest of the population in the Estuary.

The ecological consequences of an industrial manipulation such as polyploidization are difficult to foresee, given that they conjoin complex traits such as increased vigour, partial sterility and at the same time the possibility of cross-breeding and introgression into the local populations of conspecifics. In the context of the EIS under consideration, however, the fact that this can be predicted to be a complex situation not mirrored by any pre-existing situation in the natural ("wilderness") situation should be a source of increased scrutiny, not dismissal. Nevertheless, as it stands the EIS does not even consider such real potential problems.

The problem becomes more acute when one considers the fact that the industry as a whole is moving towards increased use of transgenesis as a tool for manipulation of oyster populations[1]. Transgenesis (the movement through molecular biology methods of DNA from one species to another) is being actively pursued for traits such as even more vigorous growth, and resistance against some of the known devastating parasites and pathogens. Given this trend, it is to be expected that DBOC would be faced with the opportunity, and perhaps the need to introduce transgenic oysters (aka as GMO oysters or genetically modified oysters) into Drakes Estero. The possible and probable consequences of the introduction of transgenic materials into a cultured ecosystem are well known, and these consequences should be expected to be exacerbated through the introduction of such materials into a wild environment. Again, no mention, consideration or evaluation of this real and potentially major problem is included in the EIS as it stands.

The oyster industry on the West Coast of North America finds itself in a crisis due to oyster-specific problems (pathogens/parasites, see below) and general, ocean-wide change such as acidification, warming, eutrophication, etc. Drakes Estero plays a critical role in maintaining the diversity necessary to confront such challenges into the future, especially if diversity of native molluscs was maintained. In particular, highly-sensitive forms of benthic and pelagic species such as larvae and early life-stages of a high diversity of organisms find refuge in estuaries such as Drakes Estero, from where they can maintain their populations. The presence of a commercial oyster farming operation such as DBOC seems, *prima facie*, antithetical to the role of a wilderness area in the Estero as a safe haven for such sensitive life forms.

Biological Mining

The cultivation of oysters and other molluscs in coastal environments such as Drakes Estero can be compared only to a limited extent to agricultural or husbandry systems. It may be more accurate to refer to such operations as "biologically-mediated mining", in the sense that most of the materials extracted (in the case of DBOC, hundreds of thousands of pounds of oysters every year) are subsidized by the standing mass of such materials in the ecosystem, not introduced from the outside as it is in more controlled agro-ecosystems. In this light, oyster beds are biological media used by humans to extract processed matter and energy from the ecosystem where the "farming" is taking place. In this light, it would be important to ask what consequences may be expected or already documented associated with such "mining" of the ecosystem. None such question is to be found in the EIS as it stands.

To follow one of many possible examples, the use of calcium and carbonate to be able to build calcium carbonate shells is one key function that is often taken for granted in the formation of oyster "product" sold in a market. Calcium, carbonate and the concomitant elements necessary for the formation of an oyster are all provided by the ecosystem to the "farmer" for free. Although we tend to take such ecological goods for granted, the current situation along the Western board of the US is developing to a point where the very survival of commercial (and native) oyster beds is in question (just as it happens for corals and many other aquatic organisms)[2]. Since the early 2000s, a general decline in seawater pH, increase in its temperature

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[1] See, for one example among many, the work of Cooper and Tiersch cited in a report to NOAA's Sea Grant. Multiple references to be found in their 2003 Abstract presented to the workgroup on "*Genetics and Oyster Populations: Optimization of gene delivery for improved oyster health*"
http://www.mdsg.umd.edu/issues/chesapeake/oysters/research/meeting/abstracts/abstract31.html , accessed December 2011. It must be noted that the first patent granted on the transgenic manipulation of a metazoan, in 1987, applied to transgenic oysters.

[2] See: Feeley, R.A., Alin, S.R., et al. 2010. The combined effects of ocean acidification, mixing, and respiration on pH and carbonate saturation in an urbanized estuary. *Estuarine, Coastal and Shelf Science* 88 (4):442-449. And references therein.

and an increase also in CO_2 concentrations all have led to a decrease in the amount of calcium carbonate that can be precipitated out of solution to make oyster's and other organisms' shells (this is properly noted on p. 176 of the EIS, but not pursued). The drops in levels of aragonite/calcite (precipitated calcium carbonate) in these conditions have been demonstrated in seawater along the Pacific coast, and is known to cause serious challenges to many organisms, impairing the overall calcification rates for many species of marine calcifiers, including cold water corals, coccolithophorids, foraminifera, sea urchins and pteropods, and of course, mussels, clams and oysters, all important components in the trophic chain and organization of marine environments in the estuary and in the ocean. Biological oxygen demand imposed on an ecosystem by the forced rearing of massive amounts of aerobic organisms such as oysters tend to worsen this situation through both the removal of oxygen (leading also to increased CO_2 concentrations and decreased pH), and through the added acidification of the immediate environment due to both decomposition and excretion from biomass. Once again, such critical questions are not considered or addressed in the EIS in its current form. One should be compelled to ask, in the face of this knowledge and the knowledge that environmental conditions are rapidly changing, whether a large-scale "farming" operation such as DBOC can force a tipping-point onto an ecosystem already challenged through the diversity of pressures described above. We know that the situation is close to a tipping point all along the Pacific coast of North America, since larvae and juveniles of oysters and other calcifiers have been observed to fail due to these causes in Washington and Oregon. That such a tipping point may be in fact near in Drakes Estero seems supported by recent failures of oyster larvae raising at the DBOC itself[3].

The foregoing is only one example which is currently being studied intensively, but one should ask similar questions about other materials being extracted from the Estero ecosystem by the DBOC, such as nitrogen, phosphorus, and many others. Such effects accumulate over time, and thus become very relevant when considering the extension of a DBOC lease into the future. In general, the question should be asked: to what extent can an ecosystem sustain the prolonged extraction (biological mining) of various materials from a watershed, especially when the ecosystem in question is slated to become a wilderness area, a refuge for the larger oceanic environment in the Point Reyes State Marine Reserve and the Point Reyes Marine Conservation Area, which the Estero supports by maintaining sensitive larval, juvenile and other life forms[4]?

II. Ecosystem Health: Pathogens, Parasites and Disease

The EIS under consideration appropriately identifies two non-native species *Didemnum vexillum* and *Batillaria atramentaria* as species of interest for evaluation. In addition to representing a large range of species which are exotic to the Estero, these are important also because they are known to cause significant damage to wild and cultivated aquatic species. The question is raised in the EIS, even though not really addressed, as to whether the tunicate and snail may simply be representative of future species to be inevitably introduced through the movement of various materials from one ecosystem to the other.

The EIS fails to consider other equally important organisms and relationships which would likely be impacted by the continued presence of DBOC in the Estero. As discussed above, DBOC must continuously import biological materials from the outside, making the introductions of exotic species not a question of possibility, but one of probability: the probability that introductions will occur is in direct proportion to the intensity of importation of outside materials, which is obviously directly related to the length of permanence of the "farming" facilities. The list of species posing considerable risks as introductions into Drake's Bay is long, and includes animals, algae, plants, and very importantly also microbial species and the microscopic forms of non-microbial life. A sound EIS cannot be complete without consideration of these species.

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[3] Cashulin, K 2010. After 30 million deaths, farmer seeks new seed. Point Reyes Light, 7/29/10. http://www.ptreyeslight.com/Point_Reyes_Light/Home/Entries/2010/7/29_After_30_million_deaths,_farmer_seeks_new_seed.html. Accessed Dec. 2011.

[4] See: Callum, MR et al. 2003. Ecological criteria for evaluating candidate sites for marine reserves. *Ecological Applications*, 13(1) Supplement, 2003, pp. S199–S214, and references therein.

Microbes affecting molluscs directly will be among the most obvious among those one should expect to be introduced through continued mollusc cultivation: high concentrations of a single species in hatcheries, rearing tanks and cultivation beds are all ideal ecological conditions for the selection and reproduction of microbes adapted to live with these mollusc species. Many of the species to be expected will be specific to the mollusc under cultivation, but many others will also be less specific, posing a real and serious risk for the onset of epidemics among resident, non-commercial species in the Estero.

The EIS draft as it stands does mention the introduction of *Haplosporidium nelsoni*, the agent of the puzzling "MSX-multinucleate sphere unknown" disease of oysters, as well as a herpesvirus which seems to have become established locally in recent times[5]. But the history of oyster cultivation is a narration of waves of disease and parasitism with massive losses, which should be expected from obvious biological principles of invasion biology; it is only a matter of time before new waves of parasites, pathogens and other disease agents become imported through commercial operations. A thorough EIS should therefore include consideration of the effects of other known introductions of pathogens such as "Dermo" disease, roseovirus, the "Quahong Parasite Unknown" found on clams, *Bonamia ostreae* of flat oysters, *Vibrio tubiashii* on various shellfish and the many others which will continue to inevitably emerge. Such an EIS should also establish parameters to evaluate the real expectation that many more will be introduced: a review of the microbes detected by the commercial mollusc industry yields a diverse list of poorly known and hardly understood microscopic species, most of which turn up to be new to science – this is not a coincidence, and it is clearly only a question of time before the list continues growing with unaccountable consequences. What may not be apparent, however, is that such a list represents only those organisms detected because they cause catastrophic damage in the closely-observed situation of commercial hatcheries and production areas. From an environmental perspective, however, one must ask seriously how many other such species normally go undetected yet cause untold damage to the non-commercial species in the Estero. A reasonable EIS should include consideration of this question, which is a critical one despite the fact that it is difficult to address. Whereas there may be methods to try and quantify the problem using theoretical and experimental approaches, a complete EIS would explicitly ask and answer at the very least: what is the course of action which best serves the mission of the designated area, knowing that we cannot know or quantify *specifically* the risks, while knowing that such risks are real, existing and dire?

There is a known general trend, possibly due to larger-scale change in the oceans, in the occurrence of disease organisms as major drivers of aquatic environments[6], and commercial cultivation in such environments operates as an effective magnifier of this trend. To site and maintain a commercial operation in the midst of an ecosystem already stressed by the general trend seems, in my considered opinion, *prima facie* antithetical to the stable and balanced functioning of that ecosystem. It may have been appropriate to suggest a commercial operation in this location a century ago, but given the real situation of this environment in the 21st Century, the proposal seems plainly anachronistic and unjustifiable.

III. Bioprospecting and Benefit Sharing

Throughout its history, the mollusc cultivation industry has been marked by boom-bust dynamics due to the fact that it is based on poorly known organisms in the context of complex and barely known ecological dynamics *ex*-wilderness. Commercial producers in all areas of the world cultivating shellfish have gone through these highly unstable dynamics, and DBOC is not an exception. However, Drakes Estero does provide something that other areas do not match, viz. access to biological diversity. Every time a new disease emerges in shellfish cultivation, there are immediate solutions which may or may not improve the situation, but in the mid- to long term the only viable solution which cultivators can consider is the introduction of new germplasm which can provide, through trial, error and selection, resistant stocks to maintain the industry in operation. It can be said in fact that after more than two centuries of boom-and-bust dynamics, the next stage for the industry may be one of focused, selective breeding more akin to that

[5] For a good review see: Burge, CA. 2010. Examining the roles of environment, host, and pathogen in the host-pathogen relationship between the oyster herpesvirus and the Pacific oyster. PhD Thesis, University of Washington.
[6] Ward JR, Lafferty KD. 2004. *The Elusive Baseline of Marine Disease: Are Diseases in Ocean Ecosystems Increasing?* PLoS Biol 2(4): e120. doi:10.1371/journal.pbio.0020120

typically practiced in agricultural systems for which access to wild, diverse germplasm is a *conditio sine qua non*. There is circumstantial evidence suggesting that DBOC may be aware of the potential of profiting from this important resource which derives directly from the wild, un-managed diversity in Drakes Estero: first, whether the managers of DBOC realize it or not, their drive towards including the rearing of native molluscs in the larval stage as "seed" would quite naturally lead to pressure to commercialize new genetic stock of value to the industry worldwide. Second, there are several companies that have as their explicit business plan to profit from bioprospecting in aquatic environments, and the presence of DBOC would be a key facilitator for their activities through logistic support, rearing capacity and other facilities. One of these companies, formerly called PhyloTech and now named Second Genome was founded by DBOC-vocal supporter Corey Goodman[7]. Nevertheless, no evidence is presented in the EIS of any consideration of the general questions raised by bioprospecting nor the specific stance vis-a-vis DBOC's potential involvement in bioprospecting for resistant and otherwise innovative varieties of molluscs and indeed of other biological species available in the Estero.

Needless to say, the multi-billion dollar aquaculture industry[8] should be in fact a focus of attention for the bioprospecting activities in wild environments. Such activities can represent a source of revenue and well-being but also a justified reason for concern for the public trust endowed on the NPS. The NPS has developed, through costly past experience, a series of policies and regulations to manage bioprospecting activities in lands under its stewardship[9], but there is no evidence of this experience in the current version of the EIS. A complete EIS should have considered the impact of an extended presence of DBOC on the future of the NPS' responsibility towards the public as a steward of Drakes Estero from this perspective. Is the public losing precious and irreplaceable resources by the short-sighted and comparatively meager profits of one company, where in fact the future of a whole international industry could be at stake? What steps are being taken to ensure that this is not the case in whatever scenario is chosen among the several considered for the future of the environment in Drakes Estero?

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[7] See for example: Timermann, L. 2010. PhyloTech, Corey Goodman's First Environmental Health Startup, Raises $1.2M in Seed Capital. Xconomy, 7/6/10. http://www.xconomy.com/san-francisco/2010/07/06/phylotech-corey-goodmans-first-environmental-health-startup-raises-1-2m-in-seed-capital/ , accessed December 2011. Other examples include the PhyloChip project (http://phylochip.com/), featuring another DBOC-advocate, John Hulls.

[8] FAO estimates a 2006 value of this industry at US$78.8 billion, with an annual growth in that year of 7 %. FAO. *State of the World Aquaculture*. In http://www.fao.org/fishery/topic/13540/en, accessed December 2011.

[9] See: Edmonds Institute v. Babbit et al. 42F Supp. 2d 1,4 (DC Cir. 1999).
Boens, L. 1999. Edmonds Institute v. Babbitt: Bioprospecting on Federal Lands, Public Loss, or Public Gain. *Great Plains Nat. Resources J.* 4 : 50-73.
National Park Service. *Benefits-Sharing in the National Parks Environmental Impact Statement*. http://www.nature.nps.gov/benefitssharing/legal.cfm, accessed December 2011.

DEC 0 9 2011

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December 9, 2011

Draft EIS DBOC SUP
c/o Superintendent Cicely Muldoon
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: Drakes Bay Oyster Company's Comments on the National Park Service Draft Environmental Impact Statement for Special Use Permit

Dear Superintendent Muldoon:

Drakes Bay Oyster Company ("DBOC" or "the farm") appreciates the opportunity to comment on the National Park Service ("NPS" or "Service") Draft Environmental Impact Statement ("DEIS") reviewing DBOC's request for issuance of a Special Use Permit to enable DBOC to continue to use the land and facilities within the Point Reyes National Seashore ("PRNS" or the "Seashore").

I. INTRODUCTION

In 2007, the Service published *Stewardship Begins With People: An Atlas of Places, People, and Handmade Products*, the fourteenth report in the Conservation and Stewardship Publication Series. Exhibit 1, NPS, *Stewardship Begins With People: An Atlas of Places, People, and Handmade Products* (2007) ("Stewardship Report"). In its Introduction, the Stewardship Report explains that it "is a guide to the work of friends and neighbors of U.S. national parks, heritage areas, and national historic landmarks who are practicing a stewardship ethic and demonstrating a commitment to sustainability." *Id.* at 5.

The Stewardship Report featured Point Reyes National Seashore and its long history of ranching and oyster aquaculture, and quoted Kevin Lunny of DBOC, who explained: "From our house, we look out over the oyster beds and the estuary every day . . . It's a beautiful view and it's something that we love and cherish. We're deeply committed to that ecosystem and its protection." *Id.* at 43.

DBOC remains committed to stewardship of Drakes Estero and the sustainable production of oysters, and offers the following comments on the DEIS in support of its application for a Special Use Permit to continue its operations at Drakes Estero.

DBOC's submission includes its comment letter and exhibits, the collected work of Dr. Goodman on harbor seal issues, an environmental report by ENVIRON International Corporation, and a number of references for inclusion in the administrative record.

II. BACKGROUND

The Drakes Bay Oyster Company houses the only remaining oyster cannery still in operation in the State of California. It is located within what is now the Point Reyes National Seashore, located thirty miles northwest of San Francisco, where oyster farming has taken place for nearly a century.

DBOC currently holds a 1972 Reservation of Use and Occupancy ("RUO") and 2008 Special Use Permit ("SUP") (jointly, the "RUO/SUP"), which expire on November 30, 2012. DEIS, Appendix A. The farm's onshore facilities subject to the RUO are located on about 2.5 acres of land adjoining Drakes Estero, in which oysters are cultivated. The farm also operates under the SUP, which consolidates previous SUPs issued by NPS for the purpose of supplying water for the oyster farm and using and maintaining the sewage pipeline and leachfield associated with the RUO. The oyster farm cultivates shellfish in Drakes Estero pursuant to two leases from the California Department of Fish and Game ("CDFG").

Pursuant to Section 124 of Public Law 111-88 ("Section 124"),[1] Congress authorized the Secretary of the Interior to issue a special use permit for a period of ten years to DBOC to continue its existing shellfish operations.[2] DEIS, Appendix B. DBOC has applied for a SUP from the NPS consistent with the terms found in Article 11 of the RUO, which states:

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1 "Prior to the expiration on November 30, 2012 of the Drakes Bay Oyster Company's Reservation of Use and Occupancy and associated special use permit (''existing authorization'') within Drake's Estero at Point Reyes National Seashore, notwithstanding any other provision of law, the Secretary of the Interior is authorized to issue a special use permit with the same terms and conditions as the existing authorization, except as provided herein, for a period of 10 years from November 30, 2012: *Provided*, That such extended authorization is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal. The Secretary shall take into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization. Nothing in this section shall be construed to have any application to any location other than Point Reyes National Seashore; nor shall anything in this section be cited as precedent for management of any potential wilderness outside the Seashore." Department of Interior, Environment, and Related Agencies Appropriations Act, 2010, Pub. L. No. 111-88 § 124 (2009).

2 Contrary to the Public Scoping Meeting Handout, which states "[b]efore [Section 124 of Public Law 111-88]...NPS did not have the authority to extend the permit beyond 2012," it should be recognized that NPS can also issue a special use permit to DBOC for continued operations after the 2012 expiration date pursuant to other authorities. NPS specifically contemplated allowing the oyster farm to continue operating beyond the 40-year term of the RUO, which provides that upon its expiration, NPS may subsequently issue a special use permit. *See* Johnson Oyster Company Grant Deed to the United States, Exh. C § 11 (Nov. 9, 1972). Furthermore, NPS

> Upon expiration of the reserved term, a special use permit may be issued for the continued occupancy of the property for the herein described purposes, provided however, that such permit will run concurrently with and will terminate upon the expiration of the state water bottom allotments assigned to the vendor. Any permit for continued use will be issued in accordance with National Park Service regulations in effect at the time the reservation expires.

The oyster farm provides a number of important environmental and economic benefits to the area. DBOC goes to great lengths to use environmentally-friendly and sustainable culturing and harvesting techniques. For example, DBOC is the only oyster farm in California that produces most of its own seed on-site, which reduces the risk of introducing diseases or invasive species. DBOC also uses an off-bottom hanging oyster culture method that is environmentally-sustainable yet labor-intensive and, as a result, employed by less than 5% of U.S. oyster farmers. In addition to processing all its products on-site, DBOC also markets 100% of its products to Marin County and the San Francisco Bay Area in order to reduce its carbon footprint. As discussed below, in addition to the sustainable work we perform, the oysters we grow also play a critical role in the ecosystem. Together, the humans and bivalves of DBOC are working towards a sustainable way to protect and conserve Drakes Estero for future generations.

Federal legislation and agency policies reveal the national interest in maintaining DBOC aquaculture operations. In the National Aquaculture Act of 1980, Congress expressly promotes aquaculture activities and provides that the primary responsibility for developing aquaculture activities "must rest with the private sector." 16 U.S.C. §2801(a)(6). Congress concluded that it is in the "national interest" and is the "national policy" to encourage the development of aquaculture operations in the nation in order to reduce the trade deficit for fisheries products, meet increasing food demands, and create jobs. *Id.* at § 2801(b)(4) and (c). The U.S. Department of Commerce developed its own aquaculture policy to support the development of sustainable aquaculture activities. U.S. Department of Commerce, *Aquaculture Policy*, June 2011. The Department of Commerce aquaculture policy is aimed at creating a business environment that will encourage and foster the development of sustainable aquaculture to "increase[] the value of domestic aquaculture production and create[] American business, jobs and trade opportunities." *Id.* The policy also expresses the desire for the Department of Commerce to collaborate with state and business partners to support the development of sustainable aquaculture operations. *Id.*

By the same token, the National Oceanic and Atmospheric Association ("NOAA"), a division of the Department of Commerce, also developed its own policy to encourage sustainable aquaculture operations. The NOAA aquaculture policy recognizes the benefits of sustainable aquaculture: restoration of species and habitats, nutrient removal, availability of safe and local seafood products to promote health and nutrition, and creation of jobs in local communities. U.S. NOAA, *Marine Aquaculture Policy*, June 2011, at 5. The NOAA policy instructs that the

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management of commercial operations is consistent with the Service's broader policies. NPS Director's Order #53 also provides the Service the discretion to issue a special use permit upon the expiration of the existing Reservation of Use and Occupancy. NPS, Director's Order #53, Special Park Uses (2000).

government should support commercial shellfish aquaculture operations to "restore shellfish populations that provide locally produced food and jobs, help improve water quality, and restore and conserve coastal habitat." *Id.* at 7. DBOC's aquaculture operations are focused on sustainable methods for oyster cultivation and accordingly meet these objectives and provide the benefits which the NOAA expressed an interest. Drakes Bay Oyster Company, *Mission Statement, available at http://www.drakesbayoyster.com/about_us/* (last visited Nov. 27, 2011) ("All of our growing, post harvest and delivery practices are built around sound and sustainable agricultural practices with ecological responsibility and a long-standing attitude of stewardship for the land and sea that we farm").

DBOC is also passionate about public education on issues related to conservation, the environment and the history of shellfish in the area. We provide almost daily tours at no cost to the public consistent with the RUO and SUP. DBOC is the only farm of any kind within PRNS permitted to provide visitor and interpretative services to the visiting public. Without DBOC, Seashore visitors would completely lose any opportunity for services and interpretation within the Pastoral Zone of PRNS. As the State's last operating oyster cannery and the region's only oyster seed-setting hatchery, DBOC has become an important educational resource. We open our farm to educational institutions of all levels, from pre-school through graduate school. The farm also supports scientific research to learn more about native oysters, estuarine biodiversity, and human health protection. The public has recognized our oyster farm's unique value, making it a beloved and popular visitor destination.

DBOC is participating in this National Environmental Policy Act ("NEPA") process for the issuance of the new SUP, for the use of the onshore facilities as described in the RUO that the SUP replaces, and commends NPS' plan and commitment to complete the EIS in the timeframe identified in the Notice of Intent. Adhering to this timeline will be critical to ensure that the Service complies with Section 124. DBOC is committed to working with the Service and the public during the EIS process. To that end, DBOC offers the following comments as part of the DEIS process.

III. THE PURPOSE, NEED, AND PROJECT OBJECTIVES MUST BE MODIFIED

There are significant deficiencies in the Purpose, Need, and Project Objectives set forth in the DEIS. Not only do the Purpose, Need, and Project Objectives fail to incorporate binding NPS policy, but also they improperly fail to consider DBOC's needs and goals. Accordingly, the Purpose, Need, and Project Objectives must be modified, and the DEIS corrected to incorporate those modifications.

NPS policy requires that the Purpose state the "goals and objectives that NPS intends to fulfill by taking action." NPS, Director's Order No. 12 Handbook at 16 (2001) (hereinafter, "DO-12 Handbook"). These goals and objectives can come from specific legislation, such as Section 124 of Public Law 111-88, the management objectives of a General Management Plan ("GMP"), and NPS guidelines for a particular management zone. *Id.* The Need is an "explan[ation] why your park is proposing this action at this time." *Id.*

Courts interpreting NEPA have concluded that when developing the Purpose and Need, NPS must consider DBOC's needs and goals, in addition to the Service's. *See Citizens Against*

Burlington, Inc. v. Busey, 938 F.2d 190, 196 (D.C. Cir. 1991) (". . . agencies must look hard at the factors relevant to the definition of purpose. When an agency is asked to sanction a specific plan, *see* 40 C.F.R. § 1508.18(b)(4), the agency should take into account *the needs and goals of the parties involved in the application.*") (emphasis added); 43 CFR § 46.420(a)(2) ("When a bureau is asked to approve an application or permit, the bureau should consider the needs and goals of the parties involved in the application or permit as well as the public interest.").[3] Accordingly, the Purpose, Need, and Project Objectives in the DEIS must also reflect DBOC's objectives of operating an environmentally-friendly and sustainable oyster farm, as expressed in its application for a SUP renewal. *See* Exhibit 2, Karl L. Lytz Letter to Hon. Ken Salazar (July 6, 2010); Exhibit 3, DBOC Scoping Comment Letter, Attachment B (November 24, 2010).

The DEIS statement of Need is as follows:

> Action is needed at this time because pursuant to section 124 of Public Law 111-88, the Secretary has the discretionary authority to issue a SUP for a period of 10 years to DBOC for its shellfish operation, which consists of commercial production, harvesting, processing, and sale of shellfish at Point Reyes National Seashore. The existing RUO and SUP held by DBOC will expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing authorizations.

DEIS at 5. Contrary to NEPA precedent, this statement of Need fails to consider DBOC's needs and goals, in addition to the Service's. In particular, the statement fails to even minimally describe DBOC's needs for the SUP. For example, it makes no reference to DBOC's request that the renewed SUP be issued under same terms and conditions present in the RUO/SUP, for permission to complete work authorized under the 1998 Environmental Assessment, and for permission to make select physical improvements, such as an extension of an existing seawater intake pipeline. *See* Exhibit 2, Karl L. Lytz Letter to Hon. Ken Salazar (July 6, 2010); Exhibit 3, DBOC Scoping Comment Letter, Attachment B (November 24, 2010).

The failure to adequately define the Need has caused the DEIS to inadequately present the Proposed Action for public consideration. *See* Section IV, infra. Accordingly, the DEIS Statement of Need should be revised as follows (edits in underline / strikeout):

> Action is needed at this time because pursuant to section 124 of Public Law 111-88, the Secretary has the discretionary authority to issue a SUP for a period of 10 years to DBOC for its shellfish operation, which consists of commercial production, harvesting, processing, and sale of shellfish at Point Reyes National Seashore.

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[3] Notably, this is what the NPS agreed to do pursuant to the Statement of Principles with DBOC in April 2008. DEIS, Appendix C ("NPS will consult in good faith with DBOC on the purpose and need of the project as needed, particularly during impact analysis, to assist in improving the preferred alternative to avoid, mitigate or otherwise address any adverse impacts.").

> The existing RUO and SUP held by DBOC will expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing authorizations that incorporates the same terms and conditions as the existing authorizations, allows completion of activities evaluated and found to have no significant impact on the environment in the 1998 NPS Environmental Assessment, and permits minor improvements to existing facilities.

The DEIS statement of Purpose also is flawed because it fails to incorporate relevant NPS policy and to comply with NEPA. The statement of Purpose is as follows:

> The purpose of the document is to use the NEPA process to engage the public and evaluate the effects of issuing a SUP for the commercial shellfish operation. The results of the NEPA process will be used to inform the decision of whether a new SUP should be issued to DBOC for a period of 10 years.

Id. This statement of Purpose is flawed because it fails to indicate that to the extent the NPS identifies effects associated with issuing a SUP, it is also obligated to consider mitigation measures to address those effects.

Under NPS policy and NEPA regulations, it is insufficient for a NPS EIS document to simply "evaluate the effects" of a Proposed Action and go no further. Instead, NPS policy and NEPA regulations require that an EIS include a detailed discussion of potential mitigation measures to address identified impacts. NPS Management Policies, § 4.1.3 (2006) ("The Service will ensure that the environmental costs and benefits of proposed operations, development, and resource management are fully and openly evaluated before taking actions that may impact the natural resources of parks . . . [including] . . . the full incorporation of mitigation measures . . . ."); *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989) (NEPA requires the EIS to contain a "detailed discussion of possible mitigation measures"); 40 CFR 1502.16(h) (requiring discussion in the EIS of "[m]eans to mitigate adverse environmental impacts"); 43 CFR 46.130 ("The effects of any mitigation measures other than the ameliorative design elements included in the applicant's proposal must also be analyzed."); DO-12 Handbook, § 4.5.G.6 (the NPS "must develop and analyze mitigation . . . . All 'relevant, reasonable mitigation measures that could improve the project are to be identified,' . . . ." The NPS "must also analyze the effectiveness of mitigation measures proposed, and the impacts if the project were to proceed without mitigation.").

The failure to adequately define the Purpose by including the NPS obligation to discuss mitigation measures in detail has caused the DEIS to inadequately present potential mitigation measures for identified effects. *See* Section VII, infra. The DEIS Statement of Need should be revised as follows (edits in underline / strikeout):

> The purpose of the document is to use the NEPA process to engage the public, ~~and~~ evaluate the effects of issuing a SUP for the commercial shellfish operation, and discuss in detail potential mitigation measures to address such effects. The results of the

NEPA process will be used to inform the Secretary of the Interior's decision of whether a new SUP should be issued to DBOC for a period of 10 years.

Finally, the Project Objectives improperly fail to incorporate the only "Management Objectives" from the PRNS General Management Plan ("GMP") that are particular to the oyster farm. The Project Objectives as stated are:

- Manage natural and cultural resources to support their protection, restoration, and preservation.
- Manage wilderness and potential wilderness areas to preserve the character and qualities for which they were designated.
- Provide opportunities for visitor use and enjoyment of park resources.

Id. Although the DEIS cites no source for these "Project Objectives" (DEIS at 5), these important PRNS values can be traced back to the GMP, and the NPS Management Policies (2006). *See* GMP at 1-2 (natural and cultural resource protection, restoration, and preservation); NPS Management Policies, § 6.2.21 (2006) (manage wilderness and potential wilderness); GMP at 3-4 (visitor use and enjoyment of park resources).

The NPS Management Policies explain that the GMP is a vital park management tool that "(1) clearly defines the desired natural and cultural resource conditions to be achieved and maintained over time; (2) clearly defines the necessary conditions for visitors to understand, enjoy, and appreciate the park's significant resources, and (3) identifies the kinds and levels of management activities, visitor use, and development that are appropriate for maintaining the desired conditions; and (4) identifies indicators and standards for maintaining the desired conditions." NPS Management Policies, § 2.2 (2006). The GMP is binding on the agency. "No major new development or other major commitment of park land or natural or cultural resources will be authorized without an approved general management plan." *Id.*

The current Project Objectives are incomplete, however, because they fail to include the *only* GMP "Management Objectives" that are particular to the oyster farm. As part of its "Natural Resource Management" objectives, the GMP requires PRNS to "monitor and improve maricultural operations, in particular the oyster farm operation in Drakes Estero, in cooperation with the California Department of Fish and Game." GMP at 2. Furthermore, as part of the "Cultural Resource Management" objectives, the GMP requires PRNS to "ensure that agricultural and maricultural activities are consistent with the historical evolution of land and water use at Point Reyes." GMP at 3.

Accordingly, it is insufficient to subsume these particularized "Management Objectives" in a single bullet generically stating that it is the PRNS objective to "[m]anage natural and cultural resources to support their protection, restoration, and preservation." DEIS at 5. Instead, the Project Objectives must be revised to call out the oyster farm objectives with particularity (edits in underline / strikeout):

- Manage natural and cultural resources to support their protection, restoration, and preservation. Monitor and improve maricultural operations, in particular the oyster farm operation in Drakes Estero, in cooperation with the California Department of Fish and Game. Ensure that maricultural activities are consistent with the historical evolution of land and water use at Point Reyes.
- Manage wilderness and potential wilderness areas to preserve the character and qualities for which they were designated.
- Provide opportunities for visitor use and enjoyment of park resources.

In fact, the DEIS recognizes that the GMP "Management Objectives" that are particular to DBOC are important, but erroneously concludes that they are not binding. The DEIS explains that the "the NPS's decision [in the GMP] to monitor and improve the oyster operation in a manner consistent with NPS mandates *was an appropriate goal* for the anticipated lifespan of the GMP." DEIS at 46. In fact, these Management Objectives *remain* the current objectives for the PRNS because the GMP remains in effect. Instead of only using certain of the GMP's "Management Objectives" to only "guide the analysis in [the] EIS" (DEIS at 46), the DEIS should use all of the GMP's relevant "Management Objectives" as the applicable objectives for DBOC's SUP application, which is the Proposed Action being evaluated by the DEIS.

IV. THE DEIS IMPROPERLY FAILS TO DEFINE THE PROPOSED ACTION.

It is well-established that the NPS must clearly describe the "Proposed Action" whenever it prepares an EIS to evaluate whether it should exercise its authority to issue a permit.

- 43 CFR § 46.30: defining the term "Proposed action," and noting that the Proposed action "[m]ust be clearly described in order to proceed with NEPA analysis";
- 43 CFR § 46.415(a): the EIS "shall disclose: (2) A description of the proposed action;"
- 40 CFR § 1502.14(b): the EIS must "[d]evote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits".
- *NRDC v. Callaway*, 524 F.2d 79, 92 (2d Cir. 1975) (emphasis added). "*It is absolutely essential to the NEPA process* that the decisionmaker be provided with a detailed and careful analysis of the *relative environmental merits and demerits of the proposed action and possible alternatives*, a requirement that we have characterized as "the linchpin of the entire impact statement . . . ."

It is also well-established that defining the "Proposed Action" is critical because NPS's development of alternatives must reference, depend on, and address significant issues related to the "Proposed Action." "The [EIS] shall document the examination of the range of alternatives

[]. The range of alternatives includes those reasonable alternatives [] that meet the purpose and need of the proposed action, and address one or more significant issues [] *related to the proposed action*." 43 CFR § 46.415(b) (emphasis added) (citations omitted); *see also* 43 CFR § 46.420(b) (reasonable alternatives "includes alternatives that are technically and economically practical or feasible and meet the purpose and need of the proposed action").

It appears that NPS did not follow these well-established rules because the DEIS fails to define the "Proposed Action." For example, the Executive Summary states that the DEIS "examines four alternatives"—a "no-action" alternative and three "action" alternatives—but makes no mention of and does not define the "Proposed Action." DEIS at iii. An electronic word search through the DEIS' Sections 1 through 5 for "proposed action" returns no discussion of a single "Proposed Action" evaluated in the DEIS.

Instead, it appears that the NPS has improperly conflated its responsibility to describe both a "Proposed Action" and alternatives that meet the purpose and need of the "Proposed Action" and address one or more significant issues related to the "Proposed Action" by preparing three "action alternatives." For example, although the DEIS quotes 43 CFR § 46.415(b)(1), which calls for the no-action alternative to be compared and contrasted to the impacts "of the proposed action and any reasonable alternatives," the DEIS goes on to describe how it analyzes the "action alternatives," not a proposed action and reasonable alternatives. DEIS at 234. This conclusion is supported by the way the DEIS discusses the "action alternatives" when dismissing archeological and paleontological resources from further study. *See* DEIS at xvi (referencing multiple "*proposed actions*", not a single proposed action).

The DEIS' apparent failure to define the "Proposed Action" is not through lack of communication. DBOC's SUP request made in its Scoping Comment letter should have been defined as the "Proposed Action." *See* Exhibit 3, DBOC Scoping Comment Letter, Attachment B (November 24, 2010); Exhibit 2, Karl L. Lytz Letter to Hon. Ken Salazar (July 6, 2010). The technical details of this "Proposed Action" were provided to NPS in a variety of DBOC communications. DEIS at 21 (citing communications received by the NPS, including DBOC's Scoping Comments and communications between DBOC and the California Coastal Commission). If NPS needed more information from DBOC in order to adequately define the "Proposed Action," it was incumbent on the NPS to request such information through the Scoping Process. *See id.* (NPS claim that it was not able to fully evaluate all the action alternatives because it lacked "design plans and other relevant data" from DBOC).

Furthermore, by failing to define the "Proposed Action," it also appears that the DEIS did not design the "action" alternatives to address one or more significant issues related to the "Proposed Action." 43 CFR § 46.415(b).

By failing to adequately describe the "Proposed Action," the DEIS never adequately describes the action under consideration by the NPS. Consequently, the DEIS deprives the public of the opportunity to understand what the "Proposed Action" is, and also fails to provide a measure against which to gauge the impacts of the no-action alternative. This error is compounded by the NPS selection of the wrong environmental baseline against which to measure the impacts of the "Proposed Action" and reasonable alternatives. *See* Section V, *infra*.

V. THE DEIS IMPROPERLY APPLIES THE WRONG ENVIRONMENTAL BASELINE FOR THE "ACTION" ALTERNATIVES.

The DEIS uses the "No Action" alternative as the environmental baseline against which the three "action" alternatives are evaluated to identify environmental impacts. DEIS at 234 ("the analysis of the action alternatives may be documented by contrasting the expected future conditions under each action alternative to the expected future conditions under the no-action alternative"). Under this scenario, the environmental baseline for all the "action" alternatives is a hypothetical scenario that assumes that DBOC's operations have ceased. This is contrary to NEPA for two reasons.

First, the DEIS approach fails to compare the "Proposed Action" to the pre-project environmental baseline, which contradicts standard NEPA procedure for analyzing impacts, NPS NEPA regulations, and the approach used by the NPS for this same location in 1998. It is well-documented that the standard environmental baseline employed under NEPA is composed of pre-project environmental conditions, against which the impacts of the "Proposed Action" are then measured. *See* Bass, Herson, Bogdan, THE NEPA BOOK 98 (2d ed. 2001) ("To effectively evaluate the significance of impacts, it is important to establish a baseline against which to compare the impacts of a proposed action. Usually the baseline consists of the pre-project environmental conditions."); *American Rivers v. FERC*, 201 F.3d 1186, 1197-1199 (9th Cir. 2000) (use of pre-project environmental baseline that includes existing dams appropriate under NEPA); *Town of Cave Creek, Arizona v. FAA*, 325 F.3d 320, 328-329 (D.C. Cir. 2003) (use of pre-project environmental baseline to calculate incremental noise associated with each alternative for cumulative impacts analysis appropriate under NEPA). And with good reason—by using the pre-project environmental baseline, the agency is relying on conditions that are measureable and can be used with certainty.

Furthermore, the NPS used exactly this method—comparing the proposed action to the pre-project environmental baseline—when it prepared an Environmental Assessment for the Johnson Oyster Company (predecessor to DBOC) in 1998 to study the potential environmental impacts associated with improvements to bring JOC into compliance with federal, state, and Marin County regulations. Environmental Assessment / Initial Study Joint Document, Johnson Oyster Company, Point Reyes National Seashore, Marin County, California, at 3, 7, 14-19 (May 1998) ("1998 EA").

As explained in the 1998 EA's purpose and need section, because JOC's current operations at that time had various health, safety, and building code issues, the proposed action of rehabilitating existing buildings and constructing a new facility was intended to bring JOC into compliance with these regulations. *Id.* at 3. Without the proposed improvements, NPS and other agencies would have been forced to issue cease and desist orders to JOC and eventually shut the farm down. *Id.*

Despite the possibility that taking no action would eventually lead to shutting down JOC, the Service did not use this scenario to create a hypothetical environmental baseline without the oyster farm. Instead, NPS properly used JOC's current operations as the environmental baseline against which to compare the alternatives. The "No Action" alternative was defined as allowing JOC to continue operating in violation of health, safety, and building codes. *Id.* at 6, 11. As

such, the already existing impacts would continue so that there would be "no new impacts", except that "negative economic effects would occur because JOC would eventually be closed due to noncompliance with federal, state, and local codes and regulations." *Id.* at 11-13.

Similarly, the impacts of Alternative B (the Proposed Action) and Alternative C (a variation of the proposed building improvements) were compared against the current environmental baseline of JOC's existing noncompliance. For example, regarding impacts on human health and safety from both Alternatives B and C, the 1998 EA concluded, "Code compliance upgrades will have a positive effect on human health and safety. Once the buildings and septic system meet current codes, they will no longer be a health and safety risk to park visitors and JOC staff. In addition, once hazardous material is properly stored and disposed of, potential impacts to visitors and JOC staff will be minimal and not significant." *Id.* at 18, 23.

Moreover, the NPS NEPA regulations suggest this is the way NEPA evaluation *should* be done. "The analysis of the effects of the no-action alternative may be documented by contrasting the current condition and expected future condition should the proposed action not be undertaken with the impacts of the proposed action and any reasonable alternatives." 43 CFR § 46.415(b)(1)[4]. The only way the no-action alternative could be contrasted with the impacts associated with the proposed action and alternatives is if the EIS previously *measures* the environmental impacts of those actions against the same environmental baseline. Otherwise, comparing the impacts of no-action alternative against the proposed action and alternatives would be a hypothetical exercise.

Without any explanation or authority, however, the DEIS foregoes the measurable pre-project environmental baseline and instead elects to compare the "action" alternatives to the "no action" alternative, a hypothetical scenario that cannot be measured because it imagines environmental conditions that have not existed in Drakes Estero for nearly a century. DEIS at 234. Selecting this methodology without explanation and authority constitutes arbitrary and capricious agency action. *American Rivers*, 201 F.3d at 1195-1197 (explaining that even if Congress delegated authority to an agency to interpret how to implement the statute, the agency's action must be reasonable).

There is a second problem with the DEIS decision to measure the impacts of the "action" alternatives against the "no action" alternative, instead of against the pre-project environmental baseline. Namely, the "action" alternatives do not appear to analyze the "Proposed Action" and demonstrate how they address "one or more significant issues [] related to the proposed action." 43 CFR § 46.415(b) (citation omitted). This is the case because the "action" alternatives are not compared to the "Proposed Action."

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[4] Notably, subsections (2) and (3) provide that NPS can collaborate on the proposed action and alternatives prior to issuance of the DEIS with affected parties, and that a proposed action and alternatives can include adaptive management techniques.

VI. THE "ACTION" ALTERNATIVES IMPROPERLY FAIL TO ACCOUNT FOR AGRICULTURAL REALITIES

On January 23, 2008, DBOC supplied the CCC with a detailed planting and harvest projection report representing current production. Before its submittal, the report was first sent to CDFG for analysis. CDFG made certain recommendations for changes to the report. After making those corrections to the report, it was re-submitted to CDFG for a final review before it was submitted to the CCC. The 2008 DBOC letter stated:

> The maximum annual production limit is meant to keep the production of shellfish at "status quo" until the Coastal Development Permit can be finalized. As agreed, a detailed record of planting in 2006 and 2007, as well as the projected harvest based on these plantings are included as a part of this submittal. 2006 and 2007 planting schedules were very similar. Based on the planting records, it is expected that the total shellfish harvest from Drakes Estero be around 770,000 Lbs. If all environmental conditions are conducive, and mortality rates are low, as much as 850,000 Lbs could be harvested in a single year, based on the recent years' plantings. For the purposes of this consent order, the production limit should be set at "approximately 850,000 Lbs" as "current production".

Exhibit 4, DBOC letter to Christine Chestnet, CCC (January 31, 2008). All information in this report was accurate, yet the harvest projections proved to be incorrect.

Year to year there are many different conditions that may affect the harvest level of shellfish. Rainfall, temperature, ocean conditions, larvae quality, seed quality, hatchery conditions and management all contribute to growth rate and survivorship of the shellfish. For the past several years, in particular, *Vibrio tubiashi* has caused significant problems for oyster larvae and seed survivorship and performance. This particular condition has significantly affected the DBOC production. It is not unusual that harvest projections turn out to be inaccurate. Certainly, if conditions were less unfavorable, our projections could have been accurate. This is farming and there are no guarantees. DBOC has no control over these environmental conditions that affect shellfish survivability and, therefore, yields.

It would be wrong for the NPS to arbitrarily set a maximum production limit to match a year with poor production. Setting the maximum level below 850,000 pounds for any alternative that allows the continuation of DBOC in Drakes Estero would put DBOC into a position of being out of compliance with NPS, face potential enforcement action as well as public embarrassment if a normal or good year were to occur.

In truth, it seems that setting a production limit is an inappropriate way to avoid potential environmental impacts, as well as being duplicative. The CDFG already has restrictions on where shellfish can and cannot be cultured. Even the DEIS alternatives B, C and D include spatial limitations. DBOC has not requested that the areas approved for cultivation be expanded. The current restriction on spatial use of Drakes Estero will appropriately place limits on DBOC production. There has been no indication that the DBOC current production, limited to currently

approved shellfish beds, would exceed the typical production or carrying capacity of Drakes Estero if DBOC simply continues operations.

In its analysis, the NPS must consider the increased ecosystem services provided by cultured shellfish if mortality is low and yields increase and not imply that increased production equals increased negative impact. The DEIS should consider the fact that yields are unpredictable in shellfish production. The DEIS should also consider the fact that the California Fish & Game Commission and CDFG place only minimum harvest requirements on growers and protects natural resources by limiting shellfish production to only approved lease areas. This is a standard in the industry and should be used in Drakes Estero.

VII. THE DEIS FAILS TO INCLUDE A DETAILED DISCUSSION OF MITIGATION MEASURES.

Clearly described mitigation is an integral component of NEPA review. 40 CFR § 1502.14(f); 40 CFR §1502.16(h); 40 CFR §1508.25; *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351-52 (1989). Developing means to mitigate adverse environmental impacts supports informed decision making and appropriate management of environmental impacts. In the EIS, NPS must "clearly identify" mitigation measures that are "carefully specified in terms of measurable performance standards or expected results, so as to establish clear performance expectations." CEQ, Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact at 6 ("Mitigation Memorandum") (January 14, 2011). To that end, CEQ regulations explicitly require that "a mitigation and enforcement program shall be adopted . . . where applicable for any mitigation." 40 CFR §1502.9(c).

The DEIS fails to adequately identify and describe feasible mitigation measures. This is contrary to NEPA in two ways. First, the DEIS fails to make an organized attempt to mitigate adverse environmental impacts, thereby increasing the potential for adverse impacts to go unnecessarily unmitigated. Second, the DEIS applies mitigation measures to areas where there does not appear to be any adverse impact. As a result of this scattershot application of mitigation measures, and the failure to identify and analyze the expected results of mitigation applied, the DEIS' conclusion of unavoidable adverse impacts is unsupported. *See* DEIS, at 412.

A. The DEIS Violates NEPA By Not Analyzing Feasible Mitigation Measures For Identified Adverse Environmental Impacts.

In order to meet the mandates of NEPA, CEQ advises that mitigation be "clearly described." CEQ Mitigation Memorandum, at 6, 8. The DEIS fails to meet this basic guidance; instead, mitigation is scattered and buried throughout the document. Further, the document does not identify measurable performance standards or analyze the expected results of the mitigation, resulting in the overstatement of effects that could actually be mitigated. For example:

- At pages 236 to 239, the DEIS lays out a number of assumptions on which the impacts analysis is based. Buried in those assumptions are mitigation measures, such as implementation of the harbor seal protection protocol and application of NPS-approved vessel transit plan. By including these as integrated parts of the

alternatives, the impacts analysis does not clearly set forth the impacts of the actions without these measures, then identify mitigation measures to alleviate potential impacts, and then analyze the reductions in impacts with mitigation. It muddles the analysis from the beginning. This makes for a confusing and misleading document that fails to articulate how each identified mitigation measure will reduce impacts.

- At pages 251, 258, and 348-349, the DEIS mentions in passing that soil disturbances from the removal of certain onshore operations "could be mitigated with silt fencing" and "hay bales along the wetland/waters shoreline." There is no corresponding analysis of the degree to which this impact could be mitigated by these measures, and so the DEIS fails to determine whether it would be mitigated to a level that is not significant.

- At pages 296 and 302, the DEIS states that noise from the removal of shellfish infrastructure from within the Estero "would be conducted outside the harbor seal pupping season to minimize adverse impacts." The implementation of this mitigation would likely reduce noise within the harbor seal pupping season; however, embedding this into the impact analysis means that the DEIS fails to analyze impact without the addition of the harbor seal protection protocol. Without a baseline "before" analysis, it is impossible to know the magnitude of the mitigated "after."

- At page 343, the DEIS refers to the use of a silt curtain to mitigate water quality impacts from dredging actions. Again, this description fails to effectively analyze the mitigation described.

Instead of this scattershot sprinkling of inadequately described mitigation throughout the document, NPS should have prepared a comprehensive set of proposed mitigation measures to designed to mitigate adverse environmental impacts. The CEQ has recognized that preparing a mitigation monitoring plan is a highly effective way of fulfilling an agency's duty under NEPA with respect to mitigation. CEQ Mitigation Memorandum, at 9-10. As the CEQ has described, "[a] comprehensive approach to mitigation, planning, implementation, and monitoring will [] help agencies realize opportunities for reducing environmental impacts through mitigation, advancing the integrity of the entire NEPA process. *Id.* More appropriately, the DEIS should identify the potential adverse impacts of the proposed alternatives, then identify mitigation appropriate to reduce those impacts, and describe how and to what degree the mitigation will accomplish clear and measurable performance expectations. Burying mitigation in a disorganized manner throughout the document instead thwarts NEPA's goals of transparency and openness by effectively hiding relevant and useful environmental information. 40 CFR §1500.1(b).

B. The DEIS Arbitrarily Applies Mitigation Where No Adverse Environmental Impacts Have Been Identified.

The DEIS arbitrarily applies mitigation in the form of operational restrictions in action alternatives where no adverse environmental impacts have been identified. This is not supported

by the science, and again, muddles NEPA's goals of transparency, integrity and openness. 40 CFR § 1500.1(b).

For example, each action alternative would prohibit DBOC from conducting any activities within the described "harbor seal protection areas." DEIS, at 100, 102, 111. The harbor seal protection areas were created by the California Coastal Commission on the basis of a single trip report by a single scientist—the April 26, 2007 Sarah Allan trip report. The California Coastal Commission had no other data on harbor seals and no criteria for establishing this restrictive measure. Nonetheless, NPS adopted the Coastal Commissions' harbor seal protection zone when it issued the current SUP with no additional analysis or evidence. Despite a lack of scientific basis, this mitigation has become so well entrenched that the DEIS does not even discuss *not* applying it. At the time the current SUP was issued, NPS assured DBOC that the harbor seal protection area was temporary, and that it would be studied and appropriate mitigation would be established based on the best available science. That has not happened. Instead, NPS is simply extending mitigation with no scientific basis.

One effect of failing to revisit this mitigation measure based on scientific analysis is that the document fails to assess whether the harbor seal protection area is effective. The NPS now has data that shows that the oyster farm operations are not disturbing seals, but that PRNS visitors, hikers, clammers, kayakers and other disturbances account for 99% of the seal disturbances in Drakes Estero. In light of this, is the harbor seal protection area restriction for DBOC necessary at all? Furthermore, it is unclear in the DEIS whether NPS intends to apply the harbor seal protection area to aforementioned sources of known seal disturbance. The DEIS should squarely address these questions, but fails to do so.

Another mitigation measure incorporated into the DEIS without scientific basis is moving the site or timing for paralytic shellfish poison ("PSP") sampling. DEIS, at 94. The U.S. Food and Drug Administration ("USFDA") and California Department of Public Health ("CDPH") require PSP sampling to meet health and safety requirements, yet the DEIS would sever access to approved sampling sites in order to "reduce potential impacts on harbor seals." *Id.* There are no data, no records, nor even any allegations that water sampling operations have caused any harbor seal disturbances. Furthermore, CDPH staff has expressed to DBOC that even if new sampling sites are identified, the old sites must be maintained and sampled in parallel for a number of years to ensure consistency. Doubling the sampling sites would be cost prohibitive to both the state and DBOC, and would be an unnecessary burden on laboratory resources. Finally, even if there was an identified impact to harbor seals associated with PSP sampling, an obvious and reasonable mitigation measure would be to sample mussels from the channel sentinel buoy at high tide when seals are not hauled out. Accordingly, the feasibility of this questionably-beneficial mitigation based on USFDA and CDPH regulations is not addressed in the DEIS.

DBOC must be able to comply with federal and state health regulations in order to stay in operation. This means that DBOC must have access to the marine biotoxin sentinel station for weekly sampling. In all action alternatives, the DEIS would eliminate that access by redrawing the shellfish lease areas and restricting boat traffic to just those areas. Thus, current DBOC boat routes would be eliminated, and with them, access to the marine biotoxin sentinel station. Without this access, DBOC will not be allowed to harvest and sell shellfish. Thus, this appears to be a buried attempt to put DBOC out of business, and makes this mitigation measure facially

infeasible because it violates the Purpose, Need, and Project Objectives by eliminating the farm's ability to operate.

Additional unsupported "mitigation" in all action alternatives includes limiting DBOC to "[t]wo motorboats and two nonmotorized barges [to] be operated in Drakes Estero, approximately 12 trips per day, 8 hours a day, combined." DEIS, at 124. Once again, it is not clear what adverse impact this mitigation is aimed at alleviating, nor is it clear how this measure would beneficially impact any resources. On the other hand, it is very clear that limiting DBOC to two boats and barges with a combined use of 8 hours a day would cripple DBOC's operations by limiting boat use to a fraction of the current use. Furthermore, this measure could actually cause an increase of boat traffic in Drakes Estero. Restricting the number of barges that can be moved at any one time would mean that more trips are required to effectively serve DBOC operations.

Ultimately, the DEIS fails to adequately address mitigation. It buries measures within action alternatives without identifying what measures are already being undertaken, what measures are being proposed as new, what adverse impacts the measures will alleviate, how the measures will work, and whether the mitigation measures themselves will have environmental impacts (e.g., moving the PSP sampling locations). Finally, for mitigation that is appropriate and feasible, the DEIS fails to include a mitigation monitoring plan and thus fails to inform the public and decision makers as required by NEPA.

VIII. SECTION 124 "NOTWITHSTANDING ANY PROVISION OF LAW".

Because Congress directed the Service to issue the SUP for DBOC's continued operations "notwithstanding any other provisions of law," the Service may not use wilderness laws in an attempt to justify denying or strictly limiting an SUP.[5] NPS has emphasized wilderness issues during scoping and the DEIS to the exclusion of virtually every other issue. Despite the clear directive in Section 124 that other provisions of law were not to be determinative, the Service through the DEIS treats them as determinative. *See, e.g.*, DEIS at 15 (discussion regarding wilderness designations).

Although the DEIS should disclose clearly that the potential wilderness designation of Drakes Estero does not prohibit the issuance of the SUP subsequent to 2012, the DEIS never discloses this. Issuance of the SUP would not diminish or otherwise affect the existing potential wilderness designation for Drakes Estero or NPS' current management of the potential wilderness area. Not only would the potential wilderness designation remain intact, but there is no mandated timeframe for conversion of potential wilderness areas to wilderness. These topics are ignored entirely in the DEIS.

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[5] *See* Wilderness Act, 16 U.S.C. § 1131 *et seq.* (Sept. 3, 1964); Point Reyes National Seashore Wilderness Act, Public Law 94-544, 90 Stat. 2515 (1976); An Act To Designate Certain Lands Within Units of the National Park System as Wilderness, Public Law 94-567, 90 Stat. 2692 (1976); An Act to Designate Wilderness in the Point Reyes National Seashore in California as the Phillip Burton Wilderness, Public Law 99-68, 99 Stat. 166 (1985).

The oyster farm has existed since at least the 1930s, before PRNS was created in 1962 and before the PRNS Wilderness Act was passed in 1976. When PRNS was created in 1962 from individual landowners' and farmers' properties, Congress envisioned a higher level of recreational use by the public of the Seashore, and provided that the preexisting ranches and oyster farm should continue operating. The legislative history of the PRNS Enabling Legislation shows the specific Congressional intent for the oyster operation to continue after the establishment of the Seashore, as expressed by three legislators with direct involvement in bringing the PRNS to fruition. *See* Exhibit 5, Letter from William T. Bagley, John L. Burton, and Paul N. "Pete" McCloskey to Sec. Ken Salazar (August 11, 2011).

Pursuant to the 1976 PRNS Wilderness Act, Congress designated certain wilderness areas and potential wilderness areas within PRNS. Drakes Estero was designated as "potential wilderness" due to the long-standing existence of the oyster farm,[6] as well as the State's retained rights over this area.[7] Notably, wilderness laws do not prohibit all commercial operations in wilderness areas. In fact, NPS policies require the Service to manage the potential wilderness as wilderness *to the extent allowed by the existing nonconforming conditions*, such as the oyster farm. NPS Management Policies, § 6.3.1 (2006) (emphasis added). NPS continued to support the oyster farm's operations after this designation. For example, one objective of the operative 1980 GMP is the monitoring and improvement of the oyster farm. And in 1998, NPS conducted an environmental assessment for improving the oyster farm that resulted in a FONSI under NEPA.

The issuance of a SUP for continued operations past 2012 would not change NPS' historical management of Drakes Estero or the oyster farm, or prevent a future conversion from potential wilderness to wilderness. Congress has not prescribed a timetable for elimination of the oyster farm as a non-conforming use, nor for the conversion of Drakes Estero from potential wilderness to wilderness. It is not unusual for non-conforming uses in wilderness areas to be authorized. The DEIS should discuss and analyze the precedent for continuing non-conforming uses in potential wilderness and wilderness areas. It does not.

To the extent that the Service is concerned about setting precedent with regard to non-conforming uses in a potential wilderness area, the DEIS should, but does not, clarify that

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[6] For example, California Representative John Burton explained that the legislation "is intended to preserve the present diverse uses of the Seashore, but to protect the area from possible future, incompatible development." Wilderness Additions—National Park System: Hearings Before The Subcommittee On Parks and Recreation of the Committee on Interior and Insular Affairs, 94th Cong. 2 (February 5, 19 and March 2, 1976), pg. 272. The oyster farm was one of the preexisting diverse uses meant to be preserved: "There are two areas proposed for wilderness which may be included as wilderness with 'prior, non-conforming use' provisions. One is Drakes Estero where there is a commercial oyster farm." *Id.* at 273.

[7] Just four years after Congress' wilderness and potential wilderness designations in PRNS, the 1980 GMP affirmed that "the designated potential wilderness [in the Seashore] consists of most of the quarter-mile offshore strip and other wetlands over which the state of California has retained some rights...." 1980 GMP at 9.

Section 124 specifically stipulates that any decision as related to DBOC will not set a precedent for management of potential wilderness areas outside PRNS.

IX. THE DEIS SHOULD ANALYZE ADDITIONAL IMPACT TOPICS, AND MAKE CORRECTIONS TO ENVIRONMENTAL IMPACT ANALYSES.

It is crucial that the DEIS provide an objective, fair, and thorough analysis of the positive effects of the oyster farm on the environment, including but not limited to the many environmental, ecological, economic, cultural, educational, scientific, and human health and safety benefits that it provides. The DEIS should also consider how the termination of the oyster farm would result in the loss of these critical benefits.

We have repeatedly expressed our concerns about the Service's recent history relating to assessing the oyster farm's impacts on the environment. For example, various authorities, such as the Department of Interior's Inspector General, the National Academy of Sciences, and the Marine Mammal Commission have criticized the science and data that NPS has relied on and/or collected.

We requested ENVIRON International Corporation to review the DEIS and to comment on the environmental impacts analysis performed therein. ENVIRON identified two impact topics that should have been analyzed but were dismissed from analysis—Cultural Resources and Environmental Justice—and commented extensively on the environmental analysis set forth in the document, particularly on the DEIS analysis of eel grass, benthic fauna, bird interactions, habitat restoration, water quality, wetlands, coastal flooding, noise, recreation, and socioeconomics. DBOC incorporates those comments and submits them to the NPS.

Finally, DBOC believes that the DEIS should include the following information.

A. Environmental and Ecological Benefits of Oysters

It is vital that the EIS analyze the ecological role of oysters in the ecosystem. According to the National Academy of Sciences, oysters are known as "foundation species" because of the critical role they play in the ecosystem. 2009 NAS Report at 21. As recognized by the 2009 NAS Report, oysters are filter feeders that clarify and improve water quality so that the water is cleaned of excess nutrients, sediments and phytoplankton. *Id.* at 68. As a result, more sunlight penetrates the water, enhancing sub-aquatic vegetation growth. In fact, eelgrass in Drakes Estero doubled between 1991-2007, during a period of time when there was uninterrupted oyster farming and harvest levels were at their highest. *Id.* Since the functional elimination of native oysters in Drakes Estero, the oysters grown by DBOC and its predecessors have likely replaced the ecological role that native oysters once played. *Id.* The NAS Report emphasized the significance of this benefit, and concluded that DBOC's oysters are helping to "restor[e] an historic baseline ecosystem" by acting as a proxy for the native oysters that once existed. *Id.* at 22.

To this end, we believe that the DEIS must analyze the beneficial and adverse impacts of the ecological role of oysters in its evaluation of the Proposed Action, No Action Alternative, and any other Alternatives considered or rejected. The DEIS should analyze the environmental and ecological impacts of the presence of oysters from Drakes Estero, including:

- Oysters are the keystone species in the estero ecosystem, and the DEIS should consider the role that DBOC's oysters play. In addition, the DEIS must study the resultant impact of the removal of the oyster farm on water quality in the Estero due to runoff from the ranchers and ranchlands in the Pastoral Zone surrounding Drakes Estero. The No Action Alternative and other Alternatives should evaluate the adverse impacts associated with the removal of the oysters, including the long-term loss of ecosystem services they provide.

- The oysters and related equipment currently provide complex, three-dimensional habitat for special status species of fish, birds, and others, and the DEIS should consider the benefits of this habitat. There are limited alternative habitats for many of these species, and some of these alternative habitats lack the three-dimensional structure provided by DBOC's aquaculture apparatus. Rockfish, sharks, perch and other species benefit from the structures provided by the oysters and associated aquaculture apparatus, which they use as refuge, rearing and spawning habitat. Several species of surfperch (the population of which has recently declined in California) benefit from the habitat complexity of the racks. Rockfish are another species of declining fish that benefit from the habitat. For example, rockfish are generally structure-oriented in their habitat preferences, and some species use the lagoon as a nursery area and aggregate near the racks. Birds also use the shellfish racks and other shellfish gear as habitat. There is substantial evidence that shellfish, whether cultured or wild, form an important source of food for a wide variety of marine shorebirds. The role of shellfish aquaculture as a disturbance factor to birds must be placed in context with the recognized ecological functions that it has been documented to provide for a wide variety of shorebirds and waterfowl. In analyzing the No Action Alternative and other Alternatives, impacts to these species from the loss of habitat, as well as the lost ecological value of biodiversity facilitated by the aquaculture structures, should be assessed.

- Filtration functions and biodeposition provided by the oysters facilitates and supports eelgrass growth, and the DEIS should consider such benefits. Eelgrass and other submerged aquatic vegetation can be coincident with shellfish culture operations, and thus, it is appropriate to consider how shellfish practices at DBOC may directly and/or indirectly affect this priority habitat. Optimal habitats for eelgrass (*Z. marina*) growth along the U.S. West Coast include the low intertidal to shallow subtidal zone in moderately stable, non-bioturbated, fine to medium grain sediments, and moderate amounts of surface roughness and shellfish macrofauna. Eelgrass coverage and density fluctuate widely by season and year. Recruitment into new habitats depends on a combination of suitable physical, chemical, and biological conditions. The analysis of the effects of the oyster farm on Drakes Estero eelgrass abundance and distribution should take place in context by comparing eelgrass status and trends in adjacent embayments where no culture is practiced. The relative ecological value and functions of relatively monotypic meadows of eelgrass should be compared to an oyster eelgrass habitat mosaic that is provided from the oyster farm in the analysis of the baseline conditions. Where available, aerial documentation of eelgrass proliferation in Drakes Estero should be compared to other embayments where oyster culturing is practiced. In analyzing the No Action Alternative and other Alternatives, impacts to the eelgrass in the

absence of the oyster farming, such as how the loss of the filter feeding biomass affect water clarity and photosynthetically active radiation, should be assessed.

- The DEIS should consider the ecological services provided by the oysters to the estuarine ecosystem, including filter feeding, which cleans the water of excess nutrients, sediments and phytoplankton. The result is improved water quality accomplished by reduced turbidity that allows more sunlight to penetrate and enhance sub-aquatic vegetation growth. Another benefit of the filter feeders is that these excess nutrients ("otherwise contaminants") that are not converted to body protein are converted into useable forms, packaged, and made available to sub-aquatic vegetation as a form of fertilizer, also enhancing growth, thus providing additional habitat for other species. The three dimensional shapes of the oyster shells also become important habitat for other species. This is especially true for one particular method of hanging, off-bottom culture used by DBOC in Drakes Estero. All of these basin-wide benefits must be considered to provide the complete context for any localized impacts of the farm's operations to eelgrass, such as shading under racks or propeller clipping, as well as for the shellfish culture's effects on benthic pelagic coupling and sediment enrichment from biodeposition and sedimentation. The analysis of the latter should be reflective of similar culture operations under similar tidal exchange, culture densities and, ideally but not necessarily exclusively, for the same species cultured.

- The DEIS should also analyze the positive impacts that the oyster farm's operations have on the protection of harbor seals. The farm's presence discourages recreational kayakers and other recreationalists from disturbing the seals. In 1992, the NPS, NOAA, and CDFG recognized that kayak and oyster boat use in Drakes Estero during harbor seal pupping season could harm the harbor seal population due to disturbances. Since 1996, Drakes Estero has been closed from March 1 to June 30 to kayak and canoe use, and since 1992, oyster boats have been restricted to certain areas during that period. DBOC not only adheres to this protocol, but also encourages others to do the same. Many well meaning, yet uninformed, kayakers attempt to use Drakes Estero during the annual closure. As the Drakes Estero kayak launch site is located at the oyster farm, DBOC staff regularly stop would-be kayakers during pupping season, educate them about the closure and why it exists, and suggest alternative kayak locations. This DEIS must consider the adverse effects to harbor seals if the oyster farm is removed. Additionally, the 2009 NAS Report found that no causal link between seal disturbances and oyster farming could be concluded from the data and studies that NPS relied upon. *See* 2009 NAS Report at 41, 43, 44. The NPS seal monitoring program's volunteers made recording errors and omissions; these observations therefore have "limited utility." *Id.* at 44. The one modeling study for potential maricultural impacts to the harbor seals was also compromised, and thus, does not demonstrate any "causal link." *Id.* at 43. This EIS must acknowledge the inconclusive data and should consider all best available science, including any pending or future data, reports or other science—including the PRNS camera program—that directly pertain to DBOC's impacts or lack thereof on seals in Drakes Estero.

- The DEIS should analyze invasive species in the appropriate and full context. Although the Pacific oyster is not native to the West Coast of the U.S., it is the mainstay of the

industry from Mexico to British Columbia. It has not been documented as an invasive species in the Estero or Point Reyes region. Past statements regarding the oyster farm's operational impacts on fostering invasive species spread and/or establishment need to be placed into context. For example, current seed import policies and procedures have been in place for decades that greatly minimize the potential for the introduction of invasive species or pathogens. Shellstock is no longer imported from abroad, and oyster culture practices (while a recognized source for the introduction of some non-native invasive species in the early part of the last century (e.g., Spartina in WA)) are not the source of ballast water and/or hull fouling introductions implicated through references sometimes cited. Current practices, which have been in place now for many years, greatly minimize the potential for introductions. Substrate for currently recognized invasive species (e.g, Didemnum) provided by oyster culture operations could be provided by other structure in the absence of the oyster racks, etc. The operation's role in the spread of Didemnum or other invasive species must be evaluated based on best available science, not speculation.

- DBOC's energy usage, climate change impacts, and chemical usage should also be analyzed in the DEIS. DBOC uses very little energy to grow shellfish. The farm uses no feeds, no fertilizers, no chemicals, no fresh water, and requires no cultivation. The landing and processing site is directly adjacent to the growing area, which means little fossil fuel energy is required for planting and harvesting. The farm can harvest up to 25,000 oysters on one trip into the Estero using approximately one gallon of gasoline.

- Oyster shell is in high demand for many habitat enhancement projects, but importing oyster shell from out of state requires costly transportation and extensive pathological analyses to address non-native invasive species introduction. DBOC operates the last oyster cannery in California, making it the only significant, continuous, and renewable source of oyster shell in the state. In analyzing the No Action Alternative and other Alternatives, the DEIS must study the potential adverse effects of the loss of this local shell resource on regional habitat enhancement projects, specifically the loss of benefits to the species and ecosystems targeted. DBOC regularly contributes this shell for the purposes of Endangered Species Act habitat restoration and habitat enhancement, including the San Francisco Bay Native Oyster Restoration Project and the San Francisco Bay Bird Observatory Snowy Plover Habitat Enhancement Project, as well as other projects with other non-profits and government agencies.

B. Socioeconomic Benefits

The EIS should consider DBOC's socio-economic impacts and the resulting loss to the local and state economy, should the farm be shut down under the No Action Alternative and other Alternatives.

The DBOC oyster farm represents 85% of the shellfish growing area in Marin County and the San Francisco Bay Area. It produces nearly 40% of California's grown oysters and, as the last operating cannery in the State, 100% of shucked and packed oysters. DBOC's unique importance to the local and state economy and shellfish industry is further magnified by the fact that it is the only fully approved growing area, meaning that it is the only farm authorized to harvest oysters year-round. DBOC provides jobs to thirty-five employees, as well as housing for

many of these employees and their families. Employees' family members generally work in the area or attend schools in Marin County. As already discussed, DBOC also is a popular visitor attraction, bringing approximately 50,000 people each year to West Marin, which increases the demand for goods and services in the area.

The DEIS should consider the following socioeconomic issues:

- Jobs provided by DBOC, and taxes paid by DBOC and its employees.
- Ancillary businesses supported by DBOC as a tourist location.
- Ancillary businesses supported by DBOC as purchaser of equipment.
- Proportion of oyster production provided by the DBOC, relative to local and state production.

The DEIS should also consider the socioeconomic value of lost environmental services that would result from the oyster farm's termination:

- Loss of the oysters' nitrogen fixation and removal that currently counter, for example, nitrogen contributions from the cattle ranches surrounding Drakes Estero.
- Loss of nitrogen removal from the ecosystem when harvesting cultured shellfish.
- Loss of carbon sequestration.
- Loss of habitat diversity and functions to many species.
- Loss of quenching phytoplankton blooms.

C. Cultural Resources

The DEIS should fully evaluate the cultural resource value of the oyster farm as the only oyster farm within the Seashore and as one of the most visited destinations in the Seashore. As discussed above, DBOC continues a well-established "cultural history of oyster farming" that long antedates the creation of PRNS. 2009 NAS Report at 1. Additionally, it is the last operating oyster cannery in California. Given its cultural and historical significance, DBOC has a positive effect on the Seashore, "enhanc[ing] visitors' experience." *Id.* at 48-49. Furthermore, DBOC provides accessibility as called for in the GMP. DBOC is highly-popular with cultures that value fresh seafood in their diets, across the range of socioeconomic backgrounds. In addition, DBOC is accessible to disabled visitors to the PRNS.

The DEIS should address the Service's own long history of supporting the oyster farm; describe how the 1980 PRNS GMP supports the project; and disclose the Service's prior 1998 NEPA analysis conducted for the oyster farm, when it was operated by JOC, including the Finding of No Significant Impact ("FONSI") under NEPA. For example, the 1980 GMP specifically highlighted the oyster farm, as well as the surrounding ranches, a visitor center, a hostel, and a horse outfitter, as "major features of the National Seashore." 1980 GMP at 7-8. It

should also be disclosed within the DEIS that there are currently numerous commercial operations and working cattle and dairy ranches within PRNS. Furthermore, the ranches all previously operated under RUOs like the one under which DBOC is currently operating, and since the expiration of these RUOs, the ranches now continue operating pursuant to SUPs like the one requested by DBOC.

D. Educational Benefits

The DEIS should consider the educational benefits provided by DBOC. DBOC plays an essential role in educating the public on the history of oyster farming in PRNS, oysters' value as a beneficial source of protein, coastal ecosystems, and the nature and efficacy of organic sustainable farming. It provides almost daily tours, at no cost, for the public and students from elementary through graduate school. As part of its visitor services, DBOC also provides bathrooms, directions, information about PRNS, and PRNS publications to the visiting public.

The DEIS should consider that DBOC is the only farm of any kind within PRNS permitted to provide visitor and interpretative services to the visiting public. Without DBOC, Seashore visitors would completely lose any opportunity for services and interpretation within the Pastoral Zone of PRNS.

E. Scientific Benefits

The DEIS should consider the positive scientific benefits provided by the continued operation of the farm. DBOC contributes to science and research related to native oysters, estuarine biodiversity, and human health protection. It is the only oyster farm in the state with an on-site hatchery, lab, and biologists on staff. DBOC also presciently recognized the importance of native oyster restoration projects, and donated $10,000 worth of oyster shells to the largest such project in California. DBOC, through its donation of oyster shell to the San Francisco Bay Bird Observatory, has actually enabled increased hatching and fledgling rates for an endangered species, the Western Snowy Plover.

F. Human Health and Safety

The following benefits to human health and safety should be considered in the DEIS. As the last operating cannery in the state, DBOC produces 100% of shucked and packed oysters in California. The fact that it processes its oysters on-site greatly increases seafood safety. DBOC can harvest, shuck, pack, and deliver its oysters to San Francisco Bay Area markets within 24 hours, thereby providing healthy, locally-grown food to meet local demand.

DBOC is the largest marine biotoxin sampler in California. It is also the State's largest microalgae sampler. Two times per week, DBOC performs plankton tows in Drakes Estero, identifies species of dinoflagellates and diatoms in its own laboratory on-farm and provides full reports, including microscope photographs, to the CDPH, all on a voluntary basis. It cooperates, at its own expense, with the CDPH in order to ensure the safety of the shellfish harvested from Drakes Estero, and to help guide the CDPH and the CDFG in decision-making regarding sport fishing quarantines and closures.

X. THE DEIS INCORRECTLY ASSUMES NPS JURISDICTION OVER AQUACULTURE IN DRAKES ESTERO AND WOULD IMPROPERLY REQUIRE DBOC TO RELINQUISH ITS STATE TIDELAND LEASES

DBOC already has the appropriate and necessary approvals from the CDFG for its operations in the waters of Drakes Estero. CDFG has historically leased water bottoms in Drakes Estero for oyster cultivation since at least the 1930s. When the State transferred title of the submerged lands to the federal government in 1965, the State retained the right to fish and, thus, its jurisdiction to regulate mariculture operations. Accordingly, CDFG continued to lease water bottoms in Drakes Estero for oyster cultivation as it always had and still does.[8] Exercising the State's reserved fishing rights, in 2004, CDFG renewed the oyster farm's water bottom leases in Drakes Estero through 2029. In other words, the oyster farm already has the authorizations needed to continue its operations in the water past 2012.

All DBOC requires from NPS, however, is the SUP for its land operations for the purposes authorized by the existing RUO: "processing and selling wholesale and retail oysters, seafood and complimentary food items, the interpretation of oyster cultivation for the visiting public, and residential purposes reasonably incidental thereto." *Johnson Oyster Company Grant Deed to the United States*, Exh. C. at 1 (Nov. 9, 1972). The current SUP authorizes DBOC to use the land for the same purposes and the NPS should renew the permit to remain consistent with California's jurisdiction over DBOC's aquaculture activities.[9] Accordingly, it is unnecessary and unwarranted for the DEIS to require DBOC to "surrender its state water bottom lease effective November 30, 2012," and that provision should be removed. DEIS at xxiii.

A. California Retained Its Jurisdiction Over State Water Bottom Leases When It Conveyed Drakes Estero to the Federal Government

As explained in DBOC's July 6, 2010 letter requesting the SUP, and DBOC's November 24, 2010 Scoping Comment letter, the CDFG has been leasing the bottomlands in Drakes Estero for shellfish cultivation since the early 1930's. In 2004, CDFG renewed DBOC's two leases for an additional 25 years, through 2029. The CDFG has properly and consistently exercised its jurisdiction over DBOC's aquaculture operations in Drakes Estero. A decision by the NPS to reject renewal of DBOC's SUP for another ten years would prevent DBOC from operating its business and utilizing its existing state water bottom leases. Inability to conduct its oyster

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8 The State's jurisdiction over DBOC's operations in Drakes Estero remains unaffected by the May 15, 2007, letter from CDFG to PRNS purporting to confirm that the Seashore has "primary management authority."

9 The current SUP also consolidates previous SUPs issued by NPS that authorize the additional purposes of supplying water for the oyster farm, and using and maintaining the sewage pipeline and leachfield. Additionally, the current SUP attempted for the first time to exert authority over DBOC's operations in the waters of Drakes Estero, which CDFG had always controlled and still does through the two leases that have been renewed through 2029. As discussed above, because CDFG has jurisdiction over DBOC's operations in the waters of Drakes Estero and already authorized the continued operations past 2012, the SUP issued by NPS will only cover DBOC's land operations.

cultivation business also would contradict the mandates of the California Constitution and the Legislature's intent when it granted lands in the Point Reyes National Seashore area to the federal government.

The California Constitution grants citizens the "right to fish" on and upon public lands and in California waters and prohibits the State from selling or transferring state-owned land without reserving for its citizens the "absolute right to fish thereupon." Cal. Const. art. I, § 25. In 1965, the California legislature granted to the United States "all of the right, title, and interest of the State of California, held by the state by virtue of its sovereignty in and to all of the tide and submerged lands or other lands beneath navigable waters situated within the boundaries of the Point Reyes National Seashore which the Secretary of the Interior is authorized to establish by authority of Public Law 87-657, 76 Stat. 538." Cal. Legis. 1024, 1965 Reg. Gen. Sess. (Cal. 1965) at § 1. This legislative grant expressly reserved to the State of California "the absolute right to fish" upon the lands and in the "waters overlying the lands" granted to the United States, combined with "the right to convenient access to said waters over said lands for said purpose." *Id.* at § 2. By doing so, the Legislature clearly intended to maintain the constitutional right to fish for its citizens, even after granting the lands within the Point Reyes National Seashore to the federal government. *See also* Exhibit 6, Declaration of William T. Bagley (author of A.B. 1024 and companion bill A.B. 767, stating that he agreed that the State did relinquish its jurisdiction over aquaculture in Drakes Estero).

The right to fish within the PRNS, which California maintained for its citizens, includes the right to cultivate oysters. In setting forth the guidelines and regulations governing the Fish and Game Commission, the California Legislature defines "fish" to include mollusks, a family to which the oyster belongs. Cal. Fish & Game Code § 45 ("'Fish' means wild fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn, or ova thereof."). In 1965, shortly before California granted the Drakes Estero to the federal government, the Attorney General confirmed that oysters should be included in the constitutional right to fish by citing section 45 of the Fish and Game Code: "Oysters and shellfish are 'fish' (§ 45), and as such are subject to the prerogative of the sovereign to protect and preserve them in such manner and upon such terms as the Legislature deems best for the common good." 46 Ops. Cal. Atty. Gen. 68 (1965) (citing *People v. Stafford Packing Co.*, 193 Cal. 719, 725 (1924) ["[T]he general right and ownership of fish is in the people of the state and [] the state has the right to regulate and control the taking and disposition thereof"]).

The State's right to issue leases for shellfish cultivation in these waters is a property right long managed through leases authorized by the State Legislature and the California Fish and Game Commission. Under the public trust doctrine, the State has authority to "exercise a continuous supervision and control over the navigable waters of the state and the lands underlying those waters." *Nat'l Audubon Soc'y v. Sup. Ct.*, 33 Cal. 3d 419, 425 (1983).[10]

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[10] The Drakes Estero falls under the public trust doctrine because it comprises a navigable waterway, serving both recreational and commercial purposes. See id. at 434, 435 n.17 (concluding that a lake is a navigable waterway because it supports a small local industry harvesting brine shrimp but also finding that "a waterway usable only for pleasure boating is nevertheless a navigable waterway and protected by the public trust");

Indeed, the Legislature could not place the Drakes Bay Estero "entirely beyond the direction and control of the State" through its transfer of the area land to the federal government. *Illinois Central Railroad Co. v. Illinois*, 146 U.S. 387, 454 (1892).

When the California Legislature granted the Drakes Estero area to the federal government for the Point Reyes National Seashore, it did not abandon the public trust over the waters in the area. Nonetheless, analysis of the Legislature's actions reveals that it did not even intend to abandon the public trust in the Drakes Estero area and the consequent public right to fish those waters. Here, the Legislature took two specific actions indicating its intent to maintain the public trust and the resulting public right to fish in the Drakes Bay Estero area. First, it expressly reserved the public right to fish when it granted the area to the federal government. Cal. A.B. 1024 at § 2 (1965). Second, it included mollusks in its definition of "fish" in the Fish and Game code. Cal. Fish & Game Code § 45. These legislative actions can – and should be – interpreted to mean that the State did not intend to abandon the public trust in the waters of the Drakes Estero by granting land to the federal government.

The California Supreme Court also teaches that the State's public interest in its navigable waters applies to oyster cultivation activities. In *Darbee and Immel Oyster and Land Co. v. Pacific Oyster Co.*, the Court concluded that, even in light of a statute permitting citizens to "lay down and plant" oysters in public waters and the citizen's exclusive right to ownership of those oysters as a result of the statute, the rights granted by the statute were not perpetual and could not be inherited. *Id.*, 150 Cal. 392, 394-95 (1907). Instead, the statute granted citizens a "privilege" subject to the State's ultimate control of those activities and its waters. *Id.* The Supreme Court in *Darbee* also approved of the decision in *Phipps v. State*, 22 Md.380 (Md. 1864), in which the court recognized that to deposit and bed oysters within state waters was part of the "common right of free fishery" and a statute granting citizens the privilege to do so "subtracts nothing from the common right of fishery." *Phipps*, 22 Md. at 387-89.

Although the cases of *Darbee* and *Phipps* date back over a century, the general principles of those decisions apply today. The State's public interest in oyster cultivation activities demonstrates that California retains, and could not abandon, its responsibility to govern that public interest even when the Legislature transferred land in the Drakes Estero area to the federal government. Accordingly, California still maintains jurisdiction over the public's ability to "lay down and plant" oysters in state waters, which defines the aquaculture operations of DBOC. If DBOC is no longer able to continue its operations on land under the NPS SUP, DBOC would lose its ability to utilize its state water bottom leases, contradicting California's right to maintain and govern its waters, including oyster cultivation activities.

Even outside of the court system, both the federal and state legislatures recognize California's jurisdiction over DBOC's oyster cultivation operations. The Fish and Game Code

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http://www.bwkayak.com/DrakesEstero.htm (last visited Nov. 27, 2011) (recreational kayaking tours in Drakes Bay Estero); National Park Service, Department of the Interior Draft Environmental Impact Statement Drakes Bay Oyster Company Special Use Permit, September 2011, at Figure ES-2, available at http://parkplanning.nps.gov/document.cfm?parkID=333&projectID=33043&documentID=43390 (last visited Nov. 27, 2011) (depicting areas for recreational and commercial boat traffic).

recognizes that the public trust doctrine applies to fish, which include oysters. Cal. Fish & Game Code § 711.7(a) ("fish and wildlife resources are held in trust for the people of the state"). To carry out the public trust, the Legislature requires that, even when such fish and wildlife resources "exist and depend upon federal proprietary lands or federal land and water adjacent to or affecting state trust resources," all persons engaging in activities under a federal license, contract or permit be governed by the Fish and Game Code and must pay filing and permit fees for those activities if not exempted from doing under federal law. *Id.* at § 711.7(a)(1). These statutory provisions are directly applicable to the DBOC operations in the PRNS because oysters in this area are part of California's public trust, even though the surrounding lands are property of the federal government. As such, operations of the DBOC under its SUP are governed by the California Fish and Game Code.

Additionally, California governs aquaculture operations generally. *See* Cal. Fish & Game Code § 15000(a). The State requires that owners of all aquaculture facilities register with the Department of Fish and Game each year. 14 Cal. Code Regs. § 235(a). As part of that registration process, the applicant must agree to be bound by all regulations of the Fish and Game Commission and provisions of the Fish and Game Code sections regulating aquaculture. *Id.* at § 235(b). The California Legislature also regulates the stocking of aquaculture products, without restriction over whether the stocking occurs on private, state or federal territory. *See* 14 Cal. Code Regs. § 238.5.

Even federal legislation recognizes California's continued jurisdiction over fish (which, as stated above, includes oysters) after the Drakes Estero was transferred to the federal government. The Point Reyes National Seashore Act requires that the Secretary of the Interior administer the areas within the PRNS in accordance with the Wilderness Act (16 U.S.C. §1131, *et seq.*). Point Reyes National Seashore Act, Pub. L. No. 94-544, § 3, 121 Stat. 4 (1976). Notably, the Wilderness Act recognizes the jurisdiction of states over fish: "Nothing in this Act shall be construed as affecting the jurisdiction or responsibilities of the several States with respect to wildlife and fish in the national forests." 16 U.S.C. § 1133. The federal legislature further recognized that the State of California has underlying jurisdiction over hunting and fishing for the Point Reyes National Seashore by requiring that the Secretary of the Interior consult with California officials "who have jurisdiction of hunting and fishing" prior to issuing any regulations for hunting and fishing on lands and waters within the seashore boundaries. 16 U.S.C. § 459c-6.

B. The DEIS Improperly Would Require DBOC to Surrender Its CDFG Leases

For all of the "action" alternatives, the DEIS requires DBOC to "surrender its state water bottom lease effective November 30, 2012." DEIS at xxiii. As explained in Section X.A, however, California did not relinquish its jurisdiction over aquaculture in Drakes Estero when it conveyed the land to the federal government.

Accordingly, it is unnecessary and unwarranted for the DEIS to require DBOC to surrender its CDFG leases. All DBOC requires from NPS is the SUP for its land operations for the purposes authorized by the existing RUO: "processing and selling wholesale and retail oysters, seafood and complimentary food items, the interpretation of oyster cultivation for the visiting public, and residential purposes reasonably incidental thereto." *Johnson Oyster*

Company Grant Deed to the United States, Exh. C. at 1 (Nov. 9, 1972). The current SUP authorizes DBOC to use the land for the same purposes and the NPS should renew the permit to remain consistent with California's jurisdiction over DBOC's aquaculture activities.

XI. SUP RENEWAL IS POSSIBLE UNDER SECTION 124, AND THE CURRENT RUO AND SUP

The DEIS erroneously concludes that there is no possibility of renewal if the Secretary grants DBOC a 10-year SUP. DEIS at xxiii ("No extensions or renewals would be issued because section 124 only authorizes one 10-year permit.") Neither Section 124 nor DBOC's existing authorizations under the RUO/SUP support that conclusion. To the contrary, Section 124 and DBOC's RUO/SUP explicitly support the possibility of renewal at the end of the 10-year SUP term. Therefore, it is improper for the DEIS to have foreclosed the possibility of renewal.

Section 124 gives the Secretary authority to extend DBOC's SUP on the same terms and conditions as DBOC's "existing authorization" (defined as DBOC's RUO and SUP), and labels this extension as a renewal.

> [T]he Secretary of the Interior is authorized to issue a special use permit *with the same terms and conditions as the existing authorization* . . . for a period of 10 years from November 30, 2012: *Provided*, That such *extended authorization* is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such *renewal*. . . .

Section 124 (emphasis added). To determine whether Section 124 contemplates renewal past 2022, two provisions are relevant: first, the Secretary is authorized to issue a SUP with the same terms and conditions as the RUO/SUP, so those terms and conditions are read into Section 124; and second, Section 124 confirms that if the Secretary chooses to issue a SUP, it would be a renewal of the existing authorization. Taken together, both of these provisions indicate that it is unreasonable to foreclose the possibility of SUP renewal in 2022.

First, the terms and conditions present in DBOC's RUO and SUP do not foreclose the possibility of renewal. While the 2008 SUP is silent with respect to renewal, the RUO expressly contemplates an extension via SUP at the end of the 40-year RUO term in 2012. "Upon expiration of the reserved term, a special use permit may be issued for the *continued occupancy of the property* for the herein described purposes. . . ." RUO, Exhibit C, ¶ 11. Paragraph 11 refers to the SUP period as the "extended use period," indicating that any such SUP period would continue from and extend the rights created by the RUO. *Id.*

Moreover, the only limitation on the length of renewal by SUP contemplated in the RUO is the term of DBOC's CDFG state water bottom leases. The RUO states, "such permit will run concurrently with and will terminate upon the expiration of State water bottom allotments assigned to [DBOC]." RUO, Exhibit C, ¶ 11. In 2004, DBOC's CDFG leases were extended

for an additional 25-year period, until 2029.[11] Accordingly, when Section 124 passed in 2009 and authorized the Secretary to issue a SUP with the same terms and conditions as the RUO/SUP, it was already clear by the terms of the RUO that the potential for SUP renewal could extend up to 2029, the date upon which the state water bottom leases expired.

Second, Section 124's plain language indicates that the Secretary's decision to issue a SUP would constitute an "extended authorization" and a "renewal." *See* Section 124 ("*Provided*, That such *extended authorization* is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such *renewal*.") (emphasis added). This language is consistent with the terms and conditions present in the RUO/SUP, as described above, which explicitly contemplates renewal by SUP.

NPS may have been mislead by the fact that Section 124 sets the term of any SUP issued by the Secretary prior to November 30, 2012 to ten years. However, nothing in the law explicitly prohibits renewal of the SUP in 2022 when the SUP expires. In fact, by incorporating the terms and conditions from the RUO, the only limiting factor on SUP renewal would be the term of DBOC's CDFG leases, which expire in 2029.

Taken together, it is unreasonable for the DEIS to interpret Section 124 as foreclosing renewal of the SUP, should the Secretary decide to issue one. The terms and conditions present in the RUO/SUP explicitly contemplate the possibility of renewal, Section 124's plain language incorporates by reference those terms and conditions without explicitly foreclosing the possibility of renewal, and DBOC's CDFG leases had already been extended until 2029 at the time when Section 124 was passed, thereby providing the only limiting duration for renewing a SUP present in the RUO/SUP.

XII. THE NPS' FAILURE TO PICK A PREFERRED ALTERNATIVE

The DEIS states that "[a]t this time, there is not a preferred alternative." DEIS, at 120. DBOC urges the NPS not to use public comment on the DEIS as voting process to determine what the agency's recommendation to the Secretary should be.

XIII. PENDING INVESTIGATIONS

As you are aware, investigations concerning the scientific validity of prior work in Drakes Estero and concerning the farm are proceeding before the Marine Mammal Commission, and before the House Committee on Oversight and Government Reform. Exhibit 7, Sen. Dianne Feinstein letter to Sec. Salazar (September 2, 2011); Exhibit 8, Letter from Hon. Darrell Issa to Sec. Salazar (October 20, 2011). We expect that these proceedings will produce documents relevant to the topics described herein and to the SUP EIS.

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[11] Renewal of Lease M-438-01 by and between California Department of Fish and Game and Johnson Oyster company dated June 25, 2004; Renewal of Lease M-438-02 by and between California Department of Fish and Game and Johnson Oyster company dated June 25, 2004.

In addition, we ask that you incorporate the approximately 281,000 NPS photographs of DBOC operations into the list of primary documents.

DBOC understands that the DEIS comment period was extended from November 29, 2011, to December 9, 2011, in order to permit the consideration of the November 22, 2011 Marine Mammal Commission Report, "Mariculture and Harbor Seals In Drakes Estero, California" ("MMC Report"). However, DBOC cautions the NPS from drawing conclusions from the MMC Report that DBOC's activities impact harbor seals in Drakes Estero.

The MMC Report noted that "analyses in Becker et al. (2011) provide some support for the conclusion that harbor seal habitat-use patterns and mariculture activities in Drakes Estero are at least correlated. However, the data and analyses are not sufficient to demonstrate a causal relationship. Additional, carefully guided study would be required to determine if the apparent relationship is one of cause and effect." *Id.* at iii.

It is important, however, for the NPS to distinguish between the differences between correlation and causation. For example, it is said that there is a high degree of correlation between people who go to sleep wearing their shoes and socks and those same people waking up with a headache. Does that mean that going to sleep wearing shows and socks causes headaches in the morning? Of course not. The cause of both phenomenon is that people who go to sleep wearing their shoes and socks are typically intoxicated, which does in fact cause headaches.

XIV. FACTUAL INACCURACIES TO BE CORRECTED

DBOC submits for analysis and correction a number of points in Exhibit 9, DBOC Comment Matrix.

XV. A SUPPLEMENTAL EIS SHOULD BE PREPARED AND CIRCULATED

There are two circumstances in which an agency must prepare and circulate a Supplemental EIS: when "substantial changes with environmental ramifications are made to the proposal and alternatives" or "when substantial new information is discovered." DO-12 Handbook at 63. This occurs when "agency or public comments [on a DEIS] have raised substantial new issues that require full-blown analysis and many pages to address fully." *Id.*

First, a Supplemental EIS is required when the agency makes "substantial changes in the proposed action that are relevant to environmental concerns." 40 C.F.R. § 1502.9(c)(1)(i). For instance, in *Dubois v. U.S. Dept. of Agriculture*, 102 F.3d 1273 (1st Cir. 1996), the court required a Supplemental EIS where the agency introduced a new preferred alternative in the final EIS. *Id.* at 1292. Only through a Supplemental EIS could the agency fulfill the NEPA goals of assuring that the affected public "be fully informed of the proposal, its impacts and all major points of view" and that the agency would have the "benefit of informed comments and suggestions" to take the requisite "hard look" at the project's consequences. *Id.* at 1291.

Second, a Supplemental EIS is also required when "there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c)(1)(ii). The Supreme Court has explained that "if

there remains major Federal action to occur, and if the new information is sufficient to show that the remaining action will affect the quality of the human environment in a significant manner or to a significant extent not already considered, a supplemental EIS must be prepared." *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 374 (1989) (internal quotations omitted). This standard has been applied to require a Supplemental EIS where the agency's final decision was based on data that was not available at the time the EIS was created. *Klamath Siskiyou Wildlands Center v. Boody*, 468 F.3d 549, 561 (9th Cir. 2006).

Here, DBOC believes a Supplemental EIS is warranted in order to address the issues set forth in this comment letter and the Environ Report.

****

Thank you for the opportunity to submit these comments. Please contact us if you have any questions.

Sincerely,

Kevin and Nancy Lunny
Owners of Drakes Bay Oyster Company

Attachments

National Park Service
U.S. Department of the Interior
Conservation Study Institute

Stewardship Begins with People

This report is the fourteenth in the Conservation and Stewardship Publication Series produced by the National Park Service, Conservation Study Institute. This series includes a variety of publications designed to provide information on conservation history and current practice for professionals and the public. The series editor is Mary J. Mitchell, director of the Institute. This volume was published in cooperation with the National Park Service Northeast Region, Marsh-Billings-Rockefeller National Historical Park, Shelburne Farms National Historic Landmark, Eastern National, and Quebec-Labrador Foundation/Atlantic Center for the Environment.

The Conservation Study Institute was established by the National Park Service in 1998 to enhance leadership in the field of conservation. A partnership with academic, government, and nonprofit organizations, the Institute helps the National Park Service and its partners to stay in touch with the evolving field of conservation and to develop more sophisticated partnerships, tool sets for community engagement, and new strategies for the twenty-first century. The Institute is based at Marsh-Billings-Rockefeller National Historical Park within the Northeast Region of the National Park Service.

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Cover background is a composite of landscape images from Ebey's Landing National Historical Reserve and Cuyahoga Valley National Park.

Stewardship Begins with People
An Atlas of Places, People, and Handmade Products

A COOPERATIVE PROJECT:

National Park Service Northeast Region

Marsh-Billings-Rockefeller National Historical Park

National Park Service Conservation Study Institute

Shelburne Farms National Historic Landmark

Eastern National

Quebec-Labrador Foundation/Atlantic Center for the Environment

Prepared by

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Conservation and Stewardship Publication No. 14 / 2007

Stewardship Begins with People

An Atlas of Places, People, and Handmade Products

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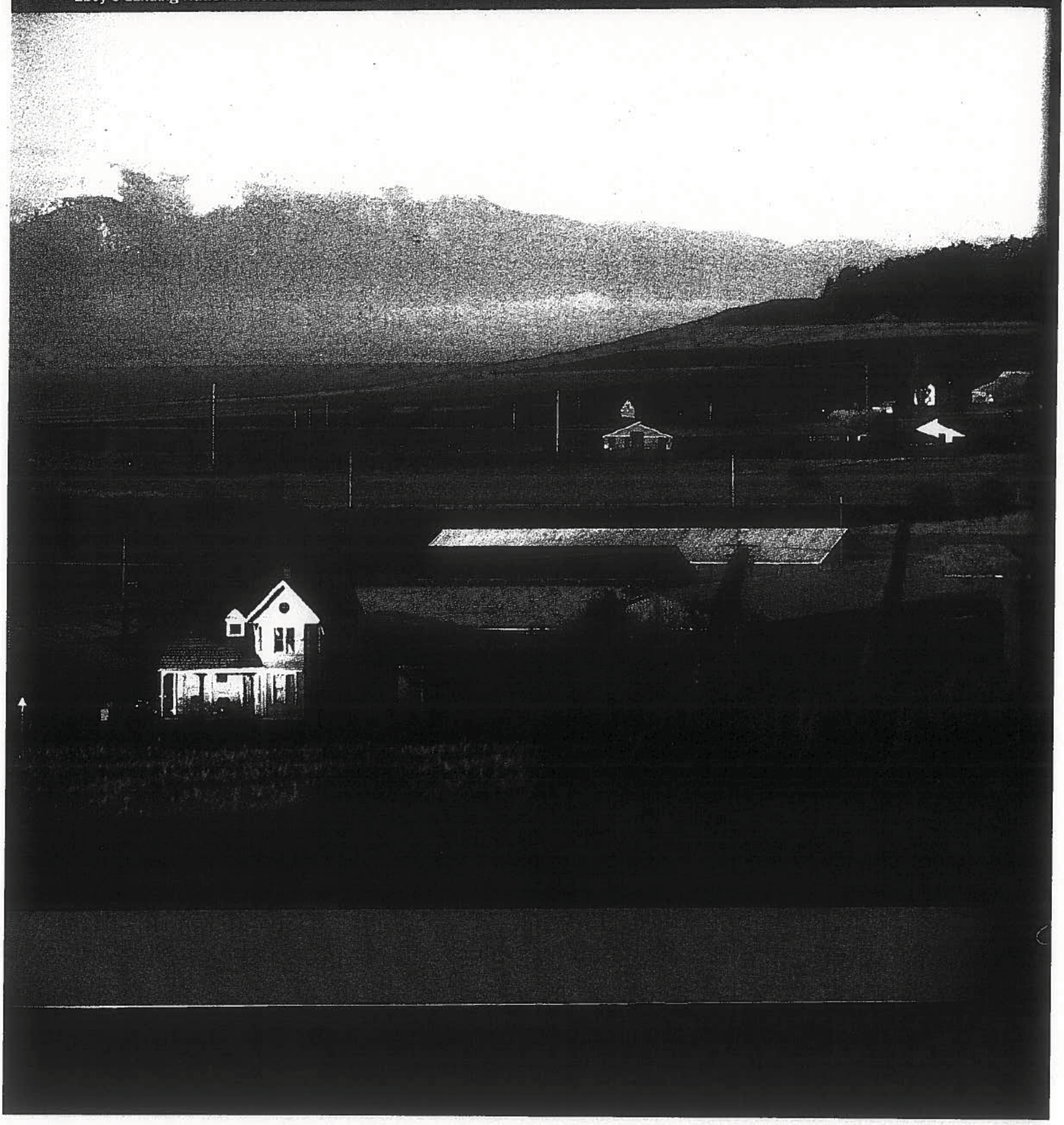
Ebey's Landing National Historical Reserve



Introduction

This *Atlas of Places, People, and Handmade Products* is a guide to the work of friends and neighbors of U.S. national parks, heritage areas, and national historic landmarks who are practicing a stewardship ethic and demonstrating a commitment to sustainability. Their work and the products they make contribute to the preservation of authentic traditional cultures and significant cultural landscapes. These stories come from two dozen national park areas ranging from the Blue Ridge Mountains to the Hawaiian Islands, and were selected as illustrative of many similar efforts and enterprises. As our title notes, stewardship begins with people, and the people in this *Atlas*—and others like them—deserve both recognition and encouragement.

Stewardship Begins with People: An Atlas of Places, People, and Handmade Products offers a fresh perspective on the sustainability of national parks and their neighboring communities, and illustrates the many different ways parks and protected areas are working in partnership with local people to strengthen natural and cultural heritage. The continuity and vitality of cultural systems and traditional production have, over time, influenced characteristic patterns of land use, the biodiversity of plants and animals, community development, and a distinctive sense of place. However, many of these traditional land uses and their related products—which less than a generation ago were taken for granted by parks and protected areas as timeless and immutable—are being rapidly destabilized and displaced. Escalating land values, falling commodity prices, and competition from global markets are all contributing to the unraveling of traditional social and economic relationships to the land. The speed and scope of this change is unprecedented.

These challenges require rethinking the conventional relationships between parks and protected areas on one hand, and local communities and producers on the other. It is no longer enough to strive for a friendly "coexistence." All parties need to be more intentional and proactive in defining their mutual interests and crafting new, more cooperative strategies that contribute to some measure of sustainability and long-term conservation. This *Atlas* represents one such strategy.

This publication marks the culmination of a multi-year research project on heritage-based products that began with planning for the historic Mount Tom forest at Marsh-Billings-Rockefeller National Historical Park. A significant cultural landscape, the Mount Tom forest is the oldest professionally managed woodland in the U.S. The park continues to manage the forest in a contemporary context that is sensitive to historic character, relevant to the local community, and environmentally responsible. Recent third-party certification of the park's forest practices by the independent Forest Stewardship Council stimulated a broader investigation of certification systems and issues associated with the branding of products.

It is no longer enough to strive for a friendly "coexistence." All parties need to be more intentional and proactive in defining their mutual interests and crafting new, more cooperative strategies that contribute to some measure of sustainability and long-term conservation.

Concurrent with these discussions at Marsh-Billings-Rockefeller National Historical Park, there has been a growing conversation between national parks and partners on ways to enhance the cultural and economic sustainability of their distinctive regional identities. One tool that has generated particular interest is the use of branding as part of larger certification systems that make transparent the connection between products and responsible social and environmental practices. This enables individuals and organizations to make informed purchasing choices in direct support of good stewardship. Congress recently demonstrated its interest as well, asking the National Park Service to explore viable ways

Marsh-Billings-Rockefeller National Historical Park

to encourage the sale of traditional products in national parks that "reflect, educate, and celebrate the unique history, spirit, culture, and natural treasures of the designated region and individual park."[1]

This interest encouraged Marsh-Billings-Rockefeller National Historical Park to join the National Park Service Conservation Study Institute and a growing circle of national parks and partners to share experiences and learn more about how these strategies are being used in other places. This inquiry extended abroad, initially involving an exchange of ideas with park managers in Italy and the Czech Republic. A bilateral workshop, "Local Typical Products: Parks and Communities Working Together for a Sustainable Future," was convened in 2002 by the Italian Nature Conservation Service, the Lazio regional parks, and the U.S. National Park Service. Sessions were held in Cinque Terre National Park and several protected areas around Rome. At Cinque Terre, participants studied the recovery and economic revitalization of a World Heritage cultural landscape of steep coastal vineyards that produce the traditional *Sciacchetrà* wine. Cinque Terre is developing one of the world's most comprehensive programs in sustainable tourism, based largely on creating an environmental quality brand for products and services.

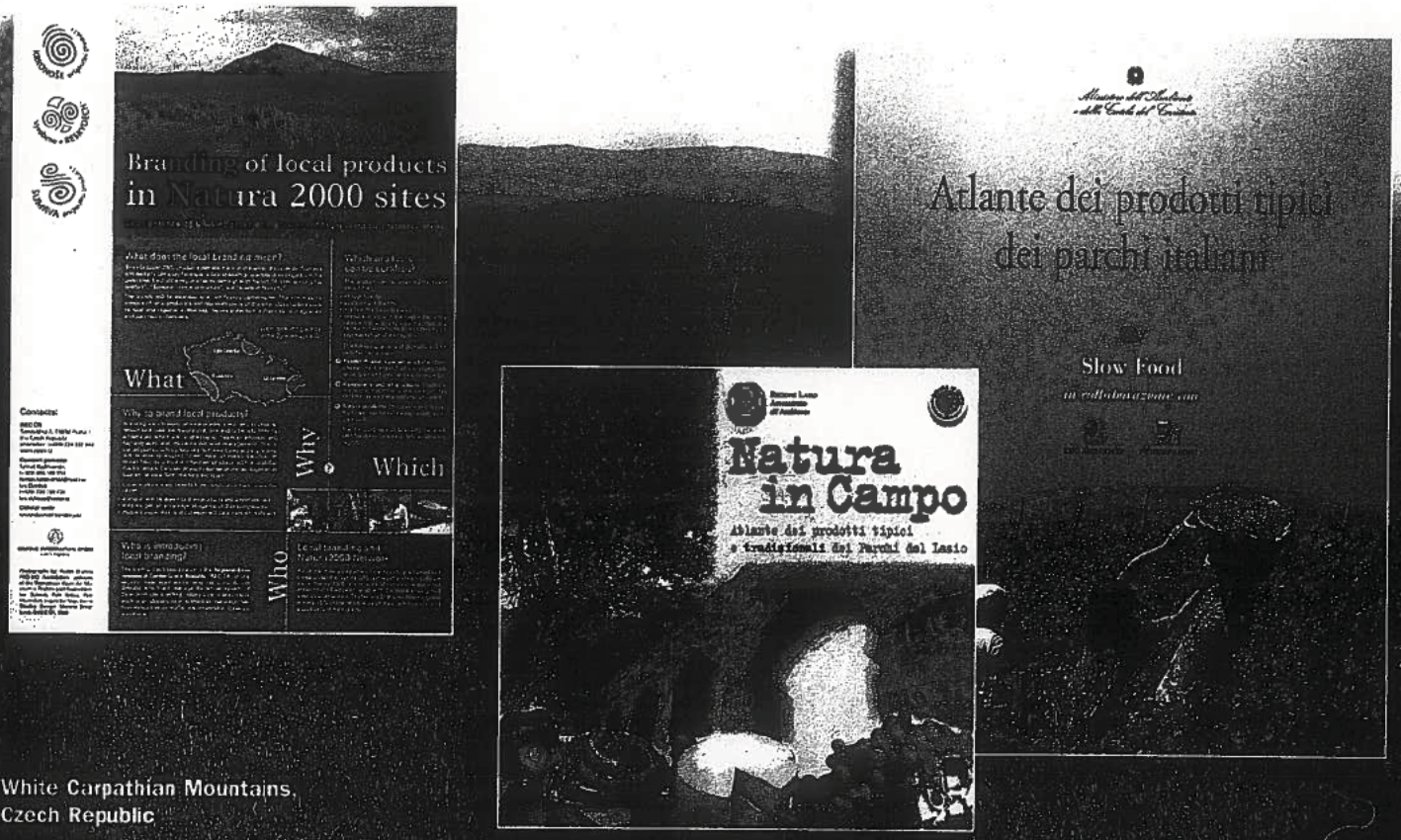
In 2006, the National Park Service participated in another bilateral workshop, "Marketing and Promotion of Local Heritage Products," convened in the Czech Republic by the Quebec-Labrador Foundation/Atlantic Center for the Environment in cooperation with the Czech Environmental Partnership Foundation, Traditions of the White Carpathians, and Regional Environmental Center Czech Republic. The workshop, which was preceded by a seminar hosted by the United States Embassy in Prague, focused on innovative strategies to conserve cultural heritage, including promoting sustainable tourism, establishing certification systems, and building regional networks of protected areas and traditional producers.

Lessons learned from these exchanges are being considered and carefully applied in the U.S. This *Atlas*, for example, takes inspiration from two Italian versions of an atlas or, in Italian, *atlante*. One was prepared for traditional products of national parks and one for the parks of the Lazio Region.[2] Both publications illustrate the extraordinary array of authentic traditional food products associated with

Italian parks and protected areas. Both publications were influenced by Slow Food, an international nonprofit organization working to protect the biodiversity and heritage of traditional, artisanal food products. Slow Food believes that food should be *good* (good taste), *clean* (not harmful to the environment), and *fair* (with producers fairly compensated). At first glance these "park atlases" may appear to be different from their more conventional map-oriented cousins. Like all atlases, however, they help us to understand the geography of special places and gain a deeper appreciation of the relationship between people and land.

The entries in this U.S. version of the *Atlas* are all places that share similar issues and challenges, though their programs and initiatives are diverse and at different stages of development. Some places, like Cuyahoga Valley National Park, Golden Gate National Recreation Area, and Shelburne Farms National Historic Landmark, have, over many years, developed strong partnerships and sophisticated strategies. In other areas, such as Point Reyes National Seashore and Ebey's Landing National Historical Reserve, various options are being assessed. In other cases, park concessioners are taking the initiative, such as Xanterra at Yellowstone National Park and Forever Resorts at Grand Teton National Park. Park cooperating associations are particularly well positioned to make the critical link with broader educational objectives. Western National Parks Association's operation of the historic Hubbell Trading Post and Golden Gate National Parks Conservancy's Warming Hut at Crissy Field are excellent examples of how cooperating associations can integrate and communicate powerful interpretive messages through place-based products.

Some of the work described in the *Atlas* is connected to traditional cultural practices, while other work is associated with newer products that enhance or encourage good stewardship. Products may be tangible in nature, such as food and crafts, or may represent an expression of intangible culture, such as traditional music. In either case, this work is an expression of people's powerful and often intergenerational relationship to special places and landscapes. All of the diverse initiatives and activities described in the *Atlas*



White Carpathian Mountains, Czech Republic

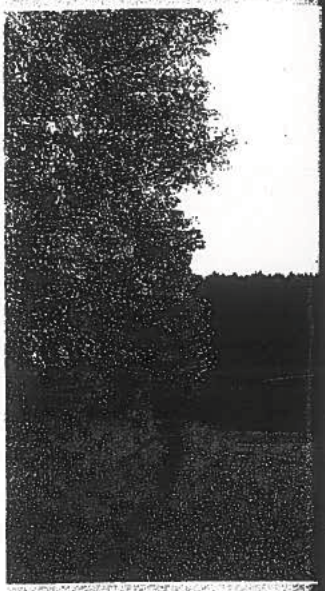
will hopefully stimulate a timely and thoughtful discussion about the ways in which national parks and protected areas can encourage and support the work of good stewardship. The *Atlas* may also foster a broader public dialogue that is relevant and responsive to people seeking a more sustainable path for the future of parks and protected areas and their neighboring communities.

We are impressed by the enthusiasm of park managers, cooperating associations, concessioners, and producers from all around the National Park System who contributed the many stories and photographs that fill these pages. Given this response, we will continue to build and facilitate an informal network to share best practices and innovation.

Writer Wendell Berry observed that "most people now are living on the far side of a broken connection..."[4] This atlas project is but one step in reestablishing this connection—between parks, traditional cultures, and neighboring communities; between people and the food they eat; and between the stewardship of American landscapes and a healthier, more sustainable future.

Rolf Diamant
Superintendent
Marsh-Billings-Rockefeller National Historical Park

Nora Mitchell
Director
Conservation Study Institute

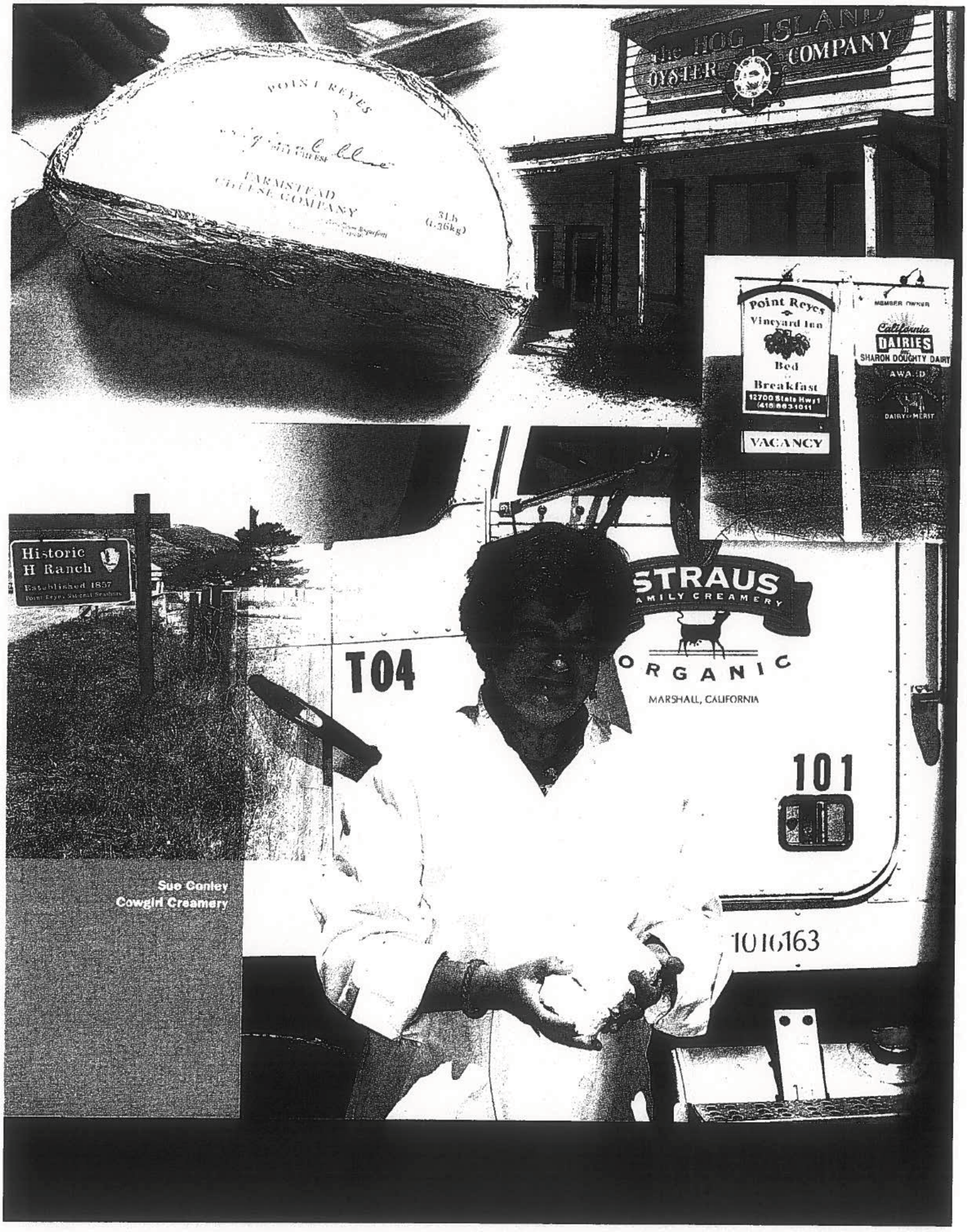


1 U.S. Congress, House, *Conference Report: Making Appropriations for the Department of the Interior, Environment, and Related Agencies for the Fiscal Year Ending September 30, 2006, and for Other Purposes*, 109th Cong., 1st sess., July 26, 2005, H.Doc. 109-188.

2 For the atlas on traditional products of Italian national parks, see http://www.atlanteparchi.it/home.html. For the atlas on the parks of the Lazio region, see http://www.parks.it/buone.pratiche/index.html.

3 See www.slowfood.com.

4 Wendell Berry, "In Distrust of Movements," *Resurgence* 198 (January/February 2000): 4.



Sue Conley
Cowgirl Creamery

Point Reyes National Seashore

CALIFORNIA

Anchoring the western shore of Marin County, Point Reyes National Seashore preserves the natural ecosystems and cultural resources of one of the most spectacularly beautiful coastal landscapes in the United States. The Point Reyes peninsula has long been associated with the early history of dairy farming in California, and its panoramic landscape is shaped by characteristic features such as windbreaks, stock ponds, open pastures, and rolling fence lines. A number of the ranches in the park's pastoral zone have been in continuous operation since the 1860s.

Point Reyes is also an important part of a larger regional landscape and economy. Marin County's three dozen dairies, including the park's historic nineteenth-century dairies, provide 20 percent of the milk for the San Francisco Bay area. In 1994, the Straus farm became the first organic dairy west of the Mississippi. Today, Sue Conley and Peg Smith's Cowgirl Creamery produces a wide array of award-winning fresh and aged cheeses made only from Straus farm milk. They own two retail stores in San Francisco, one of them in the newly renovated Ferry Building. Cowgirl Creamery, together with Marin French Cheese Company and Point Reyes Farmstead Cheese Company, help identify the region as America's "Normandy."

The county is well known for its oyster aquaculture. A half-dozen companies annually produce about 20 percent of California's oysters. For example, Hog Island Oyster Company in Marshall grows several types of North American oysters: Pacific, European, Kumamoto, Atlantic, and a trademarked Hog Island Sweetwater.

Local producers and regional consumers recognize Point Reyes and West Marin as places of quality production and authentic foods. An unusual opportunity exists to demonstrate the powerful linkage between these innovative, sustainable agricultural enterprises; market recognition; and the continued, careful stewardship of an important cultural landscape. Here is a place that can reconnect people with their natural heritage through wilderness and recreational experiences as well as with the food they eat, the beauty of the cultural landscapes where it is grown, and the honorable labor of producing it.

Pasture-based food that is locally produced invites and inevitably satisfies the desire for a real sense of place. It connects us with the seasons and the natural world and ultimately, after invigorating the palate, fortifying the body, and stimulating conversation, resonates a genuine appreciation of life.

– David Evans, owner, Marin Sun Farms[1]

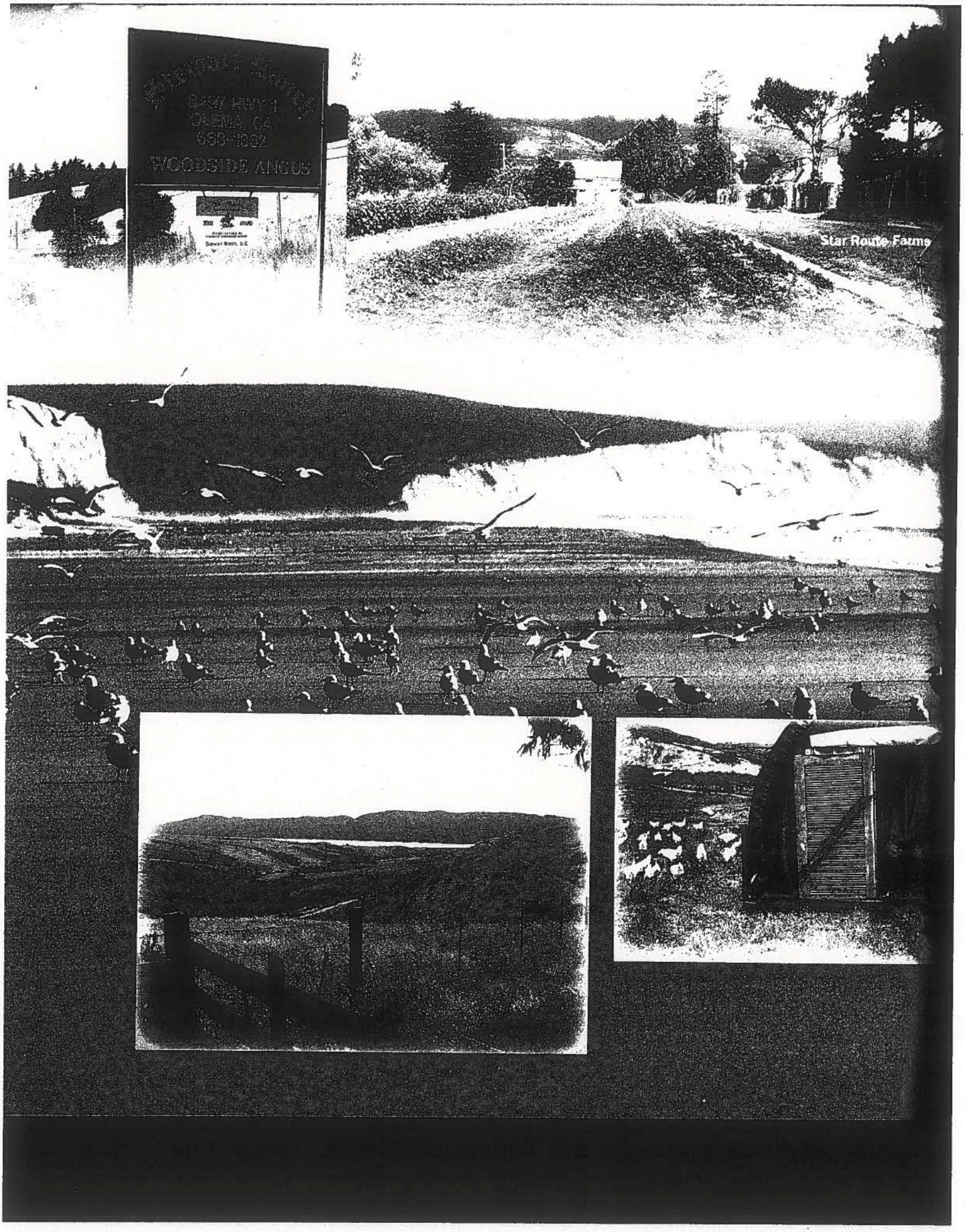
From our house, we look out over the oyster beds and the estuary every day...It's a beautiful view and it's something that we love and cherish. We're deeply committed to that ecosystem and its protection.

– Kevin Lunny, owner, Drakes Bay Family Farms[2]

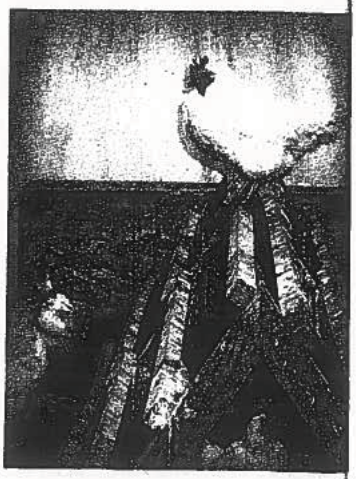
MORE ABOUT POINT REYES NATIONAL SEASHORE

Point Reyes National Seashore, created by Congress in 1962, comprises more than 71,000 acres, including 33,000 acres of wilderness. Estuaries, windswept beaches, coastal grasslands, salt marshes, and coniferous forests create a haven of 80 miles of unspoiled and undeveloped coastline. Located just an hour's drive north of San Francisco, the park receives more than 2.5 million visitors annually. The cultural history of Point Reyes extends back some 5,000 years to the Coast Miwok people who were the first human inhabitants of the peninsula; more than 100 known village sites exist within the park. In the early 1800s, Mexican land grantees established ranches. These were followed by a wave of American agricultural operations, which continue to this day in the park's pastoral zone.

1 See http://www.marinsunfarms.com.
2 Quoted in Greg Cahill, "Putting the Oysters to Bed," *Pacific Sun*, July 14, 2006; http://www.pacificsun.com/story_archives/oysters.html.


WOODSIDE ANGUS
Star Route Farms

Point Reyes National Seashore



The high-quality pastures of Point Reyes make raising grass-fed beef possible and profitable. Dave Evans (left) and Kevin Lunny (right), fifth- and fourth-generation Point Reyes ranchers respectively, farm within Point Reyes National Seashore, and both have been recognized for their environmental stewardship and innovation. They belong to a growing number of West Marin farmers and ranchers committed to sustainable agricultural strategies. On his Marin Sun Farms, Evans practices pasture rotation, avoids antibiotics and growth hormones, and sells directly to consumers. Several years ago, he built moveable henhouses that allow the chickens to forage in the pastures. The free-range birds break up manure and fertilize the soil. Lunny has converted his herd to grass-fed and organic production. Both are diversifying; Evans has opened Marin Sun Farms Butcher Shop and Eatery in nearby Point Reyes Station and Lunny's Drakes Bay Family Farms now operates an oyster farm on Drakes Estero.

Nicodemus Flour Cooperative
http://www.agecon.k-state.edu/accc/kcdc/pdf%20files/june%2004%20v6.pdf

Ernestine's Bar-B-Q Sauce
http://www.kslottery.com/wherethemoneygoes/ernestine's%20barbecue.htm

Pipestone National Monument

Pipestone National Monument
http://www.nps.gov/pipe

Pipestone Indian Shrine Association
http://authenticpipestone.com/home.htm

Point Reyes National Seashore

Point Reyes National Seashore
http://www.nps.gov/pore

Straus Family Creamery
http://www.strausmilk.com

Cowgirl Creamery
http://www.cowgirlcreamery.com

Marin French Cheese Company
http://www.marinfrenchcheese.com/

Point Reyes Farmstead Cheese Company
http://www.pointreyescheese.com/

Hog Island Oyster Company
http://www.hogislandoysters.com/v2/

Marin Sun Farms
http://www.marinsunfarms.com/

Drakes Bay Family Farms
http://www.drakesbayfamilyfarms.com/

Star Route Farms
http://www.starroutefarms.com

Shelburne Farms National Historic Landmark

Shelburne Farms
http://www.shelburnefarms.org/

Vermont FEED
http://www.nofavt.org/programs/vtfeed.php

Burlington School Food Project
http://www.shelburnefarms.org/pdfs/bsfpnewsletter2005color.pdf

A Forest for Every Classroom
http://www.nps.gov/archive/mabi/mabi/education/forest.htm

Food Works
http://www.tworiverscenter.org

Northeast Organic Farming Association of Vermont
http://www.nofavt.org

O'Bread Bakery
http://www.vermontfresh.net/member.php?id=1221

Beeken Parsons
http://www.beekenparsons.com/

Sitka National Historical Park

Sitka National Historical Park
http://www.nps.gov/sitk

Southeast Alaska Indian Cultural Center
http://www.nps.gov/sitk/parkmgmt/southeast-alaska-indian-cultural-center.htm

Alaska Native Brotherhood
http://www.anbgrandcamp.org/

National Park Concessioners

NPS Concession Environmental Management Program
http://concessions.nps.gov/coemp.cfm

ARAMARK Parks and Resorts
http://www.aramarkparks.com

Hearst Ranch
http://www.hearstranch.com

Mesa Verde National Park
http://www.nps.gov/meve

Monterey Bay Aquarium
http://www.mbayaq.org/cr/seafoodwatch.asp

T&D Willey Farms
http://www.tdwilleyfarms.com

Forever Resorts
http://foreverresorts.com/usalocations.cfm

Olympic National Park
http://www.nps.gov/olym

Grand Teton National Park
http://www.nps.gov/grte

Xanterra Parks and Resorts
http://www.xanterra.com/

Yellowstone National Park
http://www.nps.gov/yell

Grand Canyon National Park
http://nps.gov/grca

Crater Lake National Park
http://www.nps.gov/crla

Montana Legend Premium Angus Beef
http://www.montanalegend.com

Country Natural Beef
http://www.oregoncountrybeef.com

International Organization for Standardization
http://www.iso.org

Green Seal Certification
http://www.greenseal.org/

U.S. Environmental Protection Agency National Environmental Performance Track Program
http://www.epa.gov/performancetrack/

National Parks Cooperating Associations

Eastern National
http://www.easternnational.org

Jamestown Glasshouse
http://www.jamestownglasshouse.com/

Colonial National Historical Park
http://www.nps.gov/colo

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File No. 502976-0000

July 6, 2010

The Honorable Ken Salazar
Secretary
Department of the Interior
1849 C Street, N.W.
Washington, DC 20240

Re: Special Use Permit for Drakes Bay Oyster Company

Dear Secretary Salazar:

I am writing to you on behalf of Kevin and Nancy Lunny ("the Lunnys"), owners of the Drakes Bay Oyster Company ("DBOC"), to request that you enable DBOC to continue to occupy and utilize the buildings and lands on the shores of Drakes Estero, located within Point Reyes National Seashore ("PRNS"), a unit of the National Park Service ("NPS").

DBOC is a family business operated by the Lunny family, fourth and fifth generation farmers and long-term Point Reyes residents who have lived at the historic "G" Ranch, overlooking Drakes Estero. Since acquiring the business in 2004, the Lunnys have been operating a sustainable, environmentally-friendly local business that provides jobs for the community and gives visitors to PRNS a valuable cultural and historic experience.

We were encouraged to hear of your recent statement at the Great Outdoors Conference that DBOC would continue to operate within PRNS. As you acknowledged, the oyster farm has existed in PRNS for many years. In fact, commercial oyster production has taken place within Drakes Estero for over seventy years—since the early 1930s, approximately three decades before Congress established PRNS in 1962. DBOC now produces both oysters and clams as part of its operations and is the last operating oyster cannery in the State of California.

As background, and as discussed in more detail below, DBOC operates under both State and Federal permits. With respect to the former, DBOC cultivates shellfish on the bottomlands in Drakes Estero pursuant to leases from the California Department of Fish and Game, which were renewed for 25 years in 2004, and thus expire in 2029. As to the latter, DBOC operates under a Reservation of Use and Occupancy ("RUO") executed in 1972 between NPS and the previous owners of the oyster farm and under several ancillary special use permits issued by NPS. The RUO and the other permits expire in 2012; however, the RUO contains a renewal

clause, which provides for the issuance of a special use permit that would "run concurrently with and...terminate upon expiration of the State water bottom allotments...."

Questions have been raised regarding the legal authority of NPS to issue a special use permit that would allow DBOC to continue operating past 2012, given that Drakes Estero was designated "potential wilderness" in 1976, pursuant to the Point Reyes Wilderness Act, Public Law 95-544. Notably though, the designation of Drakes Estero as "potential wilderness" was never meant to preclude the continued operations of DBOC. As is evident from relevant legislative history and environmental reviews, Drakes Estero was designated as "potential wilderness" rather than wilderness because of the understanding that oyster cultivation would continue, in light of California's retained interest in leasing the bottomlands for shellfish cultivation.

Moreover, and importantly, in October of 2009 Congress expressly authorized the Department of the Interior to issue DBOC a special use permit to continue its operations past 2012. As this letter describes, and given Congress's recent directive, there are multiple important reasons to issue such a permit, including the rich history of oyster farming in Drakes Estero and the myriad cultural, recreational, educational and ecological benefits DBOC provides.

I. RICH HISTORY OF MARICULTURAL OPERATIONS IN DRAKES ESTERO

Oyster farming has enjoyed a long history in Drakes Estero. The Miwok Indians were the original "oyster-farm operators," with their harvesting of native shellfish beginning thousands of years ago. In fact, their ancient oyster middens are still present in the estero. Commercial oyster farming began in the estero in the 1930s, with the original allotment recorded in the name of David C. Drier on January 18, 1934 for the purpose of growing oysters.[1] Although several transfers occurred during those early years, for most of its commercial history, the estero was farmed by Johnson's Oyster Company. In 2004, the Lunny family purchased the farm from Johnson's Oyster Company and have sought to adopt many of the same sustainable practices used by the Miwoks in order to conserve the important natural resources of the area.

This long history of maricultural operations has been routinely recognized as a valid and important use of Drakes Estero. The legislative history of the Point Reyes National Seashore Act, for example, is replete with references to both the history and legacy of oyster farming and the important benefits it provides to PRNS. For instance, during congressional hearings on the establishment of PRNS, former NPS Director Conrad Wirth explained that the "[e]xisting commercial oyster beds and an oyster cannery at Drakes Estero...should continue under national seashore status because of their public values. The culture of oysters is an interesting and unique industry which presents exceptional educational opportunities for introducing the public, especially students, to the field of marine biology."[2] Comments made during the Senate hearings

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[1] *See* NPS, Environmental Assessment/Initial Study Joint Document, Johnson Oyster Company, Marin County, Point Reyes National Seashore, at 8 (May 1998).

[2] NPS, Conrad L. Wirth, Director, Report on the Economic Feasibility of the Proposed Point Reyes National Seashore at 20 (1961), included in the Hearings Before the Subcommittee on Public Lands of the Committee on

on the proposed PRNS legislation echoed this view: "[t]his proposed legislation provides a balanced use between the public and private interests concerned [because] the oyster and commercial fisheries would be able to continue operation and provide both recreation and economic value to the seashore."[3]

In the early 1970s, when Congress began considering designating wilderness areas within PRNS, the importance of the oyster operations was affirmed. Senator John Tunney, who introduced the PRNS wilderness legislation, reiterated that "[e]stablished private rights of landowners and leaseholders will continue to be respected and protected. The existing agriculture and aquaculture uses can continue."[4] Similarly, Representative John Burton underscored that the legislation's intent was to "preserve the present diverse uses of the Seashore," including the commercial oyster operations in Drakes Estero.[5] The Department of Interior itself recommended that an express wilderness designation would be inappropriate: "Commercial oyster farming operations take place in this estuary and the reserved rights by the State on tidelands in this area make this acreage inconsistent with wilderness."[6]

Until very recently, NPS consistently agreed with these conclusions and appeared supportive of the continued use of Drakes Estero for maricultural operations. The RUO itself, for example, contains a renewal clause, which provides that "[u]pon expiration of the reserved term, a special use permit may be issued for the continued occupancy of the property...."[7]

Additionally, in the Final Environmental Impact Statement prepared by NPS evaluating the potential impacts associated with designating certain PRNS lands as wilderness, NPS discussed the "oyster-farm operation" and noted that while removing the oyster farm might remove human activities from the estero, there would be a "loss of some compensating values. Besides its economic benefits to the community, the farm has decided interpretive importance as a popular 'living exhibit,' where visitors have the unique opportunity to observe the operation

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Interior and Insular Affairs, U.S. Senate, 87th Congress, First Session on S.486, A Bill to Establish The Point Reyes National Seashore in the State of California and for Other Purposes (Mar. 28, 29, and 31, 1961).

[3] Hearings Before the Subcommittee on Public Lands of the Committee on Interior and Insular Affairs, U.S. Senate, 87th Congress, First Session on S.476, A Bill to Establish The Point Reyes National Seashore in the State of California and for Other Purposes at 17 (Mar. 28, 29, and 31, 1961).

[4] Hearings on S.1093 and S.2472 Before the Subcommittee on Parks and Recreation of the Committee on Interior and Insular Affairs, 94th Cong. 271 (1976).

[5] *Id.* at 272-73.

[6] Letter dated September 8, 1976, from John Kyl, Assistant Secretary of the Interior, to U.S. Representative James A. Haley, Chairman, Committee on Interior and Insular Affairs, House of Representatives, U.S. House Report No. 94-1680, 94 U.S. Code and Congressional News 5593 .

[7] JOC Grant Deed to the United States, Exh. C, § 11 (Nov. 9, 1972). The clause, in fact, only requires that the special use permit "run concurrently with and will terminate upon the expiration of the State water bottom allotments...." Those "State water bottom allotments" refer to a renewable lease issued by the California Department of Fish and Game, which has granted DBOC the right to cultivate oysters in Drakes Estero through 2029. California Department of Fish & Game Amendment No. 2 to Indenture of Lease, M-438-01 (Dec. 2, 2005). Accordingly, issuance of a SUP that would "run concurrently with" the State water bottom allotments would be consistent with the state authorizations and would allow the oyster farm to continue operating through 2029.

and to purchase freshly grown oysters. These are appropriate purposes at Point Reyes, a recreational-category park."[8]

NPS continued to recognize the value of the oyster operations in its 1980 PRNS General Management Plan (still in effect), which includes the following management objectives: "[t]o monitor and improve maricultural operations, in particular the oyster farm operation in Drakes Estero," and "[t]o monitor and support productive land uses and activities [including maricultural activities] which are consistent with historic patterns."[9] As recently as 1998, NPS conducted an environmental assessment pursuant to the National Environmental Policy Act ("NEPA") of the potential impacts of improving and substantially expanding the oyster farm operations. Although the planned expansion did not take place because of funding shortfalls, NPS' support of the project demonstrates the agency's recognition that oyster farm operations are a valid use of PRNS land.[10]

II. DBOC IS A BENEFICIAL USE OF PRNS

Recently, some questions have been raised regarding the types of environmental impacts oyster farming may be having on Drakes Estero. In 2006 and 2007, for example, PRNS staff prepared and released several versions of a report entitled *Drakes Estero: A Sheltered Wilderness Estuary* that purported to evaluate the impacts of DBOC on Drakes Estero and erroneously concluded that oyster farming is having an adverse ecological impact on PRNS resources. This effort to portray DBOC as having detrimental impacts appeared to be part of an attempt to "eliminate" DBOC as a "non conforming use" so that Drakes Estero and the surrounding tract of land could be converted to wilderness status. Indeed, PRNS staff took the position that they were legally precluded from issuing a special use permit to DBOC to extend operations past 2012 because of the "potential wilderness" designation.[11] However, there is no such restriction on NPS' authority.[12] Moreover, NPS has allowed non conforming uses in other potential wilderness areas.[13]

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8 *See* NPS, Final Environmental Statement FES 74-18, Proposed Wilderness: Point Reyes National Seashore, California, at 56 (Apr. 23, 1974).

9 NPS, General Management Plan: Point Reyes National Seashore, at 2-3 (Sept. 1980).

10 *See, e.g.*, Letter from Don Neubacher, Superintendent, PRNS, to Bank of Oakland (Nov. 22, 1996) (explaining the relationship between the oyster farm and NPS and noting that NPS is "genuinely excited about the planned changes" to the oyster farm and "pledge[s] to work with the Johnsons and the Bank of Oakland to make the project successful"); *see also* Thomas Yeatts, Point Reyes Light, *Park Planned Big New Oyster Plant* (Aug. 2, 2008) (documents obtained by the newspaper indicate that, beginning in 1996, "Point Reyes National Seashore (PRNS) staff developed a plan to renovate the Johnson Oyster Company's rickety buildings and septic system, and proposed new two-story development").

11 *See, e.g.*, Field Solicitor Opinion Re: Point Reyes Wilderness Act (Feb. 26, 2004) (concluding that the Wilderness Act, the Point Reyes Wilderness Act, and NPS Management Policies mandate that NPS convert potential wilderness, such as Drakes Estero, to wilderness status "as soon as the non conforming use can be eliminated").

12 For clarification, we disagree with NPS' legal interpretation that any law precludes the agency from allowing DBOC to continue operating past 2012. There is no mandate found in any applicable law or guidance that

From the outset it should be noted that since purchasing the farm in 2004, the Lunnys have dedicated significant time and resources to cleaning up the oyster farm and resolving past violations of law that had occurred during their predecessor's operations. *See, e.g.*, Peter Jamison, Point Reyes Light, *Park Service to Close Historic Oyster Farm* (June 15, 2007) (discussing DBOC's cleanup and quoting PRNS spokesman John Dell'Osso, "Kevin [Lunny] has done a fantastic job of cleaning up. Everything we've asked him to do, he's done."). The Lunnys remain committed to continuing those cleanup efforts and ensuring that DBOC is operated in a sustainable, environmentally-friendly manner.[14] As such, the family—along with their many supporters in western Marin County environmental and agricultural circles—was disheartened by the NPS report, which appeared to, among other things, overlook the many beneficial effects of oyster culture operations on the environment.[15]

In order to help resolve the debate regarding the scope of impacts of DBOC and the availability of scientific analysis, the National Academy of Sciences ("NAS") agreed to help clarify the scientific issues regarding maricultural activities and produced two reports. The first report, which was released in May of 2009, assessed the adequacy of the claimed scientific bases for NPS staff's preliminary conclusions in their Drakes Estero reports, and evaluated the

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would require NPS to convert "potential wilderness" to wilderness on a particular timetable. The Wilderness Act, for example, does not use the phrase "potential wilderness," much less define when "potential wilderness" must become actual wilderness, if ever. NPS management policies, director's orders, and reference manuals are all silent with respect to a specific timetable for conversion and only provide that, once "non conforming uses" have ceased, NPS will publish a Federal Register notice to change the designation from potential wilderness to wilderness. *See* NPS Reference Manual #41 at Appendix H, Wilderness Preservation and Management (1999). There is no requirement, however, mandating that NPS ensure that such operations cease by a certain date, and there has been no environmental review of the impact of removing the oyster cultivation operation in Drakes Estero.

[13] Examples of non conforming uses that NPS has allowed in other potential wilderness areas include: i) operation of motorized boats in potential wilderness areas of Grand Canyon National Park; ii) public use of Five High Sierra camps and the Ostrander ski hut in potential wilderness areas of Yosemite Valley; iii) operation by Southern California Edison of hydroelectric dams in potential wilderness areas of Sequoia-Kings Canyon National Park; and iv) use of roads in Cumberland National Seashore located in potential wilderness. As discussed below, the oyster farm provides greater cultural, recreational, educational and ecological benefits than these examples of non conforming uses.

[14] Prior to the Lunny family's ownership, the oyster farm had suffered from a degree of deterioration that led to a number of violations of law, including the Coastal Development Act, and enforcement actions by the California Coastal Commission ("CCC"). The Lunnys are working with the CCC to resolve those violations and ensure that DBOC's operations fully comply with all applicable local, state, and federal regulations. Additionally, an incident recently occurred at the farm in which clam-growing equipment was inadvertently placed into a Harbor Seal Protection Area. The Lunnys immediately took steps to rectify this mistake and are implementing processes to ensure that such mistakes do not occur in the future. Moreover, many of NPS' allegations that the oyster farm adversely impacts harbor seals have since been retracted at very recent Marine Mammal Commission ("MMC") hearings. Like the NAS, the MMC has become involved specifically to resolve the debate surrounding the oyster farm's impact on harbor seals. The MMC has held a series of panel hearings, and is working on a report that is due out in the near future.

[15] The Department of Interior's Inspector General investigated the various versions of the NPS Report and found that scientific inaccuracies undermined NPS' conclusions regarding the oyster farm's ecological impact on Drakes Estero.

available data specifically regarding the impact of DBOC's maricultural activities.[16] The second report, which was released in February of 2010, broadly addresses best management practices and performance standards to enhance the overall benefits of shellfish mariculture and minimize any negative ecological effects.[17]

The first NAS report reasonably concluded that "there is a lack of strong scientific evidence that shellfish farming has major adverse ecological effects on Drakes Estero at the current (2008-2009) levels of production and under current (2008-2009) operational practices, including compliance with restrictions to protect eelgrass, seals, water-birds, and other natural resources." NAS 2009 Report at 6. The report goes on to discuss some of the over-looked beneficial effects that DBOC is having on the estero, including: (i) the potential that oyster culture in Drakes Estero is replacing the important "filtering capacity and biogeochemical processing that was lost in the mid-19th century and subsequent decades with the overharvest and functional elimination of the native Olympia oyster" (*id.* at 68); (ii) the possible beneficial effects on eelgrass in the area, given that eelgrass has approximately doubled in Drakes Estero from 1991 to 2007 (*id.*); (iii) the positive economic impact for the region—including employment, tax revenue, and local food production (*id.* at 64); and (iv) the positive visitor experience, given that DBOC "preserves a piece of local and regional culture and history" (*id.* at 65).

As noted above, the oyster farm provides significant ecological benefits to Drakes Estero. DBOC's oysters are helping to "restor[e] an historic baseline ecosystem" by acting as a proxy for native oysters. *Id.* at 22; *see also* NAS 2010 Report at 13-14. The oysters are also known as "ecosystem engineers" and "foundation species" (NAS 2009 Report at 18) that bolster the ecosystem's resilience against abnormal events like phytoplankton blooms or sedimentation from storm water run-off (*id.* at 22, 23).[18]

In addition to the work done by the oysters, the Lunnys themselves are committed to conserving and protecting PRNS. For example, DBOC is the only oyster farm in California to produce and hatch its own seeds on site, greatly reducing the risk of introducing contaminants and invasive species. And it employs an environmentally-friendly off-bottom "hanging culture" method, used by less than 5% of U.S. oyster farmers due to the labor-intensive hand harvesting required. The Lunnys are also dedicated to educating others about conservation and the environment. The oyster farm offers free tours to the public to inform them about the history of oyster farming in PRNS, oysters' value as a beneficial source of protein, coastal ecosystems, and the nature and efficacy of organic sustainable farming. Similarly, the oyster farm offers its

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16 *See* National Academy of Sciences, National Research Council, Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California (2009) ("NAS 2009 Report").

17 *See* National Academy of Sciences, National Research Council, Ecosystem Concepts for Sustainable Bivalve Mariculture (2010) ("NAS 2010 Report").

18 The second NAS report provides further detailed discussion of the general ecosystem services that bivalves perform. NAS 2010 Report at 10-11. In fact, these ecosystem services are so significant that the report recommends quantifying their economic value, as well as developing policies to encourage restoration of bivalves in more ecosystems so they can improve and benefit from these services. *See id.*

facilities to researchers and participates in research on native oysters, estuarine biodiversity, and human health protection.

For all these reasons, many of PRNS' 2.5 million annual visitors flock to DBOC, which carries on the long-standing tradition of oyster farming in Drakes Estero and remains as the last operating oyster cannery in the State. With its cultural, recreational, educational and ecological benefits, the oyster farm undoubtedly "enhances visitors' experience in the estero." *Id.* at 65.

By contrast, should the oyster farm be shut down, the community would be adversely impacted in significant ways. Not only would PRNS lose the numerous visitors for whom DBOC is a destination, but the oyster farm employees who have specialized skills would lose their livelihood, and the low-income housing that DBOC provides for their employees would be demolished. This in turn would effect the local ranches, where many of DBOC's employees' family members work. Furthermore, removing the oysters could have an adverse effect on the Drakes Estero ecology, including its water quality.

Both NAS reports ultimately affirm that there is no ecological justification to deny DBOC a special use permit. And given that Congress has expressly authorized NPS to issue a special use permit, there is no legal justification either. NPS should issue DBOC a special use permit to continue its operations past 2012.[19]

III. NPS AUTHORITY TO ISSUE A SPECIAL USE PERMIT FOR CONTINUED OPERATIONS PAST 2012

In October of 2009, Congress provided a definitive answer to the legal question of whether NPS has the authority to issue a special use permit to DBOC to continue operating past 2012. The answer was a resounding yes.

Specifically, Congress directed that:

> Prior to the expiration on November 30, 2012 of the Drake's Bay Oyster Company's Reservation of Use and Occupancy and associated special use permit ('existing authorization') within Drake's Estero at Point Reyes National Seashore, notwithstanding any other provision of law, the Secretary of the Interior *is authorized to issue a special use permit with the same terms and conditions as the existing authorization*, except as provided herein, for a period of 10 years from November 30, 2012: Provided, That such extended authorization is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal. The Secretary shall take

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[19] As you know, Senator Dianne Feinstein contacted you when the first NAS report was issued and expressed her concern that NPS had "exaggerated the effects of the oyster population on the Estero's ecosystem" and appeared to be continuing to ignore the potential beneficial impacts of maricultural operations. *See* Letter from Dianne Feinstein to the Honorable Ken Salazar (May 5, 2009). We agree with Sen. Feinstein's conclusion that the NAS report "does not present any compelling ecological reason for refusing to renew the Drakes Bay Oyster Company lease in 2012."

into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization.

Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010, Pub. L. No. 111-88 § 124 (2009) (emphasis added).

As such, now that the second NAS report has been issued, DBOC respectfully requests that NPS provide a proposed special use permit to DBOC incorporating the same terms and conditions under which DBOC currently operates, including an appropriate annual fee.

Thank you very much for your attention to this matter. We understand that Will Shafroth, Deputy Assistant Secretary for Fish, Wildlife and Parks, recently visited DBOC on February 4, 2010. The Lunnys would be happy to host you, Secretary Salazar, and any other interested Department of Interior officials on a tour of the oyster farm, and/or provide any follow-up information requested. We look forward to meeting with you and your staff to discuss this matter in further detail, and will be in touch to set this up. If you have any questions or would like additional information, please do not hesitate to reach me at (415) 395-8136.

Best regards,

Karl Lytz M.B.

Karl S. Lytz
of LATHAM & WATKINS LLP

cc: The Honorable Dianne Feinstein
Will Shafroth, Deputy Assistant Secretary for Fish, Wildlife and Parks
Jonathan Jarvis, Director, National Park Service
George Turnbull, Acting Regional Director, Pacific West Region, National Park Service
Cicely Muldoon, Superintendent, Point Reyes National Seashore

Drakes Bay Oyster Company's Comments on the National Park Service Draft Environmental Impact Statement for Special Use Permit

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11.	Best, G., M. Singh, D. Mourato, and Y.J. Chang. 2001. Application of immersed ultrafiltration membranes for organic removal and disinfection by-product reduction. Water Science and Technology: Water Supply 1(5/6): 221-231.
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Drakes Bay Oyster Company

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November 24, 2010

DBOC SUP EIS
c/o Superintendent Cicely Muldoon
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: Drakes Bay Oyster Company Comments on National Park Service Scoping Letter for Special Use Permit Environmental Impact Statement

Dear Superintendent Muldoon:

Drakes Bay Oyster Company ("DBOC" or "the farm") appreciates the opportunity to comment on the October 8, 2010, National Park Service ("NPS" or "Service") scoping letter during environmental review by the NPS of DBOC's request for issuance of a Special Use Permit to enable DBOC to continue to use the land and facilities within the Point Reyes National Seashore ("PRNS" or the "Seashore") subject to the 1972 Reservation of Use and Occupancy ("RUO").

I. INTRODUCTION

The Drakes Bay Oyster Company houses the only remaining oyster cannery still in operation in the State of California. It is located within what is now the Point Reyes National Seashore, located thirty miles northwest of San Francisco, where oyster farming has taken place for nearly a century. The farm's onshore facilities subject to the RUO are located on about 2.5 acres of land adjoining Drakes Estero, in which oysters are cultivated. The farm is currently operating under a 2008 Special Use Permit ("2008 SUP") that consolidates previous SUPs issued by NPS for the purpose of supplying water for the oyster farm and using and maintaining the sewage pipeline and leachfield associated with the RUO itself (hereinafter, the "RUO and associated permits"). For the first time, the 2008 SUP attempted to exert authority over DBOC's operations in the waters of Drakes Estero. However, the oyster farm cultivates shellfish in Drakes Estero pursuant to two leases from the California Department of Fish and Game (CDFG).

As explained in the July 6, 2010 letter requesting the SUP, the CDFG has been leasing the bottomlands in Drakes Estero for shellfish cultivation since the early 1930's. As required by the California Constitution, the California Legislature retained fishing rights in the tidelands, as well as mineral rights, when it otherwise transferred ownership of the tidelands to the United States in 1965. The State's right to issue leases for shellfish cultivation in these waters is a property right long managed through leases authorized by the State Legislature and the

California Fish and Game Commission. In 2004, DBOC's two leases were renewed for 25 years, through 2029. Therefore, DBOC is not seeking a permit from the NPS to cultivate oysters in Drakes Estero. Instead, DBOC is seeking a SUP consistent with the terms found in Article 11 of the RUO, which states: "Upon expiration of the reserved term, a special use permit may be issued for the continued occupancy of the property for the herein described purposes, provided however, that such permit will run concurrently with and will terminate upon the expiration of the state water bottom allotments assigned to the vendor. Any permit for continued use will be issued in accordance with National Park Service regulations in effect at the time the reservation expires."

The oyster farm provides a number of important environmental and economic benefits to the area.[1] DBOC goes to great lengths to use environmentally-friendly and sustainable culturing and harvesting techniques. For example, DBOC is the only oyster farm in California that produces and hatches most of its own seed on-site, which reduces the risk of introducing diseases or invasive species. DBOC also uses an off-bottom hanging oyster culture method that is environmentally-sustainable yet labor-intensive and, as a result, employed by less than 5% of U.S. oyster farmers. In addition to processing all its products on-site, DBOC also markets 100% of its products to Marin County and the San Francisco Bay Area in order to reduce its carbon footprint. As discussed below, in addition to the sustainable work we perform, the oysters we grow also play a critical role in the ecosystem. Together, the humans and bivalves of DBOC are working towards a sustainable way to protect and conserve Drakes Estero for future generations.

DBOC is also passionate about public education on issues related to conservation, the environment and the history of shellfish in the area. We provide almost daily tours at no cost to the public consistent with the RUO and SUP issued by the NPS. As the State's last operating oyster cannery and the region's only oyster seed-setting hatchery, DBOC has become an important educational resource. We open our farm to educational institutions of all levels, from pre-school through graduate school. The farm also supports scientific research to learn more about native oysters, estuarine biodiversity, and human health protection. The public has recognized our oyster farm's unique value, making it a beloved and popular visitor destination.

DBOC will participate in this NEPA process for the issuance of the new SUP, for the use of the onshore facilities as described in the RUO that the SUP replaces, and commends NPS' plan and commitment to complete the EIS in the timeframe identified in the Notice of Intent. Adhering to this timeline will be critical to ensure that the Service complies with Public Law 111-88, Section 124. DBOC is committed to working with the Service and the public during the EIS process. To that end, DBOC offers the following comments as part of the scoping process.

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[1] NPS recognizes the general benefits of shellfish aquaculture: "The aquaculture industry is important to coastal communities and nearby national parks. It creates employment and business opportunities at the same time maintaining healthy and productive marine populations, species and ecosystems." NPS, "A Growing Relationship: Parks and Aquaculture" webinar (Mar. 30, 2010).

II. THE PURPOSE, NEED, AND OBJECTIVES SHOULD BE MODIFIED.

Drakes Bay Oyster Company currently holds a Reservation of Use and Occupancy and associated permits, all of which will expire on November 30, 2012. Pursuant to Section 124 of Public Law 111-88,[2] Congress authorized the Secretary of the Interior to issue a special use permit for a period of ten years to DBOC to continue its existing shellfish operations at the Seashore.[3] On July 6, 2010, DBOC requested the issuance of a new SUP upon expiration of the existing permit. Attachment A, Letter from Karl S. Lytz, on behalf of Drakes Bay Oyster Company, to the Honorable Ken Salazar (July 6, 2010) (hereinafter "DBOC Application"); Attachment B, Proposed Project Description for DBOC Special Use Permit.

There are significant deficiencies in the NPS' Purpose, Need, and Project Objectives for the project. Without a clear and complete statement, NPS resources will be committed in violation of the Council on Environmental Quality ("CEQ") NEPA Regulations. *See* 40 C.F.R. § 1502.2(f) ("Agencies shall not commit resources prejudicing selection of alternatives before making a final decision."). DBOC respectfully asserts that the Purpose, Need, and Project Objectives for the EIS should be defined more clearly and completely than they have been in the Service's October 8, 2010, Scoping Letter.

The NPS' Purpose and Need statement is as follows:

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2 "Prior to the expiration on November 30, 2012 of the Drakes Bay Oyster Company's Reservation of Use and Occupancy and associated special use permit (''existing authorization'') within Drake's Estero at Point Reyes National Seashore, notwithstanding any other provision of law, the Secretary of the Interior is authorized to issue a special use permit with the same terms and conditions as the existing authorization, except as provided herein, for a period of 10 years from November 30, 2012: *Provided*, That such extended authorization is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal. The Secretary shall take into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization. Nothing in this section shall be construed to have any application to any location other than Point Reyes National Seashore; nor shall anything in this section be cited as precedent for management of any potential wilderness outside the Seashore." Department of Interior, Environment, and Related Agencies Appropriations Act, 2010, Pub. L. No. 111-88 § 124 (2009).

3 Contrary to the Public Scoping Meeting Handout, which states "[b]efore [Section 124 of Public Law 111-88]...NPS did not have the authority to extend the permit beyond 2012," it should be recognized that NPS can also issue a special use permit to DBOC for continued operations after the 2012 expiration date pursuant to other authorities. NPS specifically contemplated allowing the oyster farm to continue operating beyond the 40-year term of the RUO, which provides that upon its expiration, NPS may subsequently issue a special use permit. *See* Johnson Oyster Company Grant Deed to the United States, Exh. C § 11 (Nov. 9, 1972). Furthermore, NPS management of commercial operations is consistent with the Service's broader policies. NPS Director's Order #53 also provides the Service the discretion to issue a special use permit upon the expiration of the existing Reservation of Use and Occupancy. NPS, Director's Order #53, Special Park Uses (2000).

> Pursuant to Section 124 of Public Law 111-88, the Secretary of the Interior has the discretionary authority to issue a Special Use Permit for a period of 10 years to Drakes Bay Oyster Company (DBOC) for commercial harvesting and processing of shellfish at Point Reyes National Seashore. The existing Reservation of Use and Occupancy and associated Special Use Permit held by DBOC expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing permit.
>
> On behalf of the Secretary, the NPS will use the NEPA process to engage the public and evaluate the effects of continuing the commercial operation within the national park. The results of the NEPA process will be used to inform the decision of whether a new Special Use Permit should be issued to DBOC for a period of 10 years.

NPS, Scoping Letter at 1 (Oct. 8, 2010). In addition, the Project Objectives statement is as follows:

- Manage natural and cultural resources to support their maximum protection, restoration, and preservation.
- Manage wilderness and potential wilderness areas to preserve the character and qualities for which they were designated.
- Engage a broad spectrum of the public and relevant agencies in the NEPA process.

This statement of the Purpose, Need, and Project Objectives for the project fails to even minimally describe the oyster farm, as required by NEPA and NPS policy. Further, on the NPS scoping meeting informational posters and in NPS materials distributed, the word "wilderness" showed up twenty-one times, yet there was no description whatsoever of the farm.

When performing NEPA analysis, the Purpose should state the "goals and objectives that NPS intends to fulfill by taking action." NPS, Director's Order #12, Conservation Planning, Environmental Impact Analysis, and Decision-making, at 16 (2001) (hereinafter "NPS DO #12"). These goals and objectives can come from specific legislation, such as Section 124 of Public Law 111-88, the management objectives of a General Management Plan ("GMP"), and NPS guidelines for a particular management zone. *See id.* The Need is a "discussion of project 'background.'" *Id.* The EIS should be guided by these NPS policies and define the Purpose, Need, and Project Objectives more clearly by taking the following into consideration.

Additionally, as part of the Purpose and Need, NPS must also consider the project applicant DBOC's needs and goals, in addition to the Service's. *See Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991) ("When an agency is asked to sanction a specific plan, *see* 40 C.F.R. § 1508.18(b)(4), the agency should take into account *the*

needs and goals of the parties involved in the application.") (emphasis added). Accordingly, the statement of the Purpose, Need, and Objectives in the EIS should also reflect DBOC's objectives of operating an environmentally-friendly and sustainable oyster farm for a renewable ten-year period under a Service-issued SUP.

DBOC agrees with the Service that the Purpose and Need for the EIS is to consider DBOC's request to NPS for the issuance of a new SUP for its land operations upon expiration of the existing NPS authorizations, pursuant either to the renewal provision in the RUO or Section 124 of Public Law 111-88, but believes it should clarify that DBOC needs no other authorizations from the NPS besides a SUP to extend DBOC's use and occupancy of the land and buildings which are the subject of the RUO and associated permits in order to continue its land operations past 2012.

DBOC already has the appropriate and necessary approvals from the California Department of Fish and Game ("CDFG") for its operations in the waters of Drakes Estero. CDFG has historically leased water bottoms in Drakes Estero for oyster cultivation since at least the 1930s. When the State transferred title of the submerged lands to the federal government in 1965, the State retained the right to fish, and thus its jurisdiction to regulate mariculture operations. As such, CDFG continued to lease water bottoms in Drakes Estero for oyster cultivation as it always had and still does.[4] Exercising the State's reserved fishing rights, in 2004, CDFG renewed the oyster farm's water bottom leases in Drakes Estero through 2029. Accordingly, the oyster farm already has the authorizations needed to continue its operations in the water past 2012. DBOC will also seek approvals from other federal and state agencies and requests that the Service invite the agency noted in Section VI as a cooperating agency that meets both tests of "...jurisdiction by law and special expertise." A Citizen's Guide to the NEPA: Having Your Voice Heard. All DBOC requires from NPS, however, is the SUP for its land operations for the purposes authorized by the existing RUO: "processing and selling wholesale and retail oysters, seafood and complimentary food items, the interpretation of oyster cultivation for the visiting public, and residential purposes reasonably incidental thereto." Johnson Oyster Company Grant Deed to the United States, Exh. C. at 1 (Nov. 9, 1972). The current SUP authorizes DBOC to use the land for the same purposes.[5]

As stated above, the Purpose and Need should also be based on the management objectives stated in the 1980 PRNS General Management Plan. General Management Plans

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[4] The State's jurisdiction over DBOC's operations in Drakes Estero remains unaffected by the May 15, 2007, letter from CDFG to PRNS purporting to confirm that the Seashore has "primary management authority."

[5] The current SUP also consolidates previous SUPs issued by NPS that authorize the additional purposes of supplying water for the oyster farm, and using and maintaining the sewage pipeline and leachfield. Additionally, the current SUP attempted for the first time to exert authority over DBOC's operations in the waters of Drakes Estero, which CDFG had always controlled and still does through the two leases that have been renewed through 2029. As discussed above, because CDFG has jurisdiction over DBOC's operations in the waters of Drakes Estero and already authorized the continued operations past 2012, the SUP issued by NPS will only cover DBOC's land operations.

inform site-specific projects because the decision to designate a certain area for a specific use has already been made in the GMP. NPS DO #12 at 85, 86, 88. Here—as it was in the 1998 Environmental Assessment NPS conducted for certain improvements to the oyster farm when it was operated by Johnson Oyster Company—the operative document is the 1980 PRNS GMP. The Purpose and Need should include the GMP's statements about the Seashore's management objectives for the oyster farm, including: i) "to manage seashore activities in the...estuarine areas in a manner compatible with resource carrying capacity;" ii) "to monitor and improve maricultural operations, in particular the oyster farm operation in Drakes Estero, in cooperation with the California Department of Fish and Game;" iii) "to monitor and support productive land uses and activities which are consistent with historical patterns;" and iv) "to ensure that...mariculture activities are consistent with the historical evolution of land and water use at Point Reyes." 1980 GMP at 2-3.

In defining the Purpose and Need, and in describing the Objectives of this EIS, DBOC believes it is imperative to present the full context of the oyster farm's operations. From an historical perspective, the EIS should provide sufficient information about the tradition of shellfish harvesting and the role that the oyster farm has played in Drakes Estero and, more recently, within the PRNS. From a management perspective, the EIS should discuss Congressional recognition of the oyster farm's history and multiple educational, scientific and historical benefits, as well as Congressional support of the oyster farm's continuation within the Seashore, from the creation of the Seashore up to present day with the passage of Public Law 111-88.

The EIS should similarly address the Service's own long history of supporting the oyster farm;[6] describe how the 1980 PRNS GMP supports the project; and disclose the Service's prior 1998 NEPA analysis conducted for the oyster farm, when it was operated by Johnson Oyster Company, including the Finding of No Significant Impact ("FONSI") under NEPA. For example, the 1980 GMP specifically highlighted the oyster farm, as well as the surrounding ranches, a visitor center, a hostel, and a horse outfitter, as "major features of the National Seashore." 1980 GMP at 7-8. It should also be disclosed within the EIS that there are currently numerous commercial operations and working cattle and dairy ranches within PRNS. Furthermore, the ranches all previously operated under RUOs like the one under which DBOC is currently operating, and since the expiration of these RUOs, the ranches now continue operating pursuant to SUPs like the one requested by DBOC.

Importantly, NPS should acknowledge the explicit Congressional mandate per Section 124 of Public Law 111-88 directing the Service to issue a SUP "notwithstanding any other provision of law." This plain language directs the Service not to consider other laws that conflict with its consideration of DBOC's SUP application, including wilderness laws and coastal management laws.[7] Nevertheless, because NPS emphasized wilderness issues during scoping, DBOC believes that it is important that the EIS contain a thorough analysis of the 1976 designation of Drakes Estero as a potential wilderness area and the Service's obligation to

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6 *See infra* at n.10.

7 *See infra* at Sections IV and VI.

manage wilderness and potential wilderness areas. As discussed in Section IV, however, the EIS should explain that these obligations do not mean that NPS is prohibited from issuing the SUP for the continued operations of the farm past 2012. The fact that the oyster farm was to stay was clearly restated, just four years after the Wilderness Act, in the 1980 PRNS GMP.

Section 124 of Public Law 111-88 also requires NPS to consider the National Academy of Sciences report, "Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California" (2009) (hereinafter "2009 NAS Report"). This report, which is discussed in more detail in Section V below, analyzed the ecological effects of DBOC on Drakes Estero. Ultimately, the report concluded that "there is a lack of strong scientific evidence that shellfish farming has major adverse ecological effects on Drakes Estero." *Id.* at 6. With respect to the scope and objectives of the EIS, it is imperative that the EIS address all potential impacts, both beneficial and adverse, of DBOC activities on NPS-managed lands.

III. THE APPROPRIATE ENVIRONMENTAL BASELINE IS THE FARM'S EXISTING OPERATIONS.

NPS has indicated that it plans to use the No Action Alternative as the environmental baseline against which the project will be evaluated. Under this scenario, NPS' baseline would assume that the oyster farm's operations have ceased in Drakes Estero, based on the hypothetical scenario that NPS will not issue a SUP for post-2012 operations.[8] Although the No Action Alternative typically serves as the germane environmental baseline for a proposed project against which to evaluate environmental impacts of various alternatives, here it would be inappropriate and impractical for NPS to use a hypothetical projected baseline based on the oyster farm's possible future termination.[9] Instead, NEPA requires that NPS use the existing farm's operations as the environmental baseline.

The essential distinction between a No Action Alternative and the environmental baseline when the project already exists was recognized by the Ninth Circuit in *American Rivers v. Federal Energy Regulatory Commission*, 201 F.3d 1186 (9th Cir. 1999). There, an environmental group challenged FERC's use of the existing conditions of a project that had existed for 50 years as the baseline for the environmental impact analysis. The group argued that the appropriate baseline should instead be the environment as if the existing project had never

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[8] Of note, NPS historically believed that "there is no foreseeable termination of the oyster farm. NPS, Final Environmental Statement FES 74-18, Proposed Wilderness: Point Reyes National Seashore, California, at 56 (Apr. 23, 1974). Similarly, in the Environmental Assessment prepared for the Johnson Oyster Company's proposed improvements, NPS considered but rejected the alternative of removing the oyster farm, noting that "[t]he existing GMP (NPS 1980) calls for the continuation of an oyster operation within the park." NPS, Environmental Assessment / Initial Study Joint Document, Johnson Oyster Company, Point Reyes National Seashore, Marin County, California, at 7 (May 1998). The 1980 General Management Plan is still currently in effect.

[9] Not only would a hypothetical projected baseline be inappropriate and impractical here, but it may violate Section 1506.1(a)(2) of the CEQ NEPA Regulations: "Until an agency issues a record of decision . . . no action concerning the proposal shall be taken which would . . . limit the choice of reasonable alternatives." 40 C.F.R. § 1506.1(a)(2).

been built. *Id.* at 1195. The court described such a baseline as "a theoretical reconstruction of what the McKenzie River basin would be like today had the Leaburg and Walterville projects not been in place for the greater part of this century." *Id.* The Ninth Circuit rejected this "theoretical reconstruction," however, and concluded that the *existing conditions* were in fact the proper environmental baseline. *Id.* at 1199. In so holding, the court stated, "It defies common sense and notions of pragmatism to require the Commission or license applicants to gather information to recreate a 50-year-old environmental base upon which to make present day development decisions." *Id.* at 1197 (internal quotation marks omitted).

Here, as in *American Rivers*, NPS must use the existing conditions—not the No Action Alternative—as the environmental baseline. Like *American Rivers*, in which the project had existed for "the greater part of a century," an oyster farm has existed at Drakes Estero for nearly a century. And analogous to *American Rivers*, in which it was inappropriate to attempt to recreate a decades-old environmental baseline, here it would be inappropriate to project a hypothetical baseline of an unknown future without the oyster farm in order to make a present-day decision. *See id.* at 1197. The baseline serves as a *practical* requirement to identify environmental consequences of a proposed action. *Id.* at 1195 n.15. The appropriate environmental baseline should therefore consist of the current conditions at Drakes Estero—not some imagined pristine state that does not currently exist, and has not existed for nearly 100 years.

In fact, NPS has previously recognized and applied the proper environmental baseline in prior NEPA review. In 1998, NPS conducted an Environmental Assessment for Johnson Oyster Company ("JOC"), the predecessor to DBOC. NPS, Environmental Assessment / Initial Study Joint Document, Johnson Oyster Company, Point Reyes National Seashore, Marin County, California, at 7 (May 1998) (hereinafter "1998 EA"). As explained in the 1998 EA's detailed purpose and need section, because JOC's current operations at that time had various health and safety code issues, the proposed project of rehabilitating existing buildings and constructing a new facility was intended to bring JOC into compliance with these regulations. *Id.* at 3. Without the proposed improvements, NPS and other agencies would have been forced to issue cease and desist orders to JOC and eventually shut the farm down. *See id.* Instead, under the same current GMP and with the same Wilderness designation, NPS chose to collaborate and support the on-going oyster operations including the construction of permanent buildings to promote long-term processing and interpretation.

Despite the possibility of shutting down JOC, the Service did not use this scenario to create a hypothetical environmental baseline without the oyster farm. Instead, NPS properly used JOC's current operations as the environmental baseline against which to compare the alternatives. The No Action Alternative was to allow JOC to continue operating in violation of health and safety codes. *Id.* at 6, 11. As such, the already existing impacts would continue so that there would be "no new impacts", *id.* at 11-12, except that "negative economic effects would occur because JOC would eventually be closed due to noncompliance with federal, state, and local codes and regulations," *id.* at 13. Similarly, the impacts of Alternative B (the proposed project and preferred alternative) and Alternative C (a variation of the proposed building improvements) were compared against the current environmental baseline of JOC's existing noncompliance. For example, regarding impacts on human health and safety from both

Alternatives B and C, the 1998 EA concluded, "Code compliance upgrades will have a positive effect on human health and safety. Once the buildings and septic system meet current codes, they will no longer be a health and safety risk to park visitors and JOC staff. In addition, once hazardous material is properly stored and disposed of, potential impacts to visitors and JOC staff will be minimal and not significant." *Id.* at 18, 23.

Given that the appropriate environmental baseline for this proposed project should be the existing conditions at Drakes Estero, the EIS must consider both the beneficial and adverse impacts of the oyster farm's continued operation compared to the present impacts. Additionally, to the extent that NPS considers the possible future termination of the oyster farm in its No Action Alternative, the EIS must also address both the beneficial and adverse impacts to the Drakes Estero environment and ecology related to the removal of the farm.

IV. THE DESIGNATION OF DRAKES ESTERO AS POTENTIAL WILDERNESS DOES NOT PRECLUDE THE ISSUANCE OF A SUP TO DBOC.

As discussed above in Section II, Congress directed the Service to issue the SUP for DBOC's continued operations "notwithstanding any other provision of law," including, among other things, wilderness laws.[10] NPS has emphasized wilderness issues during scoping to the exclusion of virtually every other issue. The EIS should disclose clearly that the potential wilderness designation of Drakes Estero does not prohibit the issuance of the SUP subsequent to 2012. Issuance of the SUP would not diminish or otherwise affect the existing potential wilderness designation for Drakes Estero or NPS' current management of the potential wilderness area. Not only would the potential wilderness designation remain intact, but there is no mandated timeframe for conversion of potential wilderness areas to wilderness.

The oyster farm has existed since at least the 1930s, before the Point Reyes National Seashore was created in 1962 and before the PRNS Wilderness Act was passed in 1976. When PRNS was created in 1962 from individual landowners' and farmers' properties, Congress envisioned a higher level of recreational use by the public of the Seashore, and provided that the preexisting ranches and oyster farm should continue operating. The legislative history of the PRNS Enabling Legislation shows the specific Congressional intent for the oyster operation to continue after the establishment of the Seashore. *See* Attachment A, DBOC Application.

Pursuant to the 1976 PRNS Wilderness Act, Congress designated certain wilderness areas and potential wilderness areas within PRNS. Drakes Estero was designated as "potential wilderness" due to the long-standing existence of the oyster farm,[11] as well as the State's

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[10] *See* Wilderness Act, 16 U.S.C. § 1131 *et seq.* (Sept. 3, 1964); Point Reyes National Seashore Wilderness Act, Public Law 94-544, 90 Stat. 2515 (1976); An Act To Designate Certain Lands Within Units of the National Park System as Wilderness, Public Law 94-567, 90 Stat. 2692 (1976); An Act to Designate Wilderness in the Point Reyes National Seashore in California as the Phillip Burton Wilderness, Public Law 99-68, 99 Stat. 166 (1985).

[11] For example, California Representative John Burton explained that the legislation "is intended to preserve the present diverse uses of the Seashore, but to protect the area from possible future,

retained rights over this area.[12] Notably, wilderness laws do not prohibit all commercial operations in wilderness areas. In fact, NPS policies require the Service to manage the potential wilderness as wilderness *to the extent allowed by the existing nonconforming conditions*, such as the oyster farm. NPS Management Policies, § 6.3.1 (2006) (emphasis added). As discussed above in Section II, NPS continued to support the oyster farm's operations after this designation. For example, one objective of the operative 1980 GMP is the monitoring and improvement of the oyster farm. And in 1998, NPS conducted an environmental assessment for improving the oyster farm that resulted in a FONSI under NEPA.

The issuance of a SUP for continued operations past 2012 would not change NPS' historical management of Drakes Estero or the oyster farm, or prevent a future conversion from potential wilderness to wilderness. Congress has not prescribed a timetable for elimination of the oyster farm as a non-conforming use, nor for the conversion of Drakes Estero from potential wilderness to wilderness. It is not unusual for non-conforming uses in wilderness areas to be authorized. *See* Attachment A, DBOC Application. The EIS should clearly provide this background, and the Service should consider the oyster farm's nearly century-long operations in Drakes Estero, which was designated as potential wilderness only a few decades ago. The EIS should also clarify that Public Law 111-88 specifically stipulates that any decision as related to DBOC will not set a precedent for management of potential wilderness areas outside PRNS.

V. IMPACT TOPICS THAT SHOULD BE ADDRESSED BY THE EIS.

It is crucial that the EIS provide an objective, fair, and thorough analysis of the positive effects of the oyster farm on the environment, including the many environmental, ecological, economic, cultural, educational, scientific, and human health and safety benefits that it provides. The EIS should also consider how the termination of the oyster farm would result in the loss of these critical benefits.

Importantly, the CEQ NEPA Regulations direct that "environmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made." 40 C.F.R. § 1502.2(g). We have repeatedly expressed our concerns about the Service's recent history relating to assessing the oyster farm's impacts on the environment. For example, various authorities, such as the Department of Interior's Inspector General and the National Academy of Sciences, have criticized the science

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incompatible development." Wilderness Additions—National Park System: Hearings Before The Subcommittee On Parks and Recreation of the Committee on Interior and Insular Affairs, 94th Cong. 2 (February 5, 19 and March 2, 1976), pg. 272. The oyster farm was one of the preexisting diverse uses meant to be preserved: "There are two areas proposed for wilderness which may be included as wilderness with 'prior, non-conforming use' provisions. One is Drakes Estero where there is a commercial oyster farm." *Id.* at 273.

12 Just four years after Congress' wilderness and potential wilderness designations in PRNS, the 1980 GMP affirmed that "the designated potential wilderness [in the Seashore] consists of most of the quarter-mile offshore strip and other wetlands over which the state of California has retained some rights...." 1980 GMP at 9.

and data that NPS has relied on and/or collected. We have tried to work with the Service to clarify these points.[13]

More recently, NPS assigned certain PRNS staff to the NEPA team for this EIS, despite their public statements that the oyster farm adversely impacts the environment and should be terminated.[14] These staffing choices contradict NPS' stated intent to ensure that NPS staff assigned to the EIS not have a pre-existing bias against the farm. We attempted to discuss this with the Service, as well. We believe all of this should be disclosed and addressed so that the EIS does not appear to justify decisions that the Service has already made, and thus avoid violating 40 C.F.R. § 1502.2(g).

In an attempt to balance the EIS process, we offer the following comments on impact topics, which must be "accurate." NPS DO #12 at 54. This is so vital that NPS Policies state, "Although alternatives are important, they are useless unless you clearly and correctly assess their impacts in an EIS . . . . if the data are wrong or mislead the reader, it wastes the reader's time and the park's money." *Id.* We value the public's resources, and want to ensure they are used properly.

A. Environmental and Ecological Benefits

It is vital that the EIS analyze the ecological role of oysters in the ecosystem. According to the National Academy of Sciences, oysters are known as "foundation species" because of the critical role they play in the ecosystem. 2009 NAS Report at 21. As recognized by the 2009 NAS Report, oysters are filter feeders that clarify and improve water quality so that the water is cleaned of excess nutrients, sediments and phytoplankton. *Id.* at 68. As a result, more sunlight penetrates the water, enhancing sub-aquatic vegetation growth. In fact, eelgrass in Drakes Estero doubled between 1991-2007, during a period of time when there was uninterrupted oyster farming and harvest levels were at their highest. *Id.* Since the functional elimination of native oysters in Drakes Estero, the oysters grown by DBOC and its predecessors have likely replaced the ecological role that native oysters once played. *Id.* The NAS Report emphasized the significance of this benefit, and concluded that DBOC's oysters are helping to "restor[e] an historic baseline ecosystem" by acting as a proxy for the native oysters that once existed. *Id.* at 22.

To this end, we believe that the EIS must analyze the beneficial and adverse impacts of the ecological role of oysters in its evaluation of the Proposed Action, No Action Alternative,

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13 For example, we sent a letter dated May 11, 2009, to then-Regional Director Jon Jarvis about this, but never received a response.

14 We have specifically expressed our concerns to the Service about Natalie Gates, PRNS Staff Biologist and the Service's designated Point of Contact in this EIS process. For instance, in a television news report, Ms. Gates made specific statements about the farm's alleged adverse impacts to various species, and concluded that the Service's research demonstrates that DBOC should be terminated. *See* ABC-KGO, "Local Oyster Cannery May Need New Home" (May 21, 2007), *available at* http://abclocal.go.com/kgo/story?section=news/assignment_7&id=5326358 (last visited November 16, 2010).

and any other Alternatives considered or rejected. The EIS should analyze the environmental and ecological impacts of the presence of oysters from Drakes Estero, including:

- Oysters are the keystone species in the estero ecosystem, and the EIS should consider the role that DBOC's oysters play. In addition, the EIS must study the resultant impact of the removal of the oyster farm on water quality in the Estero due to runoff from the ranchers and ranchlands in the Pastoral Zone surrounding Drakes Estero. The No Action Alternative and other Alternatives should evaluate the adverse impacts associated with the removal of the oysters, including the long-term loss of ecosystem services they provide.

- The oysters and related equipment currently provide complex, three-dimensional habitat for special status species of fish, birds, and others, and the EIS should consider the benefits of this habitat. There are limited alternative habitats for many of these species, and some of these alternative habitats lack the three-dimensional structure provided by DBOC's aquaculture apparatus. Rockfish, sharks, perch and other species benefit from the structures provided by the oysters and associated aquaculture apparatus, which they use as refuge, rearing and spawning habitat. Several species of surfperch (the population of which has recently declined in California) benefit from the habitat complexity of the racks. Rockfish are another species of declining fish that benefit from the habitat. For example, rockfish are generally structure-oriented in their habitat preferences, and some species use the lagoon as a nursery area and aggregate near the racks. Birds also use the shellfish racks and other shellfish gear as habitat. There is substantial evidence that shellfish, whether cultured or wild, form an important source of food for a wide variety of marine shorebirds. The role of shellfish aquaculture as a disturbance factor to birds must be placed in context with the recognized ecological functions that it has been documented to provide for a wide variety of shorebirds and waterfowl. In analyzing the No Action Alternative and other Alternatives, impacts to these species from the loss of habitat, as well as the lost ecological value of biodiversity facilitated by the aquaculture structures, should be assessed.

- Filtration functions and biodeposition provided by the oysters facilitates and supports eelgrass growth, and the EIS should consider such benefits. Eelgrass and other submerged aquatic vegetation can be coincident with shellfish culture operations, and thus, it is appropriate to consider how shellfish practices at DBOC may directly and/or indirectly affect this priority habitat. Optimal habitats for eelgrass (*Z. marina*) growth along the U.S. West Coast include the low intertidal to shallow subtidal zone in moderately stable, non-bioturbated, fine to medium grain sediments, and moderate amounts of surface roughness and shellfish macrofauna. Eelgrass coverage and density fluctuate widely by season and year. Recruitment into new habitats depends on a combination of suitable physical, chemical, and biological conditions. The analysis of the effects of the oyster farm on Drakes Estero eelgrass abundance and distribution should take place in context by comparing eelgrass status and trends in adjacent embayments where no culture is practiced. The relative ecological value and functions of relatively monotypic meadows of eelgrass should be compared to an oyster eelgrass habitat mosaic that is provided from the oyster farm in the analysis of the baseline conditions. Where available, aerial documentation of eelgrass proliferation in Drakes

Estero should be compared to other embayments where oyster culturing is practiced. In analyzing the No Action Alternative and other Alternatives, impacts to the eelgrass in the absence of the oyster farming, such as how the loss of the filter feeding biomass affect water clarity and photosynthetically active radiation, should be assessed.

- The EIS should consider the ecological services provided by the oysters to the estuarine ecosystem, including filter feeding, which cleans the water of excess nutrients, sediments and phytoplankton. The result is improved water quality accomplished by reduced turbidity that allows more sunlight to penetrate and enhance sub-aquatic vegetation growth. Another benefit of the filter feeders is that these excess nutrients ("otherwise contaminants") that are not converted to body protein are converted into useable forms, packaged, and made available to sub-aquatic vegetation as a form of fertilizer, also enhancing growth, thus providing additional habitat for other species. The three dimensional shapes of the oyster shells also become important habitat for other species. This is especially true for one particular method of hanging, off-bottom culture used by DBOC in Drakes Estero. All of these basin-wide benefits must be considered to provide the complete context for any localized impacts of the farm's operations to eelgrass, such as shading under racks or propeller clipping, as well as for the shellfish culture's effects on benthic pelagic coupling and sediment enrichment from biodeposition and sedimentation. The analysis of the latter should be reflective of similar culture operations under similar tidal exchange, culture densities and, ideally but not necessarily exclusively, for the same species cultured.

- The EIS should also analyze the positive impacts that the oyster farm's operations have on the protection of harbor seals. The farm's presence discourages recreational kayakers and other recreationalists from disturbing the seals. In 1992, the NPS, NOAA, and CDFG recognized that kayak and oyster boat use in Drakes Estero during harbor seal pupping season could harm the harbor seal population due to disturbances. Since 1992, Drakes Estero has been closed from March 1 to June 30 to kayak and canoe use, and oyster boats have been restricted to certain areas during that period. DBOC not only adheres to this protocol, but also encourages others to do the same. Many well meaning, yet uninformed, kayakers attempt to use Drakes Estero during the annual closure. As the Drakes Estero kayak launch site is located at the oyster farm, DBOC staff regularly stop would-be kayakers during pupping season, educate them about the closure and why it exists, and suggest alternative kayak locations. This EIS must consider the adverse effects to harbor seals if the oyster farm is removed. Additionally, the 2009 NAS Report found that no causal link between seal disturbances and oyster farming could be concluded from the data and studies that NPS relied upon. *See* 2009 NAS Report at 41, 43, 44. The NPS seal monitoring program's volunteers made recording errors and omissions; these observations therefore have "limited utility." *Id.* at 44. The one modeling study for potential maricultural impacts to the harbor seals was also compromised, and thus, does not demonstrate any "causal link." *Id.* at 43. This EIS must acknowledge the inconclusive data and should consider all best available science, including any pending or future data, reports or other science—including the PRNS camera program—that directly pertain to DBOC's impacts or lack thereof on seals in Drakes Estero.

- The EIS should analyze invasive species in the appropriate and full context. Although the Pacific oyster is not native to the West Coast of the U.S., it is the mainstay of the industry from Mexico to British Columbia. It has not been documented as an invasive species in the Estero or Point Reyes region. Past statements regarding the oyster farm's operational impacts on fostering invasive species spread and/or establishment need to be placed into context. For example, current seed import policies and procedures have been in place for decades that greatly minimize the potential for the introduction of invasive species or pathogens. Shellstock is no longer imported from abroad, and oyster culture practices (while a recognized source for the introduction of some non-native invasive species in the early part of the last century (e.g., Spartina in WA)) are not the source of ballast water and/or hull fouling introductions implicated through references sometimes cited. Current practices, which have been in place now for many years, greatly minimize the potential for introductions. Substrate for currently recognized invasive species (e.g, Didemnum) provided by oyster culture operations could be provided by other structure in the absence of the oyster racks, etc. The operation's role in the spread of Didemnum or other invasive species must be evaluated based on best available science, not speculation.

- DBOC's energy usage, climate change impacts, and chemical usage should also be analyzed in the EIS. DBOC uses very little energy to grow shellfish. The farm uses no feeds, no fertilizers, no chemicals, and requires no cultivation. The landing and processing site is directly adjacent to the growing area, which means little fossil fuel energy is required for planting and harvesting. The farm can harvest up to 25,000 oysters on one trip into the Estero using approximately one gallon of gasoline.

- Oyster shell is in high demand for many habitat enhancement projects, but importing oyster shell from out of state requires costly transportation and extensive pathological analyses to address non-native invasive species introduction. DBOC operates the last oyster cannery in California, making it the only significant, continuous, and renewable source of oyster shell in the state. In analyzing the No Action Alternative and other Alternatives, the EIS must study the potential adverse effects of the loss of this local shell resource on regional habitat enhancement projects, specifically the loss of benefits to the species and ecosystems targeted. DBOC regularly contributes this shell for the purposes of Endangered Species Act habitat restoration and habitat enhancement, including the San Francisco Bay Native Oyster Restoration Project and the San Francisco Bay Bird Observatory Snowy Plover Habitat Enhancement Project, as well as other projects with other non-profits and government agencies.

B. Socioeconomic Benefits

The EIS should consider DBOC's socio-economic impacts and the resulting loss to the local and state economy, should the farm be shut down under the No Action Alternative and other Alternatives.

The DBOC oyster farm represents 85% of the shellfish growing area in Marin County and the San Francisco Bay Area. It produces nearly 40% of California's grown oysters and, as the last operating cannery in the State, 100% of shucked and packed oysters. DBOC's unique importance to the local and state economy and shellfish industry is further magnified by the fact

that it is the only fully approved growing area, meaning that it is the only farm authorized to harvest oysters year-round. DBOC provides jobs to thirty-five employees, as well as housing for many of these employees and their families. Employees' family members generally work in the area or attend schools in Marin County. As already discussed, DBOC also is a popular visitor attraction, bringing approximately 50,000 people each year to West Marin, which increases the demand for goods and services in the area.

The EIS should consider the following socioeconomic issues:

- Jobs provided by DBOC, and taxes paid by DBOC and its employees.
- Ancillary businesses supported by DBOC as a tourist location.
- Ancillary businesses supported by DBOC as purchaser of equipment.
- Proportion of oyster production provided by the DBOC, relative to local and state production.

The EIS should also consider the socioeconomic value of lost environmental services that would result from the oyster farm's termination:

- Loss of the oysters' nitrogen fixation and removal that currently counter, for example, nitrogen contributions from the cattle ranches surrounding Drakes Estero.
- Loss of carbon sequestration.
- Loss of habitat diversity and functions to many species.
- Loss of quenching phytoplankton blooms.

C. Cultural Benefits

The EIS should fully evaluate the cultural resource value of the oyster farm as the only oyster farm within the Seashore and as one of the most visited destinations in the Seashore. As discussed above, DBOC continues a well-established "cultural history of oyster farming" that long antedates the creation of PRNS. 2009 NAS Report at 1. Additionally, it is the last operating oyster cannery in California. Given its cultural and historical significance, DBOC has a positive effect on the Seashore, "enhanc[ing] visitors' experience." *Id.* at 48-49. Furthermore, DBOC provides accessibility as called for in the GMP. DBOC is highly-popular with cultures that value fresh seafood in their diets, across the range of socioeconomic backgrounds. In addition, DBOC is accessible to disabled visitors to the PRNS.

D. Educational Benefits

The EIS should analyze the educational benefits provided by DBOC. DBOC plays an essential role in educating the public on the history of oyster farming in PRNS, oysters' value as a beneficial source of protein, coastal ecosystems, and the nature and efficacy of organic

sustainable farming. It provides almost daily tours, at no cost, for the public and students from elementary through graduate school.

E. Scientific Benefits

The EIS should consider the positive scientific benefits provided by the continued operation of the farm. DBOC contributes to science and research related to native oysters, estuarine biodiversity, and human health protection. It is the only oyster farm in the state with an on-site hatchery, lab, and biologists on staff. DBOC also presciently recognized the importance of native oyster restoration projects, and donated $10,000 worth of oyster shells to the largest such project in California. DBOC, through its donation of oyster shell to the San Francisco Bay Bird Observatory, has actually enabled increased hatching and fledgling rates for an endangered species, the Western Snowy Plover.

F. Human Health and Safety

The following benefits to human health and safety should be considered in the EIS. As the last operating cannery in the state, DBOC produces 100% of shucked and packed oysters in California. The fact that it processes its oysters on-site greatly increases seafood safety. DBOC can harvest, shuck, pack, and deliver its oysters to San Francisco Bay Area markets within 24 hours, thereby providing healthy, locally-grown food to meet local demand.

DBOC is also the largest marine biotoxin sampler in California. It cooperates, at its own expense, with the California Department of Public Health in order to ensure the safety of the shellfish harvested from Drakes Estero, and to help guide the California Department of Public Health and the California Department of Fish and Game in decision-making regarding sport fishing quarantines and closures.

VI. COOPERATING AGENCIES

As early as possible in the EIS process, NPS should involve other federal agencies that have "jurisdiction by law," or "special expertise with respect to environmental issue[s]." 40 C.F.R. §§ 1501.6, 1508.15, 1508.26. Non-federal agencies should also be involved "no later than the scoping process," where they have "jurisdiction by law and special expertise with respect to reasonable alternatives or significant environmental, social or economic impacts associate[ed] with a proposed action that requires the preparation of an environmental impact statement." CEQ Memorandum for Heads of Federal Agencies in Implementing the Procedural Requirements of NEPA, July 28, 1999; CEQ Memorandum for Heads of Federal Agencies in Implementing the Procedural Requirements of NEPA, Jan. 30, 2002. The series of CEQ Memoranda released on this subject convey the importance of involving other federal, state, and local agencies in the NEPA EIS process, and the many benefits to be gained from such cooperation. *Id.*

For the purposes of increasing the efficiency and effectiveness of the EIS process, we request that the Service invite the California Department of Fish and Game ("CDFG") as a cooperating agency per 40 C.F.R. § 1501.6 and The Council on Environmental Quality Guidance Regarding Non-Federal Cooperating Agencies (September 25, 2000). CDFG possesses special expertise with respect to the oyster farm because it is the state agency responsible for issuing

water bottoms leases for the purposes of aquaculture, and furthering the purposes of the state Aquaculture Development Act. *See* Cal. Fish & Game Code §§ 15000 *et seq.*; Cal. Pub. Res. Code §§ 825-830.

The California Coastal Commission ("CCC"), however, should not be invited to act as a cooperating agency. As discussed above in Section II, Section 124 of Public Law 111-88 removes the CCC's jurisdiction as it relates to the Service's issuance of the SUP through the plain language of the "notwithstanding any other provision of law" provision. Moreover, the CCC's expertise in coastal matters in this context is duplicative of, and less helpful than, the CDFG's aquaculture experience. Furthermore, CDFG is also empowered to comply with the provisions of the Coastal Act and, in so doing, protect coastal zone resources. *See* Cal. Pub. Res. Code §§ 30003, 30007.5.

VII. PENDING INVESTIGATIONS

As you are aware, investigations concerning the scientific validity of prior work in Drakes Estero and concerning the farm are proceeding before the Marine Mammal Commission and with the Department of Interior. We expect that these proceedings will produce documents relevant to the topics described herein and to the SUP EIS. In addition, we ask that you incorporate the approximately 250,000 NPS photographs of DBOC operations into the list of primary documents, and exclude the work of Dr. Benjamin Becker et al., as further explained under the "References of Uncertain Relevancy to the EIS" section in the November 21, 2010, submittal from our consultants Dr. Jeffrey Fisher and Dr. Robert Abbott of Environ.

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Thank you for the opportunity to submit these comments. We look forward to working with you throughout the NEPA process, including providing additional information on our operations, reviewing the draft EIS and submitting further comments on the same. Please contact us if you have any questions.

Sincerely,

Kevin and Nancy Lunny
Owners of Drakes Bay Oyster Company

Attachments

ATTACHMENT A

Drakes Bay Oyster Company Special Use Permit Application

Letter from Karl S. Lytz, on behalf of Drakes Bay Oyster Company, to the Honorable Ken Salazar (July 6, 2010)

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File No. 502976-0000

July 6, 2010

The Honorable Ken Salazar
Secretary
Department of the Interior
1849 C Street, N.W.
Washington, DC 20240

Re: Special Use Permit for Drakes Bay Oyster Company

Dear Secretary Salazar:

I am writing to you on behalf of Kevin and Nancy Lunny ("the Lunnys"), owners of the Drakes Bay Oyster Company ("DBOC"), to request that you enable DBOC to continue to occupy and utilize the buildings and lands on the shores of Drakes Estero, located within Point Reyes National Seashore ("PRNS"), a unit of the National Park Service ("NPS").

DBOC is a family business operated by the Lunny family, fourth and fifth generation farmers and long-term Point Reyes residents who have lived at the historic "G" Ranch, overlooking Drakes Estero. Since acquiring the business in 2004, the Lunnys have been operating a sustainable, environmentally-friendly local business that provides jobs for the community and gives visitors to PRNS a valuable cultural and historic experience.

We were encouraged to hear of your recent statement at the Great Outdoors Conference that DBOC would continue to operate within PRNS. As you acknowledged, the oyster farm has existed in PRNS for many years. In fact, commercial oyster production has taken place within Drakes Estero for over seventy years—since the early 1930s, approximately three decades before Congress established PRNS in 1962. DBOC now produces both oysters and clams as part of its operations and is the last operating oyster cannery in the State of California.

As background, and as discussed in more detail below, DBOC operates under both State and Federal permits. With respect to the former, DBOC cultivates shellfish on the bottomlands in Drakes Estero pursuant to leases from the California Department of Fish and Game, which were renewed for 25 years in 2004, and thus expire in 2029. As to the latter, DBOC operates under a Reservation of Use and Occupancy ("RUO") executed in 1972 between NPS and the previous owners of the oyster farm and under several ancillary special use permits issued by NPS. The RUO and the other permits expire in 2012; however, the RUO contains a renewal

clause, which provides for the issuance of a special use permit that would "run concurrently with and...terminate upon expiration of the State water bottom allotments...."

Questions have been raised regarding the legal authority of NPS to issue a special use permit that would allow DBOC to continue operating past 2012, given that Drakes Estero was designated "potential wilderness" in 1976, pursuant to the Point Reyes Wilderness Act, Public Law 95-544. Notably though, the designation of Drakes Estero as "potential wilderness" was never meant to preclude the continued operations of DBOC. As is evident from relevant legislative history and environmental reviews, Drakes Estero was designated as "potential wilderness" rather than wilderness because of the understanding that oyster cultivation would continue, in light of California's retained interest in leasing the bottomlands for shellfish cultivation.

Moreover, and importantly, in October of 2009 Congress expressly authorized the Department of the Interior to issue DBOC a special use permit to continue its operations past 2012. As this letter describes, and given Congress's recent directive, there are multiple important reasons to issue such a permit, including the rich history of oyster farming in Drakes Estero and the myriad cultural, recreational, educational and ecological benefits DBOC provides.

I. RICH HISTORY OF MARICULTURAL OPERATIONS IN DRAKES ESTERO

Oyster farming has enjoyed a long history in Drakes Estero. The Miwok Indians were the original "oyster-farm operators," with their harvesting of native shellfish beginning thousands of years ago. In fact, their ancient oyster middens are still present in the estero. Commercial oyster farming began in the estero in the 1930s, with the original allotment recorded in the name of David C. Drier on January 18, 1934 for the purpose of growing oysters.[1] Although several transfers occurred during those early years, for most of its commercial history, the estero was farmed by Johnson's Oyster Company. In 2004, the Lunny family purchased the farm from Johnson's Oyster Company and have sought to adopt many of the same sustainable practices used by the Miwoks in order to conserve the important natural resources of the area.

This long history of maricultural operations has been routinely recognized as a valid and important use of Drakes Estero. The legislative history of the Point Reyes National Seashore Act, for example, is replete with references to both the history and legacy of oyster farming and the important benefits it provides to PRNS. For instance, during congressional hearings on the establishment of PRNS, former NPS Director Conrad Wirth explained that the "[e]xisting commercial oyster beds and an oyster cannery at Drakes Estero...should continue under national seashore status because of their public values. The culture of oysters is an interesting and unique industry which presents exceptional educational opportunities for introducing the public, especially students, to the field of marine biology."[2] Comments made during the Senate hearings

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[1] *See* NPS, Environmental Assessment/Initial Study Joint Document, Johnson Oyster Company, Marin County, Point Reyes National Seashore, at 8 (May 1998).

[2] NPS, Conrad L. Wirth, Director, Report on the Economic Feasibility of the Proposed Point Reyes National Seashore at 20 (1961), included in the Hearings Before the Subcommittee on Public Lands of the Committee on

on the proposed PRNS legislation echoed this view: "[t]his proposed legislation provides a balanced use between the public and private interests concerned [because] the oyster and commercial fisheries would be able to continue operation and provide both recreation and economic value to the seashore."[3]

In the early 1970s, when Congress began considering designating wilderness areas within PRNS, the importance of the oyster operations was affirmed. Senator John Tunney, who introduced the PRNS wilderness legislation, reiterated that "[e]stablished private rights of landowners and leaseholders will continue to be respected and protected. The existing agriculture and aquaculture uses can continue."[4] Similarly, Representative John Burton underscored that the legislation's intent was to "preserve the present diverse uses of the Seashore," including the commercial oyster operations in Drakes Estero.[5] The Department of Interior itself recommended that an express wilderness designation would be inappropriate: "Commercial oyster farming operations take place in this estuary and the reserved rights by the State on tidelands in this area make this acreage inconsistent with wilderness."[6]

Until very recently, NPS consistently agreed with these conclusions and appeared supportive of the continued use of Drakes Estero for maricultural operations. The RUO itself, for example, contains a renewal clause, which provides that "[u]pon expiration of the reserved term, a special use permit may be issued for the continued occupancy of the property...."[7]

Additionally, in the Final Environmental Impact Statement prepared by NPS evaluating the potential impacts associated with designating certain PRNS lands as wilderness, NPS discussed the "oyster-farm operation" and noted that while removing the oyster farm might remove human activities from the estero, there would be a "loss of some compensating values. Besides its economic benefits to the community, the farm has decided interpretive importance as a popular 'living exhibit,' where visitors have the unique opportunity to observe the operation

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Interior and Insular Affairs, U.S. Senate, 87th Congress, First Session on S.486, A Bill to Establish The Point Reyes National Seashore in the State of California and for Other Purposes (Mar. 28, 29, and 31, 1961).

[3] Hearings Before the Subcommittee on Public Lands of the Committee on Interior and Insular Affairs, U.S. Senate, 87th Congress, First Session on S.476, A Bill to Establish The Point Reyes National Seashore in the State of California and for Other Purposes at 17 (Mar. 28, 29, and 31, 1961).

[4] Hearings on S.1093 and S.2472 Before the Subcommittee on Parks and Recreation of the Committee on Interior and Insular Affairs, 94th Cong. 271 (1976).

[5] *Id.* at 272-73.

[6] Letter dated September 8, 1976, from John Kyl, Assistant Secretary of the Interior, to U.S. Representative James A. Haley, Chairman, Committee on Interior and Insular Affairs, House of Representatives, U.S. House Report No. 94-1680, 94 U.S. Code and Congressional News 5593 .

[7] JOC Grant Deed to the United States, Exh. C, § 11 (Nov. 9, 1972). The clause, in fact, only requires that the special use permit "run concurrently with and will terminate upon the expiration of the State water bottom allotments...." Those "State water bottom allotments" refer to a renewable lease issued by the California Department of Fish and Game, which has granted DBOC the right to cultivate oysters in Drakes Estero through 2029. California Department of Fish & Game Amendment No. 2 to Indenture of Lease, M-438-01 (Dec. 2, 2005). Accordingly, issuance of a SUP that would "run concurrently with" the State water bottom allotments would be consistent with the state authorizations and would allow the oyster farm to continue operating through 2029.

and to purchase freshly grown oysters. These are appropriate purposes at Point Reyes, a recreational-category park."[8]

NPS continued to recognize the value of the oyster operations in its 1980 PRNS General Management Plan (still in effect), which includes the following management objectives: "[t]o monitor and improve maricultural operations, in particular the oyster farm operation in Drakes Estero," and "[t]o monitor and support productive land uses and activities [including maricultural activities] which are consistent with historic patterns."[9] As recently as 1998, NPS conducted an environmental assessment pursuant to the National Environmental Policy Act ("NEPA") of the potential impacts of improving and substantially expanding the oyster farm operations. Although the planned expansion did not take place because of funding shortfalls, NPS' support of the project demonstrates the agency's recognition that oyster farm operations are a valid use of PRNS land.[10]

II. DBOC IS A BENEFICIAL USE OF PRNS

Recently, some questions have been raised regarding the types of environmental impacts oyster farming may be having on Drakes Estero. In 2006 and 2007, for example, PRNS staff prepared and released several versions of a report entitled *Drakes Estero: A Sheltered Wilderness Estuary* that purported to evaluate the impacts of DBOC on Drakes Estero and erroneously concluded that oyster farming is having an adverse ecological impact on PRNS resources. This effort to portray DBOC as having detrimental impacts appeared to be part of an attempt to "eliminate" DBOC as a "non conforming use" so that Drakes Estero and the surrounding tract of land could be converted to wilderness status. Indeed, PRNS staff took the position that they were legally precluded from issuing a special use permit to DBOC to extend operations past 2012 because of the "potential wilderness" designation.[11] However, there is no such restriction on NPS' authority.[12] Moreover, NPS has allowed non conforming uses in other potential wilderness areas.[13]

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8 *See* NPS, Final Environmental Statement FES 74-18, Proposed Wilderness: Point Reyes National Seashore, California, at 56 (Apr. 23, 1974).

9 NPS, General Management Plan: Point Reyes National Seashore, at 2-3 (Sept. 1980).

10 *See, e.g.*, Letter from Don Neubacher, Superintendent, PRNS, to Bank of Oakland (Nov. 22, 1996) (explaining the relationship between the oyster farm and NPS and noting that NPS is "genuinely excited about the planned changes" to the oyster farm and "pledge[s] to work with the Johnsons and the Bank of Oakland to make the project successful"); *see also* Thomas Yeatts, Point Reyes Light, *Park Planned Big New Oyster Plant* (Aug. 2, 2008) (documents obtained by the newspaper indicate that, beginning in 1996, "Point Reyes National Seashore (PRNS) staff developed a plan to renovate the Johnson Oyster Company's rickety buildings and septic system, and proposed new two-story development").

11 *See, e.g.*, Field Solicitor Opinion Re: Point Reyes Wilderness Act (Feb. 26, 2004) (concluding that the Wilderness Act, the Point Reyes Wilderness Act, and NPS Management Policies mandate that NPS convert potential wilderness, such as Drakes Estero, to wilderness status "as soon as the non conforming use can be eliminated").

12 For clarification, we disagree with NPS' legal interpretation that any law precludes the agency from allowing DBOC to continue operating past 2012. There is no mandate found in any applicable law or guidance that

From the outset it should be noted that since purchasing the farm in 2004, the Lunnys have dedicated significant time and resources to cleaning up the oyster farm and resolving past violations of law that had occurred during their predecessor's operations. *See, e.g.*, Peter Jamison, Point Reyes Light, *Park Service to Close Historic Oyster Farm* (June 15, 2007) (discussing DBOC's cleanup and quoting PRNS spokesman John Dell'Osso, "Kevin [Lunny] has done a fantastic job of cleaning up. Everything we've asked him to do, he's done."). The Lunnys remain committed to continuing those cleanup efforts and ensuring that DBOC is operated in a sustainable, environmentally-friendly manner.[14] As such, the family—along with their many supporters in western Marin County environmental and agricultural circles—was disheartened by the NPS report, which appeared to, among other things, overlook the many beneficial effects of oyster culture operations on the environment.[15]

In order to help resolve the debate regarding the scope of impacts of DBOC and the availability of scientific analysis, the National Academy of Sciences ("NAS") agreed to help clarify the scientific issues regarding maricultural activities and produced two reports. The first report, which was released in May of 2009, assessed the adequacy of the claimed scientific bases for NPS staff's preliminary conclusions in their Drakes Estero reports, and evaluated the

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would require NPS to convert "potential wilderness" to wilderness on a particular timetable. The Wilderness Act, for example, does not use the phrase "potential wilderness," much less define when "potential wilderness" must become actual wilderness, if ever. NPS management policies, director's orders, and reference manuals are all silent with respect to a specific timetable for conversion and only provide that, once "non conforming uses" have ceased, NPS will publish a Federal Register notice to change the designation from potential wilderness to wilderness. *See* NPS Reference Manual #41 at Appendix H, Wilderness Preservation and Management (1999). There is no requirement, however, mandating that NPS ensure that such operations cease by a certain date, and there has been no environmental review of the impact of removing the oyster cultivation operation in Drakes Estero.

[13] Examples of non conforming uses that NPS has allowed in other potential wilderness areas include: i) operation of motorized boats in potential wilderness areas of Grand Canyon National Park; ii) public use of Five High Sierra camps and the Ostrander ski hut in potential wilderness areas of Yosemite Valley; iii) operation by Southern California Edison of hydroelectric dams in potential wilderness areas of Sequoia-Kings Canyon National Park; and iv) use of roads in Cumberland National Seashore located in potential wilderness. As discussed below, the oyster farm provides greater cultural, recreational, educational and ecological benefits than these examples of non conforming uses.

[14] Prior to the Lunny family's ownership, the oyster farm had suffered from a degree of deterioration that led to a number of violations of law, including the Coastal Development Act, and enforcement actions by the California Coastal Commission ("CCC"). The Lunnys are working with the CCC to resolve those violations and ensure that DBOC's operations fully comply with all applicable local, state, and federal regulations. Additionally, an incident recently occurred at the farm in which clam-growing equipment was inadvertently placed into a Harbor Seal Protection Area. The Lunnys immediately took steps to rectify this mistake and are implementing processes to ensure that such mistakes do not occur in the future. Moreover, many of NPS' allegations that the oyster farm adversely impacts harbor seals have since been retracted at very recent Marine Mammal Commission ("MMC") hearings. Like the NAS, the MMC has become involved specifically to resolve the debate surrounding the oyster farm's impact on harbor seals. The MMC has held a series of panel hearings, and is working on a report that is due out in the near future.

[15] The Department of Interior's Inspector General investigated the various versions of the NPS Report and found that scientific inaccuracies undermined NPS' conclusions regarding the oyster farm's ecological impact on Drakes Estero.

available data specifically regarding the impact of DBOC's maricultural activities.[16] The second report, which was released in February of 2010, broadly addresses best management practices and performance standards to enhance the overall benefits of shellfish mariculture and minimize any negative ecological effects.[17]

The first NAS report reasonably concluded that "there is a lack of strong scientific evidence that shellfish farming has major adverse ecological effects on Drakes Estero at the current (2008-2009) levels of production and under current (2008-2009) operational practices, including compliance with restrictions to protect eelgrass, seals, water-birds, and other natural resources." NAS 2009 Report at 6. The report goes on to discuss some of the over-looked beneficial effects that DBOC is having on the estero, including: (i) the potential that oyster culture in Drakes Estero is replacing the important "filtering capacity and biogeochemical processing that was lost in the mid-19th century and subsequent decades with the overharvest and functional elimination of the native Olympia oyster" (*id.* at 68); (ii) the possible beneficial effects on eelgrass in the area, given that eelgrass has approximately doubled in Drakes Estero from 1991 to 2007 (*id.*); (iii) the positive economic impact for the region—including employment, tax revenue, and local food production (*id.* at 64); and (iv) the positive visitor experience, given that DBOC "preserves a piece of local and regional culture and history" (*id.* at 65).

As noted above, the oyster farm provides significant ecological benefits to Drakes Estero. DBOC's oysters are helping to "restor[e] an historic baseline ecosystem" by acting as a proxy for native oysters. *Id.* at 22; *see also* NAS 2010 Report at 13-14. The oysters are also known as "ecosystem engineers" and "foundation species" (NAS 2009 Report at 18) that bolster the ecosystem's resilience against abnormal events like phytoplankton blooms or sedimentation from storm water run-off (*id.* at 22, 23).[18]

In addition to the work done by the oysters, the Lunnys themselves are committed to conserving and protecting PRNS. For example, DBOC is the only oyster farm in California to produce and hatch its own seeds on site, greatly reducing the risk of introducing contaminants and invasive species. And it employs an environmentally-friendly off-bottom "hanging culture" method, used by less than 5% of U.S. oyster farmers due to the labor-intensive hand harvesting required. The Lunnys are also dedicated to educating others about conservation and the environment. The oyster farm offers free tours to the public to inform them about the history of oyster farming in PRNS, oysters' value as a beneficial source of protein, coastal ecosystems, and the nature and efficacy of organic sustainable farming. Similarly, the oyster farm offers its

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[16] *See* National Academy of Sciences, National Research Council, Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California (2009) ("NAS 2009 Report").

[17] *See* National Academy of Sciences, National Research Council, Ecosystem Concepts for Sustainable Bivalve Mariculture (2010) ("NAS 2010 Report").

[18] The second NAS report provides further detailed discussion of the general ecosystem services that bivalves perform. NAS 2010 Report at 10-11. In fact, these ecosystem services are so significant that the report recommends quantifying their economic value, as well as developing policies to encourage restoration of bivalves in more ecosystems so they can improve and benefit from these services. *See id.*

facilities to researchers and participates in research on native oysters, estuarine biodiversity, and human health protection.

For all these reasons, many of PRNS' 2.5 million annual visitors flock to DBOC, which carries on the long-standing tradition of oyster farming in Drakes Estero and remains as the last operating oyster cannery in the State. With its cultural, recreational, educational and ecological benefits, the oyster farm undoubtedly "enhances visitors' experience in the estero." *Id.* at 65.

By contrast, should the oyster farm be shut down, the community would be adversely impacted in significant ways. Not only would PRNS lose the numerous visitors for whom DBOC is a destination, but the oyster farm employees who have specialized skills would lose their livelihood, and the low-income housing that DBOC provides for their employees would be demolished. This in turn would effect the local ranches, where many of DBOC's employees' family members work. Furthermore, removing the oysters could have an adverse effect on the Drakes Estero ecology, including its water quality.

Both NAS reports ultimately affirm that there is no ecological justification to deny DBOC a special use permit. And given that Congress has expressly authorized NPS to issue a special use permit, there is no legal justification either. NPS should issue DBOC a special use permit to continue its operations past 2012.[19]

III. NPS AUTHORITY TO ISSUE A SPECIAL USE PERMIT FOR CONTINUED OPERATIONS PAST 2012

In October of 2009, Congress provided a definitive answer to the legal question of whether NPS has the authority to issue a special use permit to DBOC to continue operating past 2012. The answer was a resounding yes.

Specifically, Congress directed that:

> Prior to the expiration on November 30, 2012 of the Drake's Bay Oyster Company's Reservation of Use and Occupancy and associated special use permit ('existing authorization') within Drake's Estero at Point Reyes National Seashore, notwithstanding any other provision of law, the Secretary of the Interior *is authorized to issue a special use permit with the same terms and conditions as the existing authorization*, except as provided herein, for a period of 10 years from November 30, 2012: Provided, That such extended authorization is subject to annual payments to the United States based on the fair market value of the use of the Federal property for the duration of such renewal. The Secretary shall take

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[19] As you know, Senator Dianne Feinstein contacted you when the first NAS report was issued and expressed her concern that NPS had "exaggerated the effects of the oyster population on the Estero's ecosystem" and appeared to be continuing to ignore the potential beneficial impacts of maricultural operations. *See* Letter from Dianne Feinstein to the Honorable Ken Salazar (May 5, 2009). We agree with Sen. Feinstein's conclusion that the NAS report "does not present any compelling ecological reason for refusing to renew the Drakes Bay Oyster Company lease in 2012."

into consideration recommendations of the National Academy of Sciences Report pertaining to shellfish mariculture in Point Reyes National Seashore before modifying any terms and conditions of the extended authorization.

Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010, Pub. L. No. 111-88 § 124 (2009) (emphasis added).

As such, now that the second NAS report has been issued, DBOC respectfully requests that NPS provide a proposed special use permit to DBOC incorporating the same terms and conditions under which DBOC currently operates, including an appropriate annual fee.

Thank you very much for your attention to this matter. We understand that Will Shafroth, Deputy Assistant Secretary for Fish, Wildlife and Parks, recently visited DBOC on February 4, 2010. The Lunnys would be happy to host you, Secretary Salazar, and any other interested Department of Interior officials on a tour of the oyster farm, and/or provide any follow-up information requested. We look forward to meeting with you and your staff to discuss this matter in further detail, and will be in touch to set this up. If you have any questions or would like additional information, please do not hesitate to reach me at (415) 395-8136.

Best regards,

Karl Lytz M.B.

Karl S. Lytz
of LATHAM & WATKINS LLP

cc: The Honorable Dianne Feinstein
Will Shafroth, Deputy Assistant Secretary for Fish, Wildlife and Parks
Jonathan Jarvis, Director, National Park Service
George Turnbull, Acting Regional Director, Pacific West Region, National Park Service
Cicely Muldoon, Superintendent, Point Reyes National Seashore

ATTACHMENT B

Proposed Project Description
Drakes Bay Oyster Company Special Use Permit

Proposed Project Description
Drakes Bay Oyster Company Special Use Permit

DBOC requests that the EIS consider a SUP that permits the following activities:

1. Operation and maintenance of the farm under the same terms and conditions, with a reasonable annual fee, as the existing Reservation of Use and Occupancy and associated permits, including the possibility of renewal commensurate with DBOC's bottomland leases from CDFG in Drakes Estero.

2. Completion of activities evaluated and found to have no significant impact on the environment in the 1998 NPS Environmental Assessment and FONSI for Replacement and Rehabilitation of Facilities ("1998 EA"). The 1998 EA authorized several building replacement and rehabilitation projects, of which some have not yet been completed. *See* Table 1.

TABLE 1: Status of Activities Studied in 1998 EA

Activity Permitted By 1998 EA	Status / Permitting Authority
New septic systems	Completed pursuant to 1998 EA
Debris removal	Completed pursuant to 1998 EA
Demolition of 6,590 sf building space	Completed pursuant to 1998 EA
Demolition of 2,600 sf building space	To be completed pursuant to 2012 SUP
Build new garage [900 square feet (sf)]	To be completed pursuant to 2012 SUP
Build new seed plant (hatchery) [2,625 sf]	To be completed pursuant to 2012 SUP
Rehabilitate stringing plant [500 sf]	To be completed pursuant to 2012 SUP
Build two-story Processing Plant / Interpretive Center [7,600 sf]	To be completed pursuant to 2012 SUP
Build new fencing to screen residential use area	To be completed pursuant to 2012 SUP
Replace piers and docks	To be completed pursuant to 2012 SUP

3. Provide for future consideration of renewable energy investments, including installation of solar panels.

4. Extension of the existing seawater intake pipeline to improve public health and hatchery efficiency, pursuant to plans previously provided to NPS. This extension will be 1,050 feet across the bottom of Drakes Estero, alongside the boat channel, for access to deeper, cleaner water. The pipeline will be anchored to the substrate and the screened end will be two meters, at a minimum, above the estero bottom. Plans for this pipeline have been delivered to CCC and the NPS.

5. Relocation of existing outdoor live-holding system used for seed storage and wet storage of retail shellfish.

6. Build cover over oyster washing pier per CDPH and FDA requirements to keep oysters out of direct sunlight after harvest.

7. Install outdoor display aquarium for interpretive purposes.

Drakes Bay Oyster Company

17171 Sir Francis Drake Boulevard
Inverness, CA 94937
(415) 669-1149
kevin@drakesbayoyster.com
nancy@drakesbayoyster.com

January 31, 2008

Christine Chestnut
California Coastal Commission
Statewide Enforcement Unit
45 Fremont St., Suite 2000
San Francisco, CA 94105-2219

Re: CCC-07-CD-04 Drakes Bay Oyster Company

Dear Christine,

Attached are the documents as required by section 3.2.10 of the Consent Order. The section reads:

> **Maximum Annual Production Limit.** Within 60 days of the issuance of this Consent Order, Respondents shall provide documentation showing the "current production level," including the amount harvested in the last year and any projected increases in yield for the coming year. Production of all shellfish species shall be capped at this "current production level."

Pacific oysters and Manila clams are the only species currently being produced at the Drakes Bay Oyster Farm. The total harvested weight of these species combined will remain below the production limit as set forth in this consent order.

The maximum annual production limit is meant to keep the production of shellfish at "status quo" until the Coastal Development Permit can be finalized. As agreed, a detailed record of planting in 2006 and 2007, as well as the projected harvest based on these plantings are included as a part of this submittal. 2006 and 2007 planting schedules were very similar. Based on the planting records, it is expected that the total shellfish harvest from Drakes Estero be around 770,000 Lbs. If all environmental conditions are conducive, and mortality rates are low, as much as 850,000 Lbs could be harvested in a single year, based on the recent years' plantings. For the purposes of this consent order. the production limit should be set at "approximately 850,000 Lbs" as "current production".

Attached are planting records for 2006 and 2007 and seed purchase records. Also attached is a graph of the expected shellfish harvest by year, based on the current planting.

Thank you.

Kevin Lunny

Enclosures:

2007 CDFG Monthly Tax Reports
2007 Larvae and Seed Purchase Records
2006 Planting Record
2007 Planting Record
Production Graph

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

a. READ INSTRUCTIONS BELOW BEFORE FILLING OUT REPORT.
b. Do not send coin, currency, or stamps; make check or money order payable to Department of Fish and Game.
c. Do not fail to complete certificate at bottom of report.
d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

JANUARY, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 000024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

No taxable aquaculture products harvested this month. PLEASE CHECK [ ]

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	~~64,900~~		3245.00		129.80
Other	324,500				

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$ 129.80
*Add: 10% penalty	$ 12.98
Deduct: Authorized credit	$
Total amount due	$ 142.78

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of January 2007, 19__, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Ken Lunny
TITLE OWNER (Owner, Partner, Agent or Officer if Corporation, Trustee, etc.)
DATED Dec. 28, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

SECTION I. — If no taxable oysters or other aquaculture product were harvested or received this month, the only indication needed is to check this box, sign the report and forward the original white and yellow and pink copies to the Department.

SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93

HOW TO PREPARE THIS REPORT

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2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

a. READ INSTRUCTIONS BELOW BEFORE FILLING OUT REPORT.
b. Do not send coin, currency, or stamps; make check or money order payable to Department of Fish and Game.
c. Do not fail to complete certificate at bottom of report.
d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

FEBRUARY, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

No taxable aquaculture products harvested this month. PLEASE CHECK ☐

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	313,610		3136.10		125.44
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$	125.44
*Add: 10% penalty	$	12.54
Deduct: Authorized credit	$	
Total amount due	$	137.98

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of February 2007, ~~19~~ ____, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] [signature]
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec 28, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

SECTION I. — If no taxable oysters or other aquaculture product were harvested or received this month, the only indication needed is to check this box, sign the report and forward the original white and yellow and pink copies to the Department.

SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

a. READ INSTRUCTIONS BELOW BEFORE FILLING OUT REPORT.
b. Do not send coin, currency, or stamps; make check or money order payable to Department of Fish and Game.
c. Do not fail to complete certificate at bottom of report.
d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

MARCH, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01

Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

No taxable aquaculture products harvested this month. PLEASE CHECK [ ]

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	466,015		4660.15		186.41
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$	186.41
*Add: 10% penalty	$	18.64
Deduct: Authorized credit	$	
Total amount due	$	205.05

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of may knowledge and belief a true and correct report for the month of MARCH 2007, 19____, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Kevin Lunny
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec. 28, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

SECTION I. — If no taxable oysters or other aquaculture product were harvested or received this month, the only indication needed is to check this box, sign the report and forward the original white and yellow and pink copies to the Department.

SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

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b. Do not send coin, currency, or stamps; make check or money order payable to Department of Fish and Game.
c. Do not fail to complete certificate at bottom of report.
d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

APRIL, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
OAKLAND, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

No taxable aquaculture products harvested this month. PLEASE CHECK [ ]

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	418,090		4180.90		167.24
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$	167.24
*Add: 10% penalty	$	16.72
Deduct: Authorized credit	$	
Total amount due	$	183.96

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of APRIL 2007, 19__, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] [signature]
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec. 28, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

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SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

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d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

MAY, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH) PLEASE CHECK

No taxable aquaculture products harvested this month. ☐

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	857,870		8578.70		343.15
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$	343.15
*Add: 10% penalty	$	34.31
Deduct: Authorized credit	$	
Total amount due	$	377.46

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of (MAY) 2007, ~~19~~, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Kevin Lunny
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec. 28, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

SECTION I. — If no taxable oysters or other aquaculture product were harvested or received this month, the only indication needed is to check this box, sign the report and forward the original white and yellow and pink copies to the Department.

SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93)

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

a. READ INSTRUCTIONS BELOW BEFORE FILLING OUT REPORT.
b. Do not send coin, currency, or stamps; make check or money order payable to Department of Fish and Game.
c. Do not fail to complete each section of this report.
d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

JUNE, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01

Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

No taxable aquaculture products harvested this month. PLEASE CHECK ☐

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	527,340		5273.40		210.94
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$	210.94
*Add: 10% penalty	$	21.10
Deduct: Authorized credit	$	
Total amount due	$	232.04

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of may knowledge and belief a true and correct report for the month of JUNE 2007, 19__, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] [signature]
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec. 28, 2007

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INSTRUCTIONS
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3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93)

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

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d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

JULY, 2007

DRAKES BAY OYSTER COMPAYN
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

PLEASE CHECK ☐

No taxable aquaculture products harvested this month.

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	469.290		4692.90		187.72
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$ 187.72
*Add: 10% penalty	$ 18.77
Deduct: Authorized credit	$
Total amount due	$ 206.49

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of JULY 2007, ~~19~~ , pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Kevin Lunny
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec. 28, 2007

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INSTRUCTIONS
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SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93)

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

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d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

AUGUST, 2007

DRAKES BAY OYSTER COMPNAY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

No taxable aquaculture products harvested this month. PLEASE CHECK [ ]

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	551,375		5513.75		220.55
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

Amount of tax due	$ 220.55
*Add: 10% penalty	$ 22.05
Deduct: Authorized credit	$
Total amount due	$ 242.60

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of August 2007, 19__, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Kevin Lunny
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec. 28, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

SECTION I. — If no taxable oysters or other aquaculture product were harvested or received this month, the only indication needed is to check this box, sign the report and forward the original white and yellow and pink copies to the Department.

SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

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e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

SEPTEMBER, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01

Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

PLEASE CHECK ☐

No taxable aquaculture products harvested this month.

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	554,140		5541.40		221.66
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$ 221.66
*Add: 10% penalty	$ 22.17
Deduct: Authorized credit	$
Total amount due	$ 243.83

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of September 2007 ~~19~~ ____, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Ken Lunny

TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.

DATED Dec. 28, 2007

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INSTRUCTIONS
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SECTION I. — If no taxable oysters or other aquaculture product were harvested or received this month, the only indication needed is to check this box, sign the report and forward the original white and yellow and pink copies to the Department.

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2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

a. READ INSTRUCTIONS BELOW BEFORE FILLING OUT REPORT.
b. Do not send coin, currency, or stamps; make check or money order payable to Department of Fish and Game.
c. Do not fail to complete certificate at bottom of report.
d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

OCTOBER, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

PLEASE CHECK

No taxable aquaculture products harvested this month. ☐

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	515,845		5158.45		206.34
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$	206.34
*Add: 10% penalty	$	20.64
Deduct: Authorized credit	$	
Total amount due	$	226.98

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of October 2007, 19___, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Kevin Lunny
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec. 28, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

SECTION I. — If no taxable oysters or other aquaculture product were harvested or received this month, the only indication needed is to check this box, sign the report and forward the original white and yellow and pink copies to the Department.

SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93)

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

a. READ INSTRUCTIONS BELOW BEFORE FILLING OUT REPORT.
b. Do not send coin, currency, or stamps; make check or money order payable to Department of Fish and Game.
c. Do not fail to complete certificate at bottom of report.
d. A report must be filed each month. If no mollusks were taken or harvested, so state.
e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

NOVEMBER, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

PLEASE CHECK

No taxable aquaculture products harvested this month. ☐

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	225,505		2255.05		90.20
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

Amount of tax due	$	90.20
*Add: 10% penalty	$	
Deduct: Authorized credit	$	
Total amount due	$	90.20

*Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of November 2007, 19____, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Kevin Lunny
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec 28, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

SECTION I. — If no taxable oysters or other aquaculture product were harvested or received this month, the only indication needed is to check this box, sign the report and forward the original white and yellow and pink copies to the Department.

SECTION II. — 1. Indicate by subspecies the number of oysters harvested in the box labeled "No. harvested" if sold in the shell.
2. Divide the No. harvested by 100 (Departmental studies indicate an average of 100 per gallon).
3. Place the No. of gallons in the box labeled gallons if removed from the shell (shucked).
4. Multiply the No. of gallons or 100 oysters by the Tax Rate $.04 and insert the amount of tax in box labeled as such.

SECTION III. — 1. Insert total pounds, in the shell, of mussels, abalone, rock scallops and/or clams harvested in box labeled "Pounds harvested"
2. Multiply this poundage by the tax rate $.0125 a pound and place in the box labeled "amount of tax owed"

FG-60 (REVISED 4/93)

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

AQUACULTURE LESSEES MONTHLY TAX REPORT

PLEASE OBSERVE CAREFULLY

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e. Send original along with yellow and pink copies to: DEPARTMENT OF FISH AND GAME, P.O. BOX 944209, SACRAMENTO, CALIFORNIA 94244-2090, together with remittance for the amount of the tax due. Retain goldenrod copy for your file.
f. State law requires you to keep full and complete records of your business.

This report is rendered in accordance with the provisions of Sections 15003, 15406.7 of the FISH AND GAME CODE.

DECEMBER, 2007

DRAKES BAY OYSTER COMPANY
ATTN:KEVIN LUNNY
17300 SIR FRANCIS DRAKE BLVD.
INVERNESS, CA 94937

Aquaculture Lease No. M-438-01 Aquaculture Registration No. 00024

SECTION I — (TO BE USED IF NO TAXABLE AQUACULTURE PRODUCTS ARE HARVESTED THIS MONTH)

No taxable aquaculture products harvested this month. PLEASE CHECK [ ]

SECTION II — TAXABLE OYSTERS HARVESTED THIS MONTH Please Specify

SUBSPECIES	NO. HARVESTED	DIVIDE NO. HARVESTED BY 100	GALLONS	TAX RATE	AMOUNT OF TAX OWED
Eastern		÷ by 100		4¢ per gal. or per 100	$
European					
Native					
Pacific	265,040		2650.40		106.02
Other					

SECTION III — TAXABLE MOLLUSKS (OTHER THAN ABOVE) HARVESTED THIS MONTH Please Specify

SUBSPECIES	POUNDS HARVESTED (weight in the shell)	TAX RATE	
Abalone		$.0125 Per Pound	$
Clams			
Mussels			
Scallops			
Other			

**Penalty of 10% to be added to the tax if not paid within 60 days after close of month covered by this report.*

Amount of tax due	$	106.02
*Add: 10% penalty	$	
Deduct: Authorized credit	$	
Total amount due	$	106.02

CERTIFICATE: I hereby certify that I have examined this report, and that the statements made are in good faith and the figures shown herein are to the best of my knowledge and belief a true and correct report for the month of December 2007 19__, pursuant to the provisions of the Fish and Game Code of California.

[SIGNED] Kevin Lunny
TITLE OWNER
Owner, Partner, Agent or Officer if Corporation, Trustee, etc.
DATED Dec. 31, 2007

Make remittance payable to Department of Fish and Game and send to P.O. Box 944209, Sacramento, California 94244-2090

INSTRUCTIONS
HOW TO PREPARE THIS REPORT

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FG-60 (REVISED 4/93

73-4460 Queen Kaahumananu Highway, #106
Kailua-Kona, Hawaii 96740
Sales No. 800-423-2303 Acct.Rec. (360) 875-5557

Kona Coast Shellfish L.L.C.

INVOICE

Invoice No.	Page
15061	1

Please Indicate Invoice Number On Your Remittance

Please remit to:
Kona Coast Shellfish L.L.C.
14711 NE 29th Place - Suite 111, Bellevue, WA 98007

Ship to: DRAKES BAY OYSTERS
17171 SIR FRANCES DRAKE BLVD
ATTN: LUIS ARMIENTA
INVERNESS CA 94937

Customer Number	Date
15-82903110	9/12/2007

Sold to: DRAKES BAY OYSTERS
KEVIN LUNNY
17171 SIR FRANCIS DRAKE B

INVERNESS CA 94937

Purchase Order

Ship VIA	Order No./Date	Salesman	Terms
TRK# 9488-9211-6482 9/11/2007 Air Bill-BOL: FED-EX	77 9/10/2007	829	NET 10 DAYS

Item Number	Description	U/M	Quantity	Price	Amount
1K 088128	1000 PACIFIC SEED/1000 SCREEN	NA	1,000	2.05	2,050.00
1K 088128	5% N/C PACIFIC SEED/1000 SCREEN	NA	50		
1K 090934	FREIGHT -FEDERAL EXPRESS	NA	1	47.75	47.75

PAYMENT MUST BE RECEIVED
ON OR BEFORE 9/22/2007

PAY THIS AMOUNT 2,097.75

* Product of USA * * Farm Raised *

Customer

INVOICE

INVOICE NO. 5264

KUIPER MARICULTURE, INC.
PH. (707) 822-9057
TED KUIPER
P.O. Box 507
Bayside, California 95524

SOLD TO Drakes Bay Oyster Co.
17171. S.R. One Francis Drake Blvd.
Inverness, CA. 94937

SHIP TO

CUSTOMER'S ORDER	SOLD BY	TERMS	SHIPPED VIA	F.O.B.	DATE
Kevin		30 days			26 SEPT 07

2000K	4000 Screen Manila clam seed	5.50	11,000 —
1000K	1/4 Screen Pacific oyster seed	9.50	9,500 —
		$	19,500 —

REDIFORM.
7S725/7P725 POLYPAK (50 SETS)

CARBONLESS SPEEDISET

INVOICE

INVOICE NO. 6257

KUIPER MARICULTURE, INC.
PH. (707) 822-9057
TED KUIPER
P.O. Box 507
Bayside, California 95524

SOLD TO Drakes Bay

SHIP TO

CUSTOMER'S ORDER	SOLD BY	TERMS	SHIPPED VIA	F.O.B.	DATE
KEVIN		COD			20 sept 07

500K	6000+ manilas	9.50	4750 —
	63 Bags 5 Totes		
	Bill 1355# Freight separately		
	135L @ 1400 = 189K		
	120L @ 1700 = 204K		
	60L @ 2400 = 144K		
	537K		
	Thanks!		$ 4750 —

REDIFORM.
7S725/7P725 POLYPAK (50 SETS)

CARBONLESS SPEEDISET

Nov 16 07 09:54a Kuiper Mariculture 7078223652 p.1

Whiskey Creek Shellfish Hatchery Inc

2975 Netarts Bay Rd. W.
Tillamook, Or. 97141

Bill To:

Drakes Bay Oyster
17171 Sir Frances Drake
Invernes, CA 94937

Ship To:

Drakes Bay Oyster
17171 Sir Francis Drake
Inverness, CA 98584

Invoice #: 00004919

SALESPERSON	YOUR NO.	SHIP VIA	SHIP DATE	TERMS	DATE
Suzanne Cudd		FedEx	6/21/07	Net	6/21/07

QTY.	ITEM NO.	DESCRIPTION	PRICE	UNIT	EXTENDED
13	4000	Gigas Larvae	$100.00	mil	$1,300.00

Thank you!

SALE AMT.	$1,300.00
TOTAL AMT.	$1,300.00
PAID TODAY	$0.00
BALANCE	$1,300.00

Whiskey Creek Shellfish Hatchery Inc

2975 Netarts Bay Rd. W.
Tillamook, Or. 97141

Bill To:

Drakes Bay Oyster
17171 Sir Frances Drake
Invernes, CA 94937

Ship To:

Drakes Bay Oyster
17171 Sir Francis Drake
Inverness, CA 98584

Invoice #: 00004940

SALESPERSON	YOUR NO.	SHIP VIA	SHIP DATE	TERMS	DATE
Suzanne Cudd		FedEx	7/2/07	Net	7/2/07

QTY.	ITEM NO.	DESCRIPTION	PRICE	UNIT	EXTENDED
15	4000	Gigas Larvae	$100.00	mil	$1,500.00

Thank you!

SALE AMT.	$1,500.00
TOTAL AMT.	$1,500.00
PAID TODAY	$0.00
BALANCE	$1,500.00

Whiskey Creek Shellfish Hatchery Inc

2975 Netarts Bay Rd. W.
Tillamook, Or. 97141

Bill To:

Drakes Bay Oyster
17171 Sir Frances Drake
Invernes, CA 94937

Ship To:

Drakes Bay Oyster
17171 Sir Francis Drake
Inverness, CA 98584

Invoice #: 00004984

SALESPERSON	YOUR NO.	SHIP VIA	SHIP DATE	TERMS	DATE
Suzanne Cudd		FedEx	7/19/07	Net	7/19/07

QTY.	ITEM NO.	DESCRIPTION	PRICE	UNIT	EXTENDED
12	4001	Trip Gigas Larvae	$115.00	mil	$1,380.00

V# 23

V - 320

Thank you!

SALE AMT.	$1,380.00
TOTAL AMT.	$1,380.00
PAID TODAY	$0.00
BALANCE	$1,380.00

Coast Seafoods Company

Coast Seafoods Company
P.O. Box 166 South Bend, Washington 98586
Sales No. 800-423-2303 Acct. Rec. (360) 875-5557

Please remit to:
Coast Seafoods Company
Dept. 4037 P.O. Box 34936 Seattle, WA 98124-1936

INVOICE

Invoice No.	Page
104125	1

Please Indicate Invoice Number On Your Remmittance

Ship to: DRAKE'S BAY OYSTERS
ATTN: LUIS ARMIENTA
17171 SIR FRANCIS DRAKE B
INVERNESS CA 94937

Customer Number	Date
01-82903110	7/07/2006

Sold to: DRAKES'S BAY OYSTERS
KEVIN LUNNY
17171 SIR FRANCIS DRAKE B

INVERNESS CA 94937

Purchase Order
LUIS A

Ship VIA	Order No./Date	Salesman	Terms
FED-EX 7/06/2006 Air Bill-BOL: 7921 4350 8993	2369 7/05/2006	829	NET 10 DAYS

Item Number	Description	U/M	Quantity	Price	Amount
2W 088012	MILLION TRIPLOID LARVAE	NA	4	95.00	380.00
2W 088012	5% N/C .20 MIL TRIP LRV	NA	1		
2W 090934	FREIGHT -FEDERAL EXPRESS	NA	1	56.45	56.45

PAYMENT MUST BE RECEIVED
ON OR BEFORE 7/17/2006

PAY THIS AMOUNT 436.45

* Product of USA * * Farm Raised *

Customer

Coast Seafoods Company

Coast Seafoods Company
P.O. Box 166 South Bend, Washington 98586
Sales No. 800-423-2303 Acct. Rec. (360) 875-5557

Please remit to:
Coast Seafoods Company
Dept. 4037 P.O. Box 34936 Seattle, WA 98124-1936

INVOICE

Invoice No.	Page
110314	1

Please Indicate Invoice Number On Your Remmittance

Ship to: DRAKE'S BAY OYSTERS
ATTN: LUIS ARMIENTA
17171 SIR FRANCIS DRAKE B
INVERNESS CA 94937

Customer Number	Date
01-82903110	8/03/2007

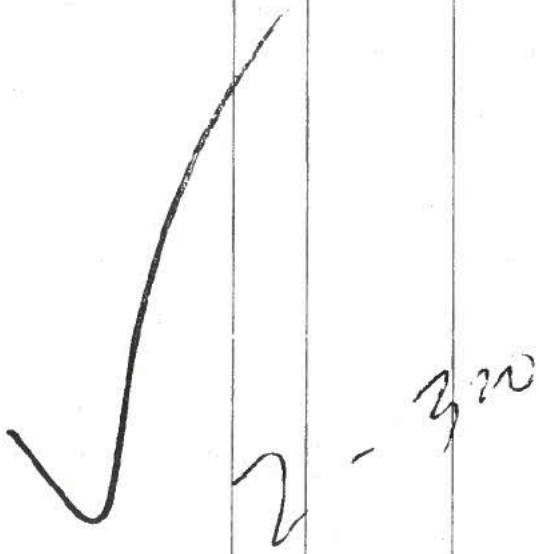
Sold to: DRAKES'S BAY OYSTERS
KEVIN LUNNY
17171 SIR FRANCIS DRAKE B

INVERNESS CA 94937

Purchase Order
LUIS

Ship VIA	Order No./Date	Salesman	Terms
TRK# 7903-0492-1184 8/02/2007 Air Bill-BOL: FED-EX	2915 8/01/2007	829	NET 10 DAYS

Item Number	Description	U/M	Quantity	Price	Amount
2W 088013	MILLION DIPLOID LARVAE	NA	15	85.00	1,275.00
2W 088013	5% N/C .75 MIL DIP LARVAE	NA	1		
2W 090934	FREIGHT -FEDERAL EXPRESS	NA	1	63.34	63.34



PAYMENT MUST BE RECEIVED
ON OR BEFORE 8/13/2007

PAY THIS AMOUNT 1,338.34

* Product of USA * * Farm Raised *

Customer

Coast Seafoods Company

Coast Seafoods Company
P.O. Box 166 South Bend, Washington 98586
Sales No. 800-423-2303 Acct. Rec. (360) 875-5557

Please remit to:
Coast Seafoods Company
Dept. 4037 P.O. Box 34936 Seattle, WA 98124-1936

INVOICE

Invoice No.	Page
110470	1

Please Indicate Invoice Number On Your Remmittance

Ship to: DRAKE'S BAY OYSTERS
ATTN: LUIS ARMIENTA
17171 SIR FRANCIS DRAKE B
INVERNESS CA 94937

Customer Number	Date
01-82903110	8/16/2007

Sold to: DRAKES'S BAY OYSTERS
KEVIN LUNNY
17171 SIR FRANCIS DRAKE B

INVERNESS CA 94937

Purchase Order
LUIS A

Ship VIA	Order No./Date	Salesman	Terms
TRK# 7923-9795-7830 8/16/2007 Air Bill-BOL: FED-EX	2930 8/09/2007	829	NET 10 DAYS

Item Number	Description	U/M	Quantity	Price	Amount
2W 088013	MILLION DIPLOID LARVAE	NA	32	85.00	2,720.00
2W 088013	5% N/C 1.60 MIL DIP LARVAE	NA	2		
2W 090934	FREIGHT -FEDERAL EXPRESS	NA	1	71.84	71.84

PAYMENT MUST BE RECEIVED
ON OR BEFORE 8/26/2007

PAY THIS AMOUNT 2,791.84

* Product of USA * * Farm Raised *

Customer

Coast Seafoods Company

Coast Seafoods Company
P.O. Box 166 South Bend, Washington 98586
Sales No. 800-423-2303 Acct. Rec. (360) 875-5557

Please remit to:
Coast Seafoods Company
Dept. 4037 P.O. Box 34936 Seattle, WA 98124-1936

INVOICE

Invoice No.	Page
111407	1

Please Indicate Invoice Number On Your Remittance

Ship to: DRAKE'S BAY OYSTERS
ATTN: LUIS ARMIENTA
17171 SIR FRANCIS DRAKE B
INVERNESS CA 94937

Customer Number	Date
01-82903110	10/23/2007

Sold to: DRAKES'S BAY OYSTERS
KEVIN LUNNY
17171 SIR FRANCIS DRAKE B

INVERNESS CA 94937

Purchase Order
LUIS 2W

Ship VIA	Order No./Date	Salesman	Terms
TRK# 7917 8639 2317 10/23/2007 Air Bill-BOL: FED-EX	3010 10/22/2007	829	NET 10 DAYS

Item Number	Description	U/M	Quantity	Price	Amount
2W 088013	MILLION DIPLOID LARVAE	NA	27	85.00	2,295.00
2W 088013	5% N/C 1.35 MIL DIP LARVAE	NA	1		
2W 090934	FREIGHT -FEDERAL EXPRESS	NA	1	68.54	68.54

PAYMENT MUST BE RECEIVED
ON OR BEFORE 11/02/2007

PAY THIS AMOUNT 2,363.54

* Product of USA * * Farm Raised *

Customer

2006 Planting Record and Harvest Projection

	Larvae Purchased	Settlement Rate	Seed Produced	Seed Purchased	Total Seed	Survival Rate	Total Expected Harvest	Number Shellfish per Gallon	Total Annual Harvest (Gallons)	Total Number of Shelfish per Pound	Total Annual Harvest (Pounds)
Pacific Oysters	103,000,000	0.25	25,750,000		25,750,000	0.25	6,437,500	100	64,375		
				1,250,000	2,000,000	0.40	800,000	100	8,000		
Manila Clams				1,000,000	1,000,000	0.60	600,000			20	30,000

Total Projected (oysters) Harvest (Gallons):	72,375	
Total Projected Shellfish (oysters) Harvest Weight (8.5 Lbs / Gal):	615,188	
Total Projected Shellfish (clams) Harvest Weight:	30,000	
Total Projected Harvest Weight (pounds)		645,188
10% Range	64,519	
Projected Lower Harvest weight:	580,669	
Projected Upper Harvest weight:	709,706	

Production range from: 580,669 Lbs. to: 709,706 Lbs. is calculated based on a 10% variability in survival of shellfish. Annual conditions can vary, resulting in a deviation in settling percentage as well as mortality rates of juvenile and adult shellfish.

Note: Manila clam weights include shell, oyster weights do not include shell.
Note: Oysters take roughly 1.5 years from planting to harvest. Clams take roughly 2.5 years.

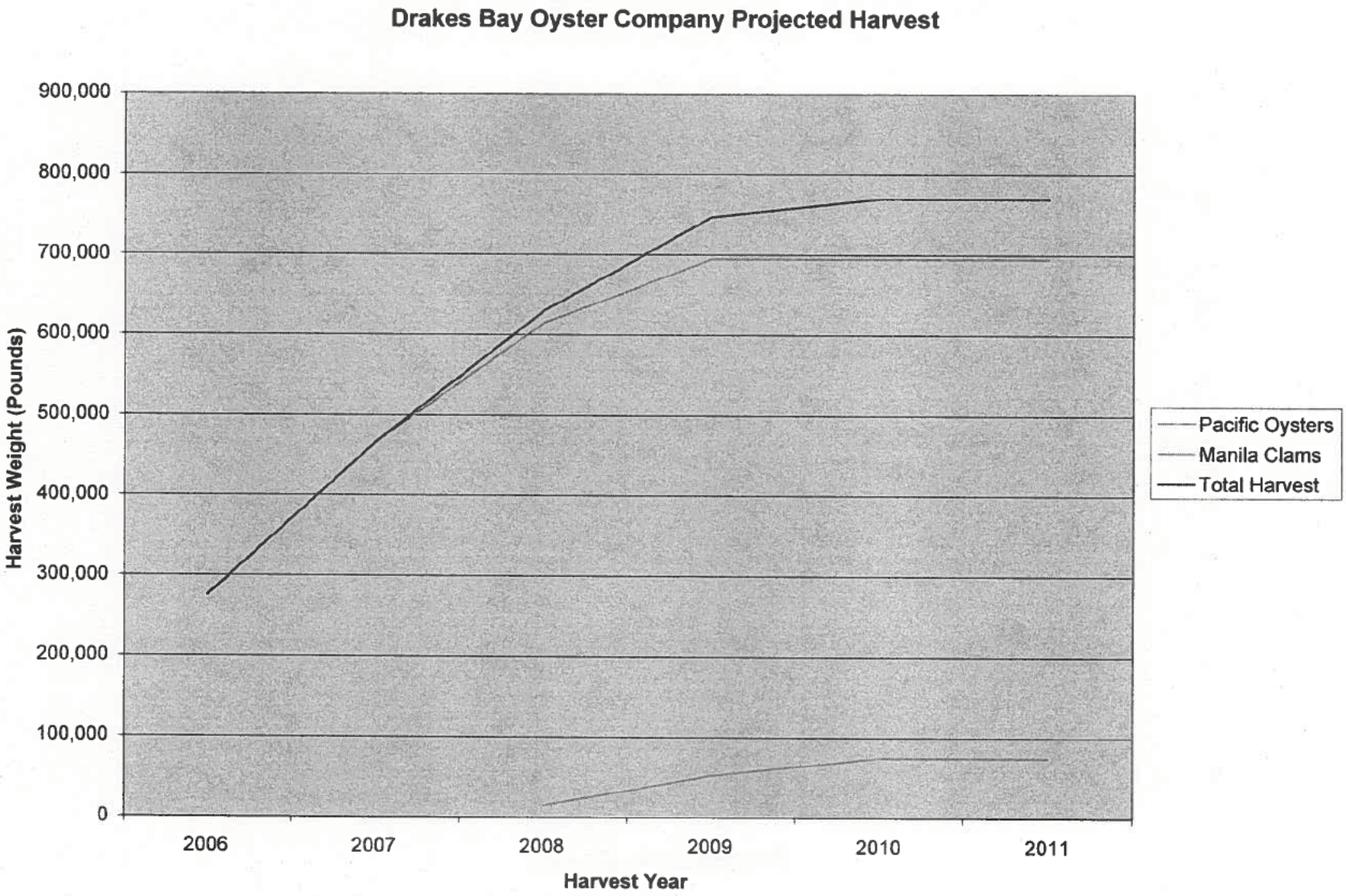
2007 Planting Record and Harvest Projection

	Larvae Purchased	Settlement Rate	Seed Produced	Seed Purchased	Total Seed	Survival Rate	Total Expected Harvest	Number Shellfish per Gallon	Total Annual Harvest (Gallons)	Total Number of Shelfish per Pound	Total Annual Harvest (Pounds)
Pacific Oysters	118,000,000	0.25	29,500,000		29,500,000	0.25	7,375,000	100	73,750		
				2,000,000	2,000,000	0.40	800,000	100	8,000		
Manila Clams				2,500,000	2,500,000	0.60	1,500,000			20	75,000

Total Projected (oysters) Harvest (Gallons):	81,750	
Total Projected Shellfish (oysters) Harvest Weight (8.5 Lbs / Gal):	694,875	
Total Projected Shellfish (clams) Harvest Weight:	75,000	
Total Projected Harvest Weight (pounds)		769,875
10% Range	76,988	
Projected Lower Harvest weight:	692,888	
Projected Upper Harvest weight:	846,863	

Production range from: 692,888 Lbs. to: 846,863 Lbs. is calculated based on a 10% variability in survival of shellfish. Annual conditions can vary, resulting in a deviation in settling percentage as well as mortality rates of juvenile and adult shellfish.

Note: Manila clam weights include shell, oyster weights do not include shell.
Note: Oysters take roughly 1.5 years from planting to harvest. Clams take roughly 2.5 years.


Drakes Bay Oyster Company Projected Harvest
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Harvest Weight (Pounds)
2006
2007
2008
2009
2010
2011
Harvest Year
Pacific Oysters
Manila Clams
Total Harvest

WILLIAM T. BAGLEY **JOHN L. BURTON** **PAUL N. "PETE" McCLOSKEY, JR.**

August 11, 2011

Secretary Ken Salazar
Department of the Interior
1839 C Street, NW
Washington, D.C. 20240

Re: ***Continuance of a Permit in Drakes Estero, Point Reyes National Seashore for the Drakes Bay Oyster Company***

Dear Mr. Secretary:

We write to recommend that you exercise your discretion to grant a Special Use Permit for the continuance of the Drakes Bay Oyster Company in the Point Reyes National Seashore when its present Reservation of Use and Occupancy expires in November, 2012.

We write as three former Northern California legislators who were personally involved in either the transfer of state tidal lands in 1965 to the Park Service, the necessary additional $35 million funding authorized in 1969 to acquire the 20,000 acres of ranches for the Park's pastoral zone, or the 1976 Wilderness Act which assigned a portion of the Park to wilderness, but retained the 20,000 acres of ranchlands to be operated by lease to private ranchers and the oyster farm to continue to operate as a "prior, non-conforming use."

As you know this has been a controversial issue since April, 2007 when Superintendent Don Neubacher and a senior Park Service scientist accused the oyster operator of endangering the seal population in the Park. The charges were subsequently determined to be false by the Department of Interior in 2008 and by a National Academy of Sciences panel in 2009. Not until 2010, did the Service release three years of logs and daily photographs secretly taken of the seal pupping areas which disclosed that kayakers and others than the oyster operators were the primary cause of seal disturbances.

For some ten weeks we have been talking to leaders on both sides of the controversy and examining the documents, particularly with regard to the environmental issues and the legislative history of the Seashore. The Seashore is somewhat unique in the National Park System in that from the beginning, it was intended to have a considerable part of its area, consisting of the historic scenic ranches being leased back to their owners, and to retain an oyster farm and California's only oyster cannery in the Drakes Estero. The Estero sits in the middle of those 20,000 acres of ranches designated as a pastoral zone; the oyster plant and cannery on the shores of Drakes Estero are in that pastoral zone.

Point Reyes National Seashore was created in 1962 through the leadership of three remarkable men, Congressman Clem Miller, Secretary of Interior Stuart Udall, and Park Director Conrad Wirth.

Wirth's words to the Congress and to the people of Marin County in 1961 were specific:

"EXISTING COMMERCIAL OYSTER BEDS AND THE OYSTER CANNERY AT DRAKES ESTERO.....SHOULD CONTINUE UNDER NATIONAL SEASHORE STATUS BECAUSE OF THEIR PUBLIC VALUES. THE CULTURE OF OYSTERS IS AN INTERESTING AND UNIQUE INDUSTRY WHICH PRESENTS EXCEPTIONAL EDUCATIONAL OPPORTUNITIES FOR INTRODUCING THE PUBLIC, ESPECIALLY STUDENTS, TO THE FIELD OF MARINE BIOLOGY."

In 1965, Assemblyman William Bagley, at the request of the Park Service, caused to be enacted A.B. 1024, conveying the State of California's tidelands and bottomlands within the Seashore to the Park Service, reserving however the fishing rights which then included shell fishing rights, traditionally leased by the state for oyster production.

Then in 1969, when the initial appropriation of $19 million became exhausted, with the threat of subdivision hanging over the Seashore, a second term Congressman was able to convince a reluctant Nixon White House to grant an additional $35 million to purchase the remaining ranch lands, which were to be continued to be operated in the 20,000 pastoral zone surrounding the Estero.

In 1972, the late Congressman Phil Burton gave the Bay Area the priceless gift of the Golden Gate National Recreation Area (GGNRA) situated just south of Point Reyes.

In 1974, Congressman John Burton and Senator John Tunney introduced bills to designate a portion of the Seashore as wilderness. Department of Interior Secretary Jon Kyl pointed out that the State of California had reserved fishing rights in the submerged lands, which was inconsistent with the submerged lands qualifying as pure wilderness. The bills were amended to add 8,000 acres surrounding and including Drakes Estero as potential wilderness. Both Congressman Burton and Senator Tunney testified that the oyster farm was intended to continue as a prior, non-conforming use within the potential wilderness area.

BURTON: "THERE ARE TWO AREAS PROPOSED FOR WILDERNESS WHICH MAY INCLUDED AS WILDERNESS WITH 'PRIOR, NON-CONFORMING USE.' ONE IS DRAKES ESTERO WHERE THERE IS A COMMERCIAL OYSTER FARM. ...."

TUNNEY: "ESTABLISHED PRIVATE RIGHTS OF LANDOWNERS AND LEASEHOLDERS WILL CONTINUE TO BE RESPECTED AND PROTECTED. THE EXISTING AGRICULTURAL AND AQUACULTURAL USES CAN CONTINUE."

Prior to the passage of the Act, both the Citizens' Advisory Commission of the GGNRA and the Sierra Club also concluded, and so recommended that the oyster farm and cannery could continue as a prior, non-conforming use.

For your convenience, we have attached the precise words of Park Director Wirth in 1961, and the words of the principals approving the continuation of the oyster farm at the time of the 1976 Wilderness Act as **Exhibit A**. Relevant excerpts from the California Bancroft Library's historical essay, SAVING POINT REYES NATIONAL SEASHORE, 1969-70, are attached as **Exhibit B**, and the affidavit of Assemblyman Bagley, with related documents attached as **Exhibit C**.

We think you will find the words of former Assistant Secretary Nathaniel Reed (last page of **Exhibit A**) or particular significance.

In our inquiries we have identified three opposing views held by honorable people, all of whom, however, have forgotten or want to set aside as no longer applicable, the commitments made in 1962 and particularly their own words and those of Senator Tunney, Congressman Burton and Assistant Secretary Reed regarding the preservation of the oyster farm as a non-conforming use in 1976/1975.

Former State Secretary of Resources Huey Johnson argues that all private operations in National Parks should be eliminated. Another group center on the single sentence in the House Committee Report accompanying the 1976 Act, setting forth the expectancy that non-conforming uses will be removed with all due speed. A third view is held that whenever there is a chance to add additional "pure" wilderness, for use only by kayakers, canoeists and hikers, the opportunity should be seized.

We have weighed these views, but believe that they are far less compelling than the commitments made back in 1976 and earlier. We are satisfied after hearing from several leading scientists outside the Service, and from the report of the National Academy of Sciences panel requested by Senator Feinstein that the 77 years of operation of the oyster farm has not endangered the local seal or bird life populations. The cannery is perhaps visited by more school children and other visitors than any other spot in the Park. The Academy of Sciences panel, in addition to finding that there was no substantial evidence of any danger to the seal population, has pointed out that the oyster farm serves as a wonderful basis for future research. Finally, producing 80% of the Bay Area's oysters, over 440,000 pounds annually, for human consumption, it meets the Commerce Department's new emphasis on local mariculture.

Each of us agreed some weeks ago that we would not make this recommendation to you if we found that the oyster farm represented any significant danger to the Estero's environment, its seal population or its bird life. It's only drawback seems to be that kayakers, canoeist and hikers will see some 140 acres of the 2,200 acre Estero covered with oyster racks and bags at low tide when they go out to see the seals and wildlife.

The convincing point was made by the Coastal Commission biologist, Dr. John Dixon, when he stated: "I don't think there is any non-correlative evidence either way whether the oyster operation endangers the seal population." This of course put the lie to the Park Service's claims back in 2007 that started this whole controversy.

We are also compelled to note that the deliberate misrepresentations of science by the Park Service, and particularly its failure for three years to disclose its logs and photographs which not only disproved its contentions of damage to the seals by the oyster farm, but put the blame on kayakers and others for most of the seal disturbances has created a wide distrust of a one of the few remaining revered institutions of our Government. None of us have ever met a Park Ranger who wasn't courteous, helpful, truthful and competent. The Neubacher Administration, however has been guilty of misconduct and deceit, as found by the Department's Inspector General. We have attached a summary of the deceits and withholding of factual data prepared by a Member of the National Academy of Sciences whose home overlooks the Seashore as **Exhibit D**. A copy of the Seashore's brochure, with a map of the pastoral and wilderness areas is appended as **Exhibit E**.

It seems highly possible to us that the there are elements in the Park Service Administration, which have had a secret agenda for some years to drive out not only the oyster farm, but the privately-leased ranches as well. There have been a whole series of small impositions on the ranchers which serve to make their operations more difficult. As of last weekend, for example, the Park Service had made no attempt to keep the wild tule elk herds in the northern wilderness section of the Seashore from breaking out onto the cattle ranches in the pastoral zone.

We think it might go a long way to restore public confidence in the Park Service to hold appropriate congressional committee hearings to ascertain why the Service seems dedicated to setting aside the words of Director Wirth of fifty years ago, and the testimony of Congressman Burton and Senator Tunney and the words of former Assistant Secretary Nat Reed regarding the 1976 Wilderness Act.

Thanking you for your public service which has done so much to restore the integrity of the Department of Interior after the scandals of the previous Administration, we remain,

Respectfully,

WILLIAM T. BAGLEY
California State Assembly, 1961-74

JOHN L. BURTON
Member of Congress, 1974-82

PETE McCLOSKEY
Member of Congress, 1967-82

EXHIBITS TO AUGUST 11, 2011 LETTER
TO DEPARTMENT OF THE INTERIOR SECRETARY KEN SALAZAR
FROM WILLIAM T. BAGLEY, JOHN L. BURTON,
AND PAUL N. "PETE" MCCLOSKEY, JR.

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EXHIBIT A

Former Director of NPS Conrad Wirth

Testimony on S. 476, A Bill to Establish The Point Reyes National Seashore in the State of California and for Other Purposes

"[e]xisting commercial oyster beds and an oyster cannery at Drakes Estero, plus three existing commercial fisheries, should continue under national seashore status because of their public values. The culture of oysters is an interesting and unique industry which presents exceptional educational opportunities for introducing the public, especially students, to the field of marine biology."

National Park Service, Conrad L. Wirth, Director, Report on the Economic Feasibility of the Proposed Point Reyes National Seashore (1961), included in the Hearings Before the Subcommittee on Public Lands of the Committee on Interior and Insular Affairs, U.S. Senate, 87th Congress, First Session on S. 476, A Bill to Establish The Point Reyes National Seashore in the State of California and for Other Purposes (March 28, 29 and 31, 1961).

REPORT ON THE

Economic Feasibility

of the

Proposed
POINT REYES NATIONAL SEASHORE

1961

prepared by

REGION FOUR OFFICE

Lawrence C. Merriam, Regional Director
180 New Montgomery Street
San Francisco 5, California

February 1961

UNITED STATES
DEPARTMENT OF THE INTERIOR
Stewart L. Udall, Secretary

NATIONAL PARK SERVICE
Conrad L. Wirth, Director

Report on the

Economic Feasibility of the PROPOSED POINT REYES NATIONAL SEASHORE

INTRODUCTION

This report concerns a survey of the economic consequences relating to the proposal to establish a Point Reyes National Seashore. The survey was conducted by the National Park Service in collaboration with University of California Professor John W. Dyckman of the Department of City and Regional Planning, and Professor Julius Margolis of the School of Business Administration. Marin County Assessor Bert Brommel and Executive Vice President Kenneth Davis of the Point Reyes National Seashore Foundation also made highly important contributions.

A tentative economic report, based on preliminary data, was completed in early 1960. The findings of that report were later supplemented by additional, more detailed information — especially concerning assessed valuation — which was brought out at a public hearing held in Kentfield, California, by a Public Lands Subcommittee of the Senate Committee on Interior and Insular Affairs.

Since the hearing, there has been opportunity to check further with Marin County officials, and the former tentative report has been edited to bring it into concert with the additional information presented at the Senate hearing. This document, which reflects the changes that have been made in the earlier report, represents a meeting of minds between the Marin County Assessor and the National Park Service with respect to assessed valuations.

So far as the investigators are concerned this report concludes the work to be done, at least for the time being, on the economics of the Point Reyes proposal. At some future time it may be feasible to develop other economic aspects of the Point Reyes proposal, and thus make a further contribution to the field of recreation economics, but there are no specific ideas in this connection on the part of the National Park Service at this time.

SUMMARY

The proposed Point Reyes National Seashore is situated on the Point Reyes Peninsula, a conspicuous promontory on the coast of Marin County, California. The highway entrance to the Peninsula is 30 to 35 miles northwest of San Francisco.

The area under consideration includes approximately 53,000 acres of land, plus bays, inland lakes, and tidal and submerged lands extending one-quarter mile to seaward from mean high tide. The varied character of the shoreline, with its wide sandy beaches, wave-swept caves and offshore rocks, and steep coastal bluffs combines with sand dunes and grasslands, chaparral and scenic fir and pine forest to make the area one of the most outstanding segments of unspoiled seashore yet remaining along the Pacific Coast.

The proximity of the proposed national seashore to one of the major metropolitan centers of the United States is a feature that adds greatly to the recreation importance of the area.

Practically all of the lands within the suggested boundary of the proposed area are in private ownership and those in productive use are largely devoted to dairy operations and beef cattle ranching. Under the present proposal the Point Reyes National Seashore would be operated through two types of land management. Of the 53,000 acres which would be acquired, 33,000 acres would be managed solely for public use. Some 20,000 acres of land situated in the central part of the Peninsula would be leased for ranching purposes to preserve the present pastoral scene.

The suggested boundaries as of April 1960 include a total of 15 dairy ranches which support approximately 7,000 dairy stock, with about 3,175 head in active milk production, and 10 beef cattle ranches with approximately 3,500 head of beef cattle. If the national seashore were established and managed in accordance with the present proposal, about half the dairy lands and beef cattle lands would continue operation under lease agreements. Ranching operation within the portion of the national seashore to be reserved for public use would be largely, if not wholly, discontinued. Two existing trans-Pacific radio receiving stations, maintained by the Radio Corporation of America and the American Telephone and Telegraph Company, respectively, would remain and would continue operation. Additional installations, consisting of public utilities in the form of electric power and telephone services, not only would remain in operation but would require expansion in connection with national seashore development.

Existing commercial oyster beds and an oyster cannery at Drakes Estero, plus three existing commercial fisheries, should continue under national seashore status because of their public values. The culture of oysters is an interesting and unique industry which presents exceptional educational opportunities for introducing the public, especially students, to the field of marine biology. Continuation of commercial fishing, with expansion of existing facilities to include sea food restaurants and markets and charter boat service for deep sea sport fishing would be compatible with the seashore concept.

Almost all of the Peninsula is privately owned and there is very limited access to the shoreline. Thus recreation now plays a relatively minor role within the boundaries of the proposed national seashore. Public areas are limited to two small developments along the shore.

On the basis of Marin County tax records, the total assessed valuation of lands and improvements within the 53,000 acres of the proposed national seashore is approximately $2,695,000. This figure includes approximately $1,726,000 in lands and improvements that are assessed locally (by the County) and $968,550 in the State-assessed communications and power utilities already mentioned, which would remain if a national seashore were established. Of the locally-assessed lands and improvements, approximately $1,291,000 represents the assessed valuation within the proposed PUBLIC USE AREA and approximately $435,000 the value within the proposed RANCHING AREA.

1975 Citizen's Advisory Commission

Summary of Golden Gate National Recreational Area (GGNRA) Citizens Advisory Commission's wilderness subcommittee (August 8, 1975)

In Their Own Words: Voices of the Citizen's Advisory Commission

The subcommittee consisted of: John Mitchell (Chairman), Fred Blumberg, Daphne Greene, Joe Mendoza, Amy Meyer, and Merritt Robinson; appointed by CAC Chairman Frank Boerger to study the issues involved with the wilderness proposal. They held three meetings, on July 10, July 22, and August 5, with various others attending and putting forth comments/concerns.

At the August 5 meeting, the group "generally agreed" on a list of points, including:

> "6. **Specific provision should be made in the legislation to allow the following uses to continue unrestrained by wilderness designation:**
>
> a. Operation of that portion of the Murphy ranch that calls within the proposed wilderness. This should be done in accordance with generally acceptable local standards of ranching practices and will include such activities as the use of pickup trucks and tractors for the purpose of maintaining necessary ranch roads, stock ponds and fences as well as caring for the health of the stock and periodic supplemental feeding.
>
> b. **Operation of Johnson's Oyster Farm including the use of motorboats and the repair and construction of oyster racks and other activities in conformance with the terms of the existing 1,000 acre lease from the State of California."**

They also recommended "the preamble of the wilderness legislation should clearly state the atypical nature of wilderness at Point Reyes."

Sierra Club

April 1974 Public Comment on Final Environmental Impact Statement (EIS) for S.2472, Bill to Designate Wilderness at Point Reyes National Seashore

"The draft Environmental Impact Statement implies that none of the Drakes Estero can be classified as wilderness because of Johnson Oyster Farm. This is misleading. The company's buildings and the access road must be excluded but the estero need not be. The water area can be put under the Wilderness Act even while the oyster culture is continued --- it will be a prior existing, non-conforming use."

Sierra Club's letter of comment on EIS, pp. A-38 to A-54; see p A-51 for this quote.

Congressman John L. Burton

Sponsor of S. 2472, Bill to Designate Wilderness at Point Reyes National Seashore

"This legislation is **intended to preserve the present diverse uses** of the Seashore...." (p. 272)

"There are two areas proposed for wilderness which **may be included as wilderness with 'prior, non-conforming use'** provisions. One is Drakes Estero where there is a commercial oyster farm..." (p. 273)

Hearings on S. 1093 and S. 2472 Before The Subcomm. on Parks and Recreation of the Comm. on Interior and Insular Affairs, 94th Cong. 271 (1976) (statement of Representative John Burton) (emphasis added).

Senator John V. Tunney

Author of S. 2472, Bill to Designate Wilderness at Point Reyes National Seashore

"Established private rights of landowners and leasholders will continue to be respected and protected. The existing agricultural and **aquacultural uses can continue.**" (p. 271)

Hearings on S. 1093 and S. 2472 Before The Subcomm. on Parks and Recreation of the Comm. on Interior and Insular Affairs, 94th Cong. 271 (1976) (statement of Senator John V. Tunney) (emphasis added).

Pete McCloskey

[redacted]

August 11, 2011

Pete,

When the massive extension to Pt. Reyes National Seashore was under consideration, I made my second inspection of the area before congressional testimony. Obviously the oyster farm on an important national park seashore raised some eyebrows, but both the legislative history and the conditions of use were sufficient for me to support the continuation of the oyster farm as a 'nontraditional use'.

The act expanding the Seashore was aided by none other than Casper Weinberger, who was the head of OMB at that time. He had gone to that wonderful California school located in the mountains above the Seashore and knew every nick and cranny of the areas to be added to the proposal. I was sure that he would cut my planned expansion to shreds; instead he added hundreds of acres of land he considered vital to protect the view and keep unwanted development at bay.

I believe I testified that the existing use of a certain defined area within the Seashore was to be considered 'a non-conforming use zone' which satisfied the Burton brothers and even Edgar Wayburn, the arch deacon of the Sierra Club and the rest of the Interior committees.

Nathaniel P. Reed
Former Assistant Secretary for
Fish & Wildlife,
Department of Interior, 1976

EXHIBIT B

Regional Oral History Office
The Bancroft Library

University of California
Berkeley, California

SAVING POINT REYES NATIONAL SEASHORE, 1969-1970: AN ORAL HISTORY OF CITIZEN ACTION IN CONSERVATION

Interviews with

Margaret Azevedo
Peter Behr
John D. Ehrlichman
Katy Miller Johnson
William L. Kahrl
Paul N. "Pete" McCloskey, Jr.
Boyd Stewart

with an
Introduction by William J. Duddleson

Interviews conducted by
Ann Lage
and
William J. Duddleson
1990, 1991

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Appendix A
McCloskey Congressional
Testimony, 5/13/69

C PT.
Reyes

POINT REYES NATIONAL SEASHORE, CALIF.

HEARING

BEFORE THE

SUBCOMMITTEE ON
NATIONAL PARKS AND RECREATION

OF THE

COMMITTEE ON
INTERIOR AND INSULAR AFFAIRS
HOUSE OF REPRESENTATIVES

NINETY-FIRST CONGRESS

FIRST SESSION

ON

H.R. 3786 and Related Bills

TO AUTHORIZE THE APPROPRIATION OF ADDITIONAL FUNDS NECESSARY FOR ACQUISITION OF LAND AT THE POINT REYES NATIONAL SEASHORE IN CALIFORNIA

HEARING HELD IN WASHINGTON, MAY 13, 1969

Serial No. 91-5

Printed for the use of the
Committee on Interior and Insular Affairs

U.S. GOVERNMENT PRINTING OFFICE
31-033 WASHINGTON : 1969

STATEMENT OF HON. PAUL N. McCLOSKEY, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. McCLOSKEY. Thank you, Mr. Chairman. I would ask unanimous consent to insert this written statement at the present time in the record. It is very brief.

Mr. TAYLOR. In the absence of objection, so ordered.
(Mr. McCloskey's full statement follows:)

STATEMENT OF HON. PAUL N. McCLOSKEY, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. Chairman, I speak in favor of H.R. 8786 and my own identical bill, H.R. 10137. In view of the breadth of the testimony which has already been heard, I will limit my testimony to personal knowledge and experience with the area in question and particularly its rising land values.

I am privileged to live about the same distance south of San Francisco that the proposed Point Reyes National Seashore is north. Before being elected to Congress in 1967, my profession was that of an attorney specializing in condemnation cases on behalf of landowners. The entire San Francisco Bay Area has been characterized by skyrocketing land prices in the last several decades. Particularly is this true with respect to rural areas which are suitable for subdivision and which are within an hour or two's drive from existing urban centers.

The decentralization of shopping centers and industry has made areas such as Point Reyes easily accessible to a new breed of affluent Americans, an ever-increasing number of people who desire to own a second home in the country.

Semi-rural areas on the periphery of the San Francisco Bay Area's suburbs have doubled in value in the past 10 years. In my own district, rural San Mateo County, land similar to Point Reyes and the same distance from San Francisco, has gone from $500 per acre to $5,000 per acre since 1962. From my personal observation and experience, I believe it would be foolish indeed to authorize any sum less than the full $57,500,000 figure of the bills before the Committee. I would likewise suggest consideration of the concept of legislative taking used in the Redwoods National Park last year. I think it absolutely certain that land values in the Point Reyes area will continue to escalate at a rate rapid enough to make even the $57,500,000 figure inadequate unless the property is taken by condemnation during calendar year 1970.

In conclusion, let me say that the cost of this acquisition is infinitesimal in comparison with the public benefits in preserving this magnificent seashore and adjoining terrain for perpetual public use. There are few areas in the world which compare with the rugged grandeur of California coastline, and in a world where we spend equivalent sums for a few days' expenditure of ammunition 8,000 miles away in Viet Nam, we would be derelict indeed not to recognize the national priority here involved.

Mr. McCLOSKEY. I have very little to add to this statement except in response to the question Mr. Skubitz asked earlier. I think there is no question but that the entire San Francisco Bay area is an area of national interest and of national historic and geographical attraction. People come from all over the world to San Francisco and the fact that this national seashore will be within an hour's driving distance to the north of the Golden Gate Bridge, I think, is extremely important as an adjunct to the ordinary visit paid San Francisco by every citizen

I would like to make a second comment. Until 2 years ago it was my privilege to earn my living as a condemnation lawyer and I think it is sometimes difficult for Members from areas other than the rapidly burgeoning population centers of California to understand the transition that is taking place around these urban areas when suddenly nearly everyone desires to have some place outside that urban area to which he can retire. Because of that, these semirural areas within an hour or twos drive of the urban centers have gone up in value by increases which are not explained solely by inflation. They are explained, I think, by the growth of an affluent society which desires this second rural home in the country with the privilege of getting into the countryside within an hour or twos driving time if at all possible. And this is the factor which to my personal knowledge, has caused lands within the same driving distance of San Francisco to increase as much as ten times in value in the last 7 years.

Before I came to the Congress, I was engaged in litigation with the U.S. Government and I am somewhat familiar with the tendency on the part of Government appraisers to undervaluate rather than overevaluate lands which they seek to acquire in areas of this kind. I would add my own admonition that in view of the history of this particular acquisition, I would submit that the higher figure of $38 million rather than the lower is the appropriate figure for this committee to authorize.

Thank you.

Mr. TAYLOR. Are you familiar with the procedures that the National Park Service used in acquiring this land?

Mr. McCLOSKEY. Not this particular land, sir. I have just been given the report that the Department has submitted.

Mr. TAYLOR. I was going to ask you whether or not, in your opinion, the jury verdicts were reasonable, but perhaps you would not know that area well enough.

Mr. McCLOSKEY. Well, juries of California tend to appreciate the prospective use of lands of this kind—this semirural land presently being used for ranches—because the wealthiest men in the San Francisco Bay area are often men who were sheepherders 20 years ago and owned ranches of this precise type.

Mr. TAYLOR. Any questions from anyone else?

Thank you very much.

Mr. McCLOSKEY. Thank you.

Appendix B
McCloskey to Ehrlichman

PAUL N. McCLOSKEY, JR.
11TH DISTRICT, CALIFORNIA

SEP 18 1969

COMMITTEE ON
GOVERNMENT OPERATIONS
AND
COMMITTEE ON
MERCHANT MARINE
AND FISHERIES

Congress of the United States
House of Representatives
Washington, D.C. 20515

September 16, 1969

Mr. John Ehrlichman
Counsel to the President
The White House
Washington, D. C.

Dear John:

Here's a starter. The only man who can save the Point Reyes National Seashore is the President. He is running out of time because the House Interior Committee is going to adjourn October 1, and the Bureau of the Budget Director, Robert Mayo, has made it clear that there are no funds available from BOB despite what has been properly characterized thus far as "weak White House support."

The money is available in the land and water conservation fund. All the President need do is order that it be released, earmarked for the national seashore projects, specifically, Point Reyes.

If you move this time, why not let a few of us know in advance so that we can properly give the President credit where it is due? It might also help to have the President announce that due to the efforts of George Murphy, Don Clausen and Bill Mailliard, he is taking this step to preserve a priceless national heritage.

Yr. Obt. Sevt.

Pete

PNMcC:cb

SEPTEMBER 18, 1969

TO: DIRECTOR MAYO

FROM: TOM HULLIN

Attached is a copy of a letter from Congressman Paul McCloskey concerning Point Reyes National Sea[illegible]

John Ehrlichman would like to know if the money in the [illegible] and water conservation fund is available.

Many thanks.

Attachment

MEMORANDUM

THE WHITE HOUSE

WASHINGTON

Hugh any change in [illegible]

McClasky

Funds in Land & Water Conservation Funds before ca committed for FY70 already publically identified w/specific projects

For 71 Budget it is an open question. Considerable re-programming

Land notes are ↑

Acquisition of additional land will cost at least 50 million.

↑ in ceiling increase

Needed Authorizing legislation is still pending.

September 26, 1969

MEMORANDUM FOR DOUG HOFE

FROM: BUD KROGH

SUBJECT: POINT REYES NATIONAL SEASHORE

I'm sure you have been beleagured with suggestions on the need to save the Point Reyes project.

Attached is some material from Congressman McCloskey's office who has been pressuring us to do what we can.

Is there anything the Department of Interior can do to help this program go forward?

MEMORANDUM 325

Appendix E
Krogh to Hullin

THE WHITE HOUSE

WASHINGTON

September 29, 1969

MEMORANDUM FOR TOD HULLIN

FROM: BUD KROGH

SUBJECT: POINT REYES

Per your instructions, I have asked Jim Schlesinger, BoB, to provide me with a memorandum on how we can get additional funding for the Point Reyes project.

I advised Schlesinger that Point Reyes had received a higher priority in our thinking, and that it was necessary for us to do something dramatic. Accordingly, he will get a memorandum back to me today or tomorrow which should be in time for Ehrlichman to brief McCloskey.

E

Appendix F
re: Cohelan Bill

7TH DISTRICT, CALIFORNIA

COMMITTEE ON APPROPRIATIONS

JEFFREY P. NEWMAN

FIELD REPRESENTATIVES:
MR. AND MRS. ROY LEMON
LATHAM SQUARE BUILDING
OAKLAND, CALIFORNIA 94612

Congress of the United States

House of Representatives

Washington, D.C. 20515

OCT 10 1969

October 9, 1969

Dear [illegible]

As you are well aware, the Administration will not release the funds necessary for further purchases of land for the Point Reyes National Seashore.

I intend to introduce a bill which is designed to stimulate the release of the trust funds and make them available for this land acquisition.

This bill is a logical extension of the Land and Water Conservation Act of 1967, which was amended to authorize partial use of funds derived from oil leases on the outer continental shelf. The Administration budget request is only $124 million for land acquisition for fiscal year 1970. This is the amount the Bureau of the Budget intends to release. The total amount available in the fund, on the other hand, is now $288.5 million. Therefore, $164.5 million will be unexpended this year unless we act soon.

This bill will suspend the authority of the Executive Branch to enter any lease agreement if the full amount of the Land and Water Conservation fund is not expended, and will also direct suspension of drilling operations under leases granted after passage of this bill in the same circumstances.

I recognize that this is a strong measure but feel it is the only way to break the fiscal logjam we are now facing.

I sincerely hope you will join me as a co-sponsor of this legislation. I intend to introduce the bill on October 19. If you wish to co-sponsor, please notify my office on EX 2661.

Sincerely yours,

Jeffery Cohelan
Member of Congress

CONSERVATION COPY

MCCLOSKEY, JR.
DISTRICT, CALIFORNIA

COMMITTEE ON
GOVERNMENT OPERATIONS
AND
COMMITTEE ON
MERCHANT MARINE
AND FISHERIES

Congress of the United States
House of Representatives
Washington, D.C. 20515

October 10, 1969

Mr. Tod R. Hullin
Administrative Assistant
The White House
Washington, D.C.

Dear Tod:

This is in preliminary response to your note of October 1 and the confidential BOB memorandum of that date.

1. The President has the authority to increase the allocation of Land and Water Conservation Act funds from $124 million to a figure in the neighborhood of $200 million or more.

2. With this increase there is also the discretion of the President or the Secretary of Interior to allocate more than $37.6 million to the Park Service, either by adding all of the increase to the Park Service or by denying funds to other beneficiaries of the fund.

3. With respect to the priorities of projects elsewhere in the United States, a new criteria might be applied, to wit: how fast are the land prices rising in the areas to be acquired? I suspect that Point Reyes, with its proximity to San Francisco, may show a higher annual increase in fair market value than some of the other areas.

4. None of this means much, of course, unless the House Interior Committee, at its hearings which are now set for November 13, increases the <u>authority</u> for Point Reyes from the present $19.1 million. It is estimated that $28.3 million will be necessary, but I suspect the real cost may now be up to $38 million.

19 + 28 ?
or + 38

5. Assuming that the increased authority is enacted by the Congress, it is my understanding that a supplemental appropriation bill would also be required.

6. To have a chance of success in these legislative actions, I assume the President should indicate now that he will allocate the required funds if Congress does its part.

7. Chairman Aspinall's motives, desires and intentions are a mystery to me.

I am enclosing for your examination a letter I have just received from Congressmen Cohelan with respect to an act he proposed to introduce on the same subject.

I will not support his bill until the other alternatives are resolved.

Best regards,

Pete

Paul N. McCloskey, Jr.

PNMcC:cb

cc: Mr. John D. Ehrlichman

November 13, 1969

MEMORANDUM FOR JOHN D. EHRLICHMAN

From: John C. Whitaker JCW

Re: Purchase of Point Reyes California Peninsula Area, Northern San Francisco, as a National Park

BACKGROUND

1. Park Director Hartzog testifies today before the House Interior Committee in favor of authorizing an increase of $33.5 Million for the purchase of Point Reyes as a national park. His testimony will center largely around the rise in land values from the previous estimate of $28.3 Million, to the present estimate of $33.365 Million to purchase the area. When asked by the Committee if he favors a supplemental FY 1970 appropriation legislation, he will "waffle" and he is instructed to do so by me.

2. Perhaps as early as tomorrow, but certainly not more than two or three weeks from now, the Interior Appropriations Committee will introduce legislation to appropriate funds and make political hay out of it. All intelligence I can gather on it indicates that the Interior Appropriations Committee will pass an appropriation of $33.365 Million. In other words, the President will be "run over" by Congress and the Democrats will collect the credit.

3. I foresee no chance the ultimately the President will veto the entire appropriations package, but he could veto the authorization bill which will come to him as one item -- but at great political expense.

4. After meeting with Carl Schwartz, Director of the Natural Resources Division, BOB; Carl McMurray, Advisory to Secretary Hickel, and Park Director Hartzog, Hartzog proposed the following plan:

E

Prepare supplemental appropriations legislation for FY 1970 for $7.5 Million. This is the amount of money he usefully feels can be spent to purchase property in the Point Reyes area during this fiscal year. Hartzog could probably get by with $2 or $3 Million if authorized to negotiate with Sweet (the key land) for only a portion of his property and defer later negotiation until next year, but that would just make the tab stiffer in later years. His schedule for appropriations for purchase of the whole park will be:

FY 1970	$ 7.5 Million (may be only $2 or 3 Million)
FY 1971	$ 7.5 Million
FY 1972	$18.5 Million
	$33.5 Million (approximately)

Hartzog, who is probably more aware than anyone about the escalating cost of land purchase, is convinced that he can purchase the park for $33.5 Million by the end of FY 1972.

5. Appropriations legislation should not include a clause for "legislative taking" since, obviously, we cannot have much of the $33.5 Million available in FY 1970. The purchase would have to be by way of the condemnation route through normal court procedures.

6. Other methods now being explored to find the necessary $7.5 Million in FY 1970 funds are as follows:

a) Carl McMurray is re-examining the possibility of reprograming funds in the Bureau of Outdoor Recreation in the Department of Interior.

b) Carl McMurray is making a delicate exploration of the possibility of making a deal with the Department of Agriculture whereby contract authority can be given from the National Park Service of Interior to the Forest Service of Agriculture in return for cash from the Department of Agriculture.

Carl Schwartz will not undertake this exploration with Agriculture until such time as an authorization bill on Point Reyes has been passed.

RECOMMENDATION

If the above options to find any money are not fruitful, and I am pretty sure they will not be, then I recommend that we go ahead and put in legislation appropriation for supplemental FY 1970 funds although it may not have to be for the full $7.5 Million.

It may be that Hartzog can get started with less money than that, but at any rate we commit for a speedy purchase by the end of FY 1972 of the entire Point Reyes area. My rationale is that we are going to be run over by Congress on this one and we should therefore pick up the political credit and do it in the most dramatic way possible.

The following parks have requests in for acquisition for FY 1970, and the total cost for purchase of parks is indicated below:

Cape Cod, Massachusetts	$ 17.401 Million
Point Reyes, California	33.5 Million
Padre Island, Texas	4.130 Million
Lake Mead, Arizona/Nevada	4.6 Million
	$59.631 Million

a) Obviously, California has much more political clout when you look at the political situation in the above States.

b) It gives the President a chance to identify with California, but not at the expense of playing regional favoritism because he can point out that Point Reyes, more than any park, represents the prime example of major encroachment by suburban sprawl of any area in the country.

c) The political pressure on this one is extremely high. For example, Congressman Don Clausen now has 250,000 petitions for purchase of the park.

2 - 3

d) Finally, on the [redacted] property (a key portion of the park) developers have reportedly made the offer of $5 Million for purchase of this land for highrise apartments, right in the choice peninsula portion of the park.

Considering the above, I recommend that the President beat the Democrats to the punch and submit supplemental FY 1970 appropriation legislation -- that he should do this in a dramatic way by inviting to the Cabinet Room the entire California Delegation (both Democrats and Republicans), together with Senators Jackson, Allott and Bible (Parks Sub Committee), Congressmen Aspinall, Saylor and Roy A. Taylor (Chairman of the House Park Subcommittee, Dem. N. C.) and Joe Skubitz (Rep. Kansas).

Just before a meeting with this large group, the President should meet privately for about ten minutes with Secretary Hickel, Senator Murphy and Don Clausen (the Point Reyes park is in his District) and then have the President announce his decision to the entire group, with an accompanying letter to Chairman Aspinall at the same time.

Assuming that no funds are forthcoming in FY 1970 from any of the above described options and further assuming that it's a real fact that we have gone through our $192.9 Billion budget level for FY 1970, then the money should come from some other program, e.g. cancel a space shot.

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THE WHITE HOUSE

WASHINGTON

November 18, 1969

MEMORANDUM FOR

Honorable George Murphy
Honorable Don Clausen

J.C. Whitaker

Subject: Point Reyes National Seashore Area

After your meeting with the President, you may wish to make the following points to the press:

1. That the Point Reyes national seashore area was originally authorized in 1962 but the funds have never really been appropriated to the full amount to purchase the area. To date, $19 Million have been appropriated to buy 22,816 acres, whereas the total park area is 54,136 acres. In other words, there are 31,320 acres left to purchase.

2. Even given the tightness of the FY'70 Budget, the President has told you that he wishes to go ahead with the purchase of this property as a national seashore area because the pressure to develop the area for highrise apartments and single family suburban dwelling units is extremely high and the President feels this beautiful area must be preserved for present and future generations.

3. If you are asked by the press why the President has decided to go ahead with this park area and not with other national park areas, you may wish to indicate that Point Reyes is unique in the sense that there are higher pressures for real estate development and escalating land values here than in any place in the country. Therefore, the President has indicated action is required now.

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2. Even given the tightness of the FY'70 Budget, the President has told you that he wishes to go ahead with the purchase of this property as a national seashore area because the pressure to develop the area for highrise apartments and single family suburban dwelling units is extremely high and the President feels this beautiful area must be preserved for present and future generations.

3. If you are asked by the press why the President has decided to go ahead with this park area and not with other national park areas, you may wish to indicate that Point Reyes is unique in the sense that there are higher pressures for real estate development and escalating land values here than in any place in the country. Therefore, the President has indicated action is required now.

4. You may wish to indicate that should the House Interior Committee enact authorizing legislation above the present funding level of $19 Million, the Administration will present a supplemental budget request for FY'70 and schedule funds for FY'71 and FY'72 to complete the purchase of the area.

John C. Whitaker
Deputy Assistant to the President

INTERVIEW HISTORY--John D. Ehrlichman

In September 1969 John Ehrlichman was President Nixon's White House counsel, and that November he became Nixon's principal assistant for domestic affairs. When he had arrived in Washington that January with the newly elected president, Ehrlichman and his family found a home in nearby Virginia, near his Stanford law school classmate and friend of twenty years, California Congressman Pete McCloskey. The two men were not only neighbors, they were in the same carpool; both were driven to work in the White House limousine assigned to Ehrlichman.

When McCloskey learned, on September 12th, that Nixon's budget director had announced that--even if Congress appropriated funds to complete land acquisition at Point Reyes National Seashore--the funds would not be released by the Nixon administration, he immediately called the one person he knew who might be able to get that policy changed: John Ehrlichman.

The key question addressed during this interview more than twenty years later was what had caused the Nixon administration's stated policy on Point Reyes funding to change, sometime between September and November of '69, from "no" to "yes"?. During the interview Ehrlichman said--accurately, as I, too, read the paper trail in the Nixon presidential files held by the National Archives--the fact that McCloskey got his attention, and that he in turn put his staff to work on it in a responsive way, was, at least, "the thing that started it in the new direction."

Arrangements for the Ehrlichman interview were facilitated by Pete McCloskey. Their friendship, estranged because of their ardently held and widely differing views on the Vietnam War--beginning about a month after McCloskey first asked Ehrlichman for help on Point Reyes--was reestablished in the mid-seventies. That was when McCloskey visited Ehrlichman in the federal prison camp where he served eighteen months following his Watergate-related obstruction-of-justice and perjury convictions.

The interview was done June 11, 1991, in Ehrlichman's home office on a hillside in Santa Fe, New Mexico, base for his consulting work which includes environmental consulting, and his writing--his third novel was in progress. His two black retrievers, Bryan and Daphne, were silent witnesses to the interview and Cat, who sat on his lap purring into the tape recorder, a more vocal one. During the morning the only reference to Ehrlichman's Watergate time of trouble was made by me, as I said goodbye. He said, have a good trip home, and I wished him good luck, "after all you've been through." Nothing, he said, could be further

number of times, departments--like the Department of the Interior in this case--would take a position, and the Bureau of the Budget would take an entirely different position. It would be up to the Congress to reconcile the conflict if they could, or for one of us to escalate it to a level in the White House where one of us got involved and refereed between the budget people and the departmental people and arrived at some kind of a reconciled position.

Congressman Pete McCloskey's Role

Ehrlichman: In this case, the [Interior] Department took a position that the Bureau of the Budget hedged for a while, and then it came along and took a position adverse to the department. It got up to the assistant level in the White House because Pete McCloskey[1] pounded on me.

Duddleson: That was the first time it was brought to your attention?

Ehrlichman: Oh, I think so. I suspect that John Whitaker, my assistant, knew that there was a conflict, but we had dozens of those in every department all the time. Ordinarily, the presumption is that the Budget people are right and the department is wrong, and we go on from there.

In this case, McCloskey was a college friend and we'd been to [Stanford] law school together and our families had grown up together. I used to give him a ride to work. The White House limousine would come out to Great Falls and pick me up and then stop in McLean[2] to get him, and then it would drop me at the White House and take him on up to the Hill. And many times, we stopped and got Lew [Lewis H.] Butler, who was assistant secretary of HEW [Health, Education, and Welfare], so the three of us would ride up together, and we would talk about whatever we had on our minds.

It was in some kind of a context like that, I'm sure, that McCloskey began to call my attention to Point Reyes. He had easy access to me and could pick up the phone and get me, and it was something that he cared a lot about, so it came to

[1]Paul N. (Pete) McCloskey, of San Mateo County, California, was a Republican member of the House, 1967-83--Ed.

[2]Great Falls and McLean are Virginia suburbs of Washington.

Who Speaks for an Administration?

Duddleson: If I can ask you to recapitulate for a minute here, the key factors in changing the administration's position on this matter called saving Point Reyes were, or included?--

Ehrlichman: Let me quarrel with your question.

Duddleson: Fair enough.

Ehrlichman: As far as I'm concerned, the administration didn't have a position, because Interior went one way and Budget went another, and we really hadn't arrived at an "administration" position. The Mayo letter [of September 10, 1969] was the budget people's position.

Duddleson: Even though in the public mind and in the press, and because the Budget Bureau was in the Executive Office of the President, it was perceived to be so [the administration position] by many people?

Ehrlichman: Sure. And if you had walked in my office the day that letter was written and said, "What's the administration's position?" and shown me that letter, I would have said, "Hey, wait a minute. The president hasn't decided this. And when we have a conflict, we reconcile it and we arrive at a common position, and we'll do that, but we haven't done it yet." So it was an <u>absence</u> of a position but it was an apparent position because the Budget letter got a lot of currency.

<u>What Turned Point Reyes in a New Direction?</u>

Pete McCloskey's Pounding Started It

Ehrlichman: And what turned them around? I would say but for Pete McCloskey pounding on me, it probably wouldn't have gotten turned around. Hickel didn't have the clout to elevate it to the level of a presidential decision. Mayo was content the way things were. Whitaker was new to the job. So if McCloskey hadn't intervened, Murphy and the others would have written a lot of letters and there would have been a lot of petitions, but I doubt that we'd have changed. We would have just let it sit there that way.

EXHIBIT C

Declaration of William T. Bagley as follows:

For the purpose of some credibility, my educational and professional background includes: 1949 graduate of the University of California – Phi Beta Kappa and Class Valedictorian; UC Boalt Hall Law School – Board of Editors, California Law Review, 1952; law practice 59 years, admitted to practice before the United States Supreme Court. Public offices, among others: Assemblyman, Marin and Sonoma counties, 1961-1974; First Chairman, Commodity Futures Trading Commission, Washington, DC, 1975-79; Member, California Public Utilities Commission, 1983-1986; Member and then Chairman, California Transportation Commission, 1983-1989; Member, UC Board of Regents, 1989-2002.

Recently my daughter Lynn Bagley, who started the Farmers Market movement in Marin County, reminded me of the fact that I authored Assembly Bill 1024 in 1965. Thus I called the UC Berkeley Bancroft Library, where approximately 500 of my 14 years of authored statutes and related files are stored, and received a packet of AB 1024 materials.

As the local Assemblyman, I received a request, dated January 4, 1965, from the Point Reyes National Seashore asking that I introduce legislation granting State-owned tidelands surrounding Seashore properties to the National Park Service. The request made no mention of fishing rights.

Since I was raised in West Marin (Woodacre) and had hunted brant (a small goose) in Limantour Bay, fought rural fires for the Marin County Fire Department as summer employment to pay for college (1945-1952), I knew of the existing oyster propagation and fishery in Drake's estuary. I was acquainted with oysterman Charlie

Johnson and his wife who he had brought back from Japan after the war. He was my constituent and ran an important local enterprise. I certainly would not have done anything to jeopardize his oyster fishing operations as his Assemblyman and as his friend and constituent representative.

In 1965, the legislature met in General Session every other year – sessions limited to 180 legislative days, members had no individual professional staff, just one secretary during the session. (There were no caucus staffs telling members "how to vote" and no partisan aisles.) Without personal staff, it was my practice to personally visit Legislative Counsel's office to deliver bill requests and discuss drafting. I have no present recollection of those discussions, but when the draft bill was delivered to me for introduction (across the Assembly desk), it reserved the "absolute right to fish." When I noted this provision (constitutionally required), I believed that the oyster operation was thus included and preserved, especially since I had earlier authored and passed AB 767 as requested by the Department of Fish and Game. AB 767 made many administrative changes regarding planting and propagation, but one major provision was to specify that "shellfish" included "oysters" and to expand "fish" to include all shellfish, not just oysters. To me and to the entire legislature, AB 767 included oyster propagation and stated that allotments must be "in the public interest", a finding to be made only by the Commission. AB 767 was signed by the Governor on July 12, 1965, three days after the signing of AB 1024. Further, and most relevantly in 1965, there existed on-going allotments and a lease or license, all having been granted by the Commission to Charlie Johnson.

All of the above was confirmed by the Department of Fish and Game Director's letter of October 22 – two weeks after these bills became effective. The Department wrote to the Seashore, to me and to Johnson: "[t]hat all State laws and regulations pertaining to shellfish cultivation (including planting requirements, land rentals, etc.) remain in effect since the conveyance by the Legislature reserves fishing rights to the State." This memorandum followed a September 30, 1965 Attorney General's Opinion (26 Cal. Atty.Gen.Ops. 68) addressed to the Director of the Department, advising that "oysters and shellfish are 'fish'", within the meaning of Fish and Game Code Section 45 . . . and "as such are subject to the prerogative of the sovereign [the State] to protect and preserve them in such a manner and upon such terms as the Legislature deems best . . .". Had these authoritative statements not been issued, I certainly would have taken corrective action to prevent possible damage to the oyster operations in my District. All of this was re-confirmed by the National Park Service in a 1974 environmental review of possible "wilderness" status which described the oyster operation: "This the only oyster farm in the Seashore, control of the lease [called a license at times] from the California Department of Fish and Game, with presumed renewal indefinitely, is within the rights reserved by the State on these submerged lands." [1]

Almost 40 years later, from about 2004 forward, other memoranda and opinion pieces began to be issued making claims that the reservation in my AB 1024 only applied to "wild fish" and further that "oysters were not fish." None of those writings, repeated by others within State agencies, makes any reference to any of the above

[1] I did not see this item at the time as there was then no controversy and I was not following this process.

related facts and of the evidence of legislative intent. Interestingly, and in the face of some of those contentions, the Fish and Game Commission continued oyster allotments and issued a new lease/license – in the public interest – in 2004 for a term of 25 years until 2029.

As the relevant National Park Service ostensible deadline year 2012 approaches re the reissuance of its own version of an oyster permit, interest in this matter accelerates. (The "Wilderness Act" is technically not controlling since Senator Dianne Feinstein, by a 2009 amendment, allowed a renewal for 10 to 15 years.) Former Congressman Pete McCloskey (1967-83) became immersed in efforts to determine whether the continuation of the oyster farm in Drake's Estero would endanger the seal population as claimed by the Park Service as the basis for terminating the oyster permit. He had been asked by a neighboring rancher to check into the question. He was acting *pro bono* in this inquiry. It was then I was reminded that it was my AB 1024 that effected the reservation of the "absolute right to fish" which prompted my own *pro bono* research and involvement.

Those who attempt to revise history perhaps did not know of the contemporaneous background facts recited here, and at times have avoided comment on the open public record available. They also avoid any discussion of the State's long-held public policy of fostering oyster culture and retrieval commencing with Fish and Game statutes first enacted in 1851. (See material developed by retired public law attorney Judith Teichman reciting this history and referencing multiple constitutional and statutory materials – also all *pro bono*).

The true meaning of the 1965 reservation of "absolute right to fish" is derived from 1965 legislative action and contemporaneous execution by authorized agencies and not by a much later interpretation by those never involved in and not aware of the 1965 process. What was reserved in 1965 was and is the extant of rights as they existed in 1965 – related in detail above. Subsequent references to "aquaculture" and other such descriptions by some State authorities in the late 2000 decade may be true today but are irrelevant to what was in fact and law reserved in 1965. Most recently one of those State commentators stated in a media interview that, "You have to look at the ink on the page. It is difficult to come to any other conclusion than this Tideland belongs to the United States." This, however, was uttered before any review of this declaration and all of the contemporaneous ink cited above.

As set forth in *Martin v. Szeto*, 32 Cal.4th 445 (2004) – headnote:

> "When statutory text is ambiguous, or it otherwise fails to resolve the question of its intended meaning, the Court looks to the statutes *legislative history and the historical circumstances* behind its enactment. Finally, the Court may consider the likely effects of a proposed interpretation because, where uncertainty exists, consideration should be given to the consequences that will flow from a particular interpretation." [emphasis added]

That consequence would be the complete obliteration of the rights reserved by the Legislature meant to encompass existing rights then extant and then described when the Legislature acted. I will leave it to others to fully brief this subject if necessary, but here add words to describe California's rules when interpreting legislative tideland grants. These seem to be broader and more result-oriented than those applied to ordinary statutes. *National Audubon Society v. Superior Court*, 33 Cal.3d 419 (1983) at

437-438 quotes favorably from *People v. California Fish Co.*, 166 Cal. 576, a case involving the grant of tidelands, stating:

> "The court first set out principles to govern the interpretation of statutes conveying that property: '[S]tatutes purporting to authorize an abandonment of ... public use will be carefully scanned to ascertain whether or not such was the legislative intention, and that intent must be clearly expressed or necessarily implied. It will not be implied if any other inference is reasonably possible. And if any interpretation of the statute is reasonably possible which would not involve a destruction of the public use or an intention to terminate it in violation of the trust, the courts will give the statute such interpretation.'"

While an absolutist would argue that the Drake's oyster operation's "absolute right" exists independent of any Seashore restraints, I am not such an absolutist. A both legal and practical conclusion would and should be a State accommodation to effect the 2009 Congressional action sponsored by Senator Dianne Feinstein – to allow renewal of National Park Services processes leading at least to a continuation of the contested use pursuant to that enactment. To reconfirm again, all of the above, I enclose and attach this letter of March 14, 1966 from the Department of Fish and Game to the Seashore and the Seashore's reply of March 25 totally agreeing with the Department.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Prepared this 1st day of August, 2011 – to be signed later.

Signed this 2nd day of August, 2011 in San Rafael, California.

William T. Bagley

March 14, 1966

Mr. Leslie P. Arnberger, Superintendent
Point Reyes National Seashore
Point Reyes, California 94956

Dear Mr. Arnberger:

Thank you for your recent letter requesting advice on regulation of the Johnson Oyster Company now within the bounds of Point Reyes National Seashore.

Upon reviewing this matter it becomes apparent that the legislation transferring the submerged lands at Point Reyes to the Federal Government specifically reserved the fishing rights to the State. (AB 1024 (Bagley) Ch. 983, Stats. of 1965).

It thus appears that all State laws and regulations pertaining to shellfish cultivation remain in effect and are applicable to the operations of Johnson Oyster Company. This would include annual rental, privilege taxes, planting requirements, etc. - in short all current sections of the Fish and Game Code, and of Title 14, California Administrative Code, which relate to shellfish cultivation.

We will appreciate your interpretation of this legislation and suggest that, if differences in opinion do exist, you so advise us and that a discussion be arranged between representatives of our agencies.

As you request, we are including copies of the maps and complete descriptions of shellfish allotments numbers 2 and 72 which are now held by the Johnson Oyster Company.

Sincerely,

[redacted]

Director

cc Mr. Johnson
Assemblyman Bagley
Mr. Edgerton
Mr. Savage
Mr. Ralph Scott
Region 3
MMO

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
POINT REYES NATIONAL SEASHORE
Point Reyes, California 94956

NATIONAL PARK SERVICE 1916 1966 50TH ANNIVERSARY

IN REPLY REFER TO:
L1425

March 25, 1966

MAR 29 1966

Mr. Robert L. Jones, Deputy Director
Department of Fish and Game
1416 Ninth Street
Sacramento, California 95814

Dear Mr. Jones:

Thank you for your letter of March 14, in regard to the Johnson Oyster Company. This office is quite agreeable with the interpretation your department has placed upon the legislation transferring the submerged lands at Point Reyes to the Federal Government. I have discussed the matter with Mr. Charles Johnson, and this is in accord with his understanding also. Accordingly the Johnson Oyster Company will continue operation under appropriate sections of California Fish and Game Code as in the past.

Copies of this exchange of correspondence are being provided to our Regional Office for their review. Should their conclusion be different from that stated above, I will notify you promptly.

Your cooperation in this matter is greatly appreciated.

Sincerely,

Leslie P. Arnberger
Superintendent

MAR 29 1966

EXHIBIT D

July 20, 2011

From: Dr. Corey S. Goodman, [redacted]

To: Pete McCloskey, [redacted]

Re: Analysis of NPS Cameras, Photos, and Logs from Drakes Estero, CA

In response to your request, I have prepared this memo to summarize what I have learned about the National Park Service (NPS) three and a half years of secret cameras, photographs, and detailed logs concerning the impact of the oyster farm – Drakes Bay Oyster Company (DBOC) – on the harbor seals and pups in Drakes Estero.

In summary, the NPS analysis of those photographs (in the form of detailed logs) contradicted the NPS public claims presented to a series of investigations, inquiries, and reviews over more than three years. NPS failed to disclose the key data (photos and logs) to the DOI Inspector General (IG), National Academy of Sciences (NAS), Marine Mammal Commission (MMC), scientific journals, and others (including the Marin County Board of Supervisors, Senator Feinstein, and other federal, state, and local officials). The NAS and MMC panels recommended that such photographic data would have helped resolve the controversy, yet NPS officials remained silent as to their existence.

The existence of the NPS secret camera program was discovered on June 6, 2010 when I first read the NPS May 1 2009 Briefing Statement, which was prepared 13-months prior. I informed the Marine Mammal Commission (MMC) of my discovery of the secret camera program the next day (June 7) at an MMC meeting. NPS officials and scientists (including PRNS Superintendent Cicely Muldoon) were present and participating at that MMC meeting. It took 24 days (until June 30) for NPS to disclose that the program went further than described in the Briefing Statement – in fact, there were not one, but two cameras taking minute-to-minute photos from dawn to dusk every day during pupping season for not one, but three and a half years beginning on May 5, 2007 (not 2008). During summer 2010, NPS officials claimed to the MMC and to the public that the cameras were for wildlife management and that "*images from the cameras have not yet been analyzed in any depth.*" The NPS photos, logs, and other program documentation, including grant proposals, contradict these statements.

Multiple FOIA requests were submitted to NPS. In response to those FOIA requests, 281,000 digital photos were released in late August 2010 and detailed NPS logs of the 2008 and 2009 photos were released on September 2, 2010. [A completely different, and previously undisclosed, 2008 database based upon different photos and volunteer records from a different observation site, was released at the end of 2010.] The NPS logs revealed that NPS had, in fact, carefully analyzed most of the photos. The NPS analyses revealed that the purpose of the cameras was to catch disturbances of the seals by oyster boats – the photos had been analyzed in detail (seemingly exclusively) for oyster boat activity and potential DBOC disturbances and had no mention of wildlife management. Despite NPS efforts, no DBOC disturbances were found. NPS suppressed both the program and its key finding.

Examination of the 281,000 NPS Photos from the Secret Camera

As part of my evaluation of the NPS camera program, I examined many thousands of the 281,000 photographs, guided in large part by the NPS logs that serve as a detailed guide to the photos. NPS volunteers examined nearly every photograph from 2008 and

2009 (the bulk of the photos) and carefully noted every time an oyster boat came or went. When compared to the photographs, the logs are extremely accurate. I verified the logs with the photos, picking dozens of events and comparing the logs vs. the photos. Additionally, I selected random dates to verify and confirm log accuracy. Finally, I used DBOC records from the GPS recorders placed in their boats. I can report that the NPS detailed logs are extremely accurate in terms of when oyster boats came and went during the pupping season in 2008 and 2009. No discrepancies were found.

The NPS logs released to date (for 2008 and 2009, evidently no logs exist for 2007 and 2010) describe 37 days in 2008 and nine days in 2009 during pupping season when DBOC boats came and went from sandbars OB and UEN. The NPS logs describe many additional days of DBOC boat trips to these sandbars in months following the pupping season (i.e., June and July). The NPS logs describe not one single bona fide disturbance during those 46 boat trips to sandbars OB and UEN during pupping season, and many more in the following months. I checked these photos and concur with the NPS volunteers – there are no DBOC disturbances recorded. The DBOC boats stayed over 500 yards from the seals at the OB haul-out (often 600-800 yards away). The NPS-NOAA-CDFG protocols recommend a 100-yard buffer from the harbor seals.

In contrast, the NPS logs describe six instances (one in 2008 and five in 2009) in which kayakers (banned from being on the estero during pupping season) got within the recommended 100-yard buffer of the OB seals and caused 50-100% of the seals to flush into the water. The cameras caught multiple disturbances by kayakers, but none by DBOC oyster boats and workers. Representative examples of these NPS photos can be found in my October 18, 2010 presentation to the California Council on Science and Technology (see http://www.youtube.com/coreysgoodman).

NPS Claims Photos are Blurry and Inconclusive – But NPS Logs Show Otherwise

On December 15, 2010, DOI Field Solicitor Gavin Frost, who was directed by DOI to conduct an investigation into allegations of scientific misconduct by NPS, interviewed me for over eight hours at my office. I started to show him many of the NPS photographs and to go through the detailed logs, but Mr. Frost declined to look at the photos and logs with me and said that was not necessary. Mr. Frost told me that Dr. Sarah Allen and Sarah Codde from NPS had both told him a few days earlier that the NPS photographs revealed not a single disturbance of the harbor seals by the oyster farm. Thus, Mr. Frost concluded it was not necessary for me to show him the photos.

Mr. Frost failed to tell me, however, that NPS scientists told him that the photos are blurry and inconclusive. In his report, Mr. Frost accepted the NPS explanation that the three and a half year camera program had little value. However, as described above, Mr. Frost failed to examine the photos and logs with me. As the NPS volunteers who produced the logs realized, the majority of the photos are clear enough to see the seals, boats, and disturbances.

The NPS explanation, as reported by Mr. Frost, is contradicted by the NPS logs. Mr. Frost's report repeated a variety of NPS explanations as to why the photographic data wasn't useful, but the fact remains that the photographs were clear enough for NPS volunteers to carefully examine and catalogue. For the 2008 and 2009 logs, the NPS volunteers had no problem following oyster boats and workers at OB/UEN. The camera filming the OB seals and oyster boats in the lateral channel was placed 300-350 yards

from the OB seals and 1,000-1,200 yards from the DBOC boats and workers. The number of days in 2008 the volunteer examined photos for OB/UEN was 37. The number of days the volunteer said visibility was poor due to fog was 4% of the total. The conclusion from the NPS logs is that around 4% of the time, the weather was foggy and the photos were blurry and inconclusive. The rest of time (i.e., 96% of time), the photos were clear enough to see oyster boats and workers at 3-5X the distance compared to the seals, and the photos were clear enough to see kayakers flush 50-100% of the seals into the water.

The photographs were sufficiently clear to determine that DBOC oyster boats in the west end of the lateral channel (600-800 yards from the seals) were not disturbing the seals, while kayakers in the east end of the lateral channel (less than 100 yards from the seals) were indeed disturbing the seals.

NPS Failed to Disclose the Photos and Logs to the NAS and MMC Review Panels

The first NPS camera began filming on May 5, 2007. The Ocean Studies Board of the National Academy of Sciences began its study in April 2008, as directed by Senator Feinstein and commissioned by NPS, to review all of the data concerning the impact of DBOC and Drakes Estero, to compare them to the NPS document titled *Drakes Estero: A Sheltered Wilderness Estuary*, and to report on whether the NPS had drawn the correct conclusions from these data and studies and presented them correctly. The NAS panel, like the MMC panel that followed them, asked the NPS to provide all NPS harbor seal data, including disturbance data, as mandated by the NAS study charter.

The NAS report, issued on May 5, 2009, concluded that:

> *The National Park Service report "Drakes Estero: A Sheltered Wilderness Estuary" in some instances selectively presented, overinterpreted, or misrepresented the available scientific information on DBOC operations by exaggerating the negative and overlooking potentially beneficial effects.*

The NAS panel went on to write that:

> *... It is not possible for the committee to resolve the controversy over individual survey sheets, but the focus on these observations highlights how this type of* [volunteer] *monitoring program is best utilized to indicate potential disturbance problems (that might result in decreased use of a haul-out habitat) rather than to quantify them definitively.* ***The latter would require a data collection system that could be independently verified, such as time and date stamped photographs.*** *This verification is especially important in circumstances where there is an indication of a source of disturbance that could lead to a regulatory action, as was the case with disturbances attributed to DBOC.* [emphasis added]

The NAS panel, in their May 5, 2009 report, recommended that time-and-date stamped photographs would provide independent verification of disturbance records and help resolve the controversy over oyster farm disturbances in Drakes Estero.

Marine Mammal Commission panel members made the same suggestion at their meeting on February 21-24, 2010. According to two journalists (Tess Elliott from the Pt. Reyes Light and Andrea Blum from The West Marin Citizen), on February 22, 2010, while visiting the west end of the estero with NPS officials and scientists and MMC panel members, MMC panel member Dr. Michael Walsh pointed across the estero to

the east end, to precisely the location where the cameras were located (unbeknownst to him), and suggested to the senior NPS scientist (Dr. Sarah Allen) that cameras at that location with time and date-stamped photographs would help resolve the controversy concerning potential disturbances by the oyster farm. The NPS scientist remained silent. During six days of discussion – two with the NAS review panel and four with the MMC review panel – NPS officials and scientists – including then PRNS Superintendent Don Neubacher and PRNS senior scientist Dr. Sarah Allen – remained silent, even though they had just such a camera system fully operational.

The next day of the MMC panel meeting, on February 23, 2010, Dr. Michael Walsh (the same panel member who recommended remote cameras the day before), asked Dr. Allen how she might improve the observation of potential disturbances. She answered:

> *"If I were to design it as a disturbance study, I'd have observers in multiple places, not just one observation site ... I'd observe [the seals] from multiple sites, hopefully less than a quarter mile [from the seals]. You'd be using scopes, but also cameras for documentation ...* ***I think observations for other wildlife have been tracked with remote cameras, with 24 hour, minute intervals or something like that. I've used such cameras in Bolinas Lagoon.*** *That's how we documented the disturbances so you can see progressive reaction and then response. That would be one way I would intensify trying to tease out the sources of disturbance, what the effect is, and the frequency, which I think is a super valid point that was brought up about the frequency -- that Peter brought up, but you're not going to detect that with the sampling we're doing now. We're only out there two to three, four days a week and only for a brief period of time because our focus is on monitoring the population."*

Thus, in answering how she might design a study of potential disturbances to the harbor seals, Dr. Allen described how she would want volunteers at multiple sites (some less than a quarter mile or 440 yards from the seals) and cameras taking minute-by-minute, time and date-stamped photographs. In describing to the MMC panel what she would like to have, Dr. Allen neglected to tell them that in 2008, she had all of those elements in place -- volunteers at two different locations (one within 350 yards of the seals), and two cameras taking minute-by-minute, time and date-stamped photographs. As of February 2010 when she made her statement to the MMC panel, Dr. Allen had been sent both the 2008 and 2009 detailed logs of the NPS photos.

Dr. Allen also failed to tell the MMC panel that the NPS photographs and their detailed analyses showed no DBOC harbor seal disturbances. Indeed, the photos and logs not only contained no data that would confirm the NPS claims, but quite the opposite, the photos and logs refuted these NPS claims. Dr. Allen had, in fact, designed and conducted a disturbance study, and found no DBOC harbor seal disturbances.

Remaining Controversy – Photos Show No Seals Getting Flushed by DBOC Boat

Of the three and a half years of photos, only those from May 8, 2007 remain controversial. Based upon responses to FOIA requests, according to NPS, no log exists for the 2007 photos. May 8, 2007 was a Tuesday. Every Tuesday, as mandated by California Department of Public Health regulation, DBOC sends a boat down the main channel towards the mouth of Drakes Estero to collect meat samples near the estero mouth for biotoxin analysis (a routine food safety standard). The DBOC boat stays well

How I Got Involved In This Issue

On April 28, 2007, Steve Kinsey, then President of the Marin County Board of Supervisors, first asked me to look at National Park Service science concerning the impacts of DBOC on Drakes Estero, and to come report on that science at a Marin County hearing on May 8, 2007. In my testimony at that hearing, I said:

> *"I believe that public policy decisions can and should be informed by quality science. But this must be science conducted rigorously, without agendas or conflicts-of-interest. The political process can be dangerously misled by bad or misused science. One of my greatest concerns when I see science being invoked in public policy debates is to make sure that it is good science and not pseudo-science or ... a blatant misuse of science."*
>
> *"My only hesitation in coming forward to testify today is the realization that openly expressing my views as a scientist may cause me to come under personal attack by local groups that are determined to remove Lunny's operation from the PRNS. Nevertheless I feel compelled to speak out for good science instructing public policy."*

Brief Biosketch

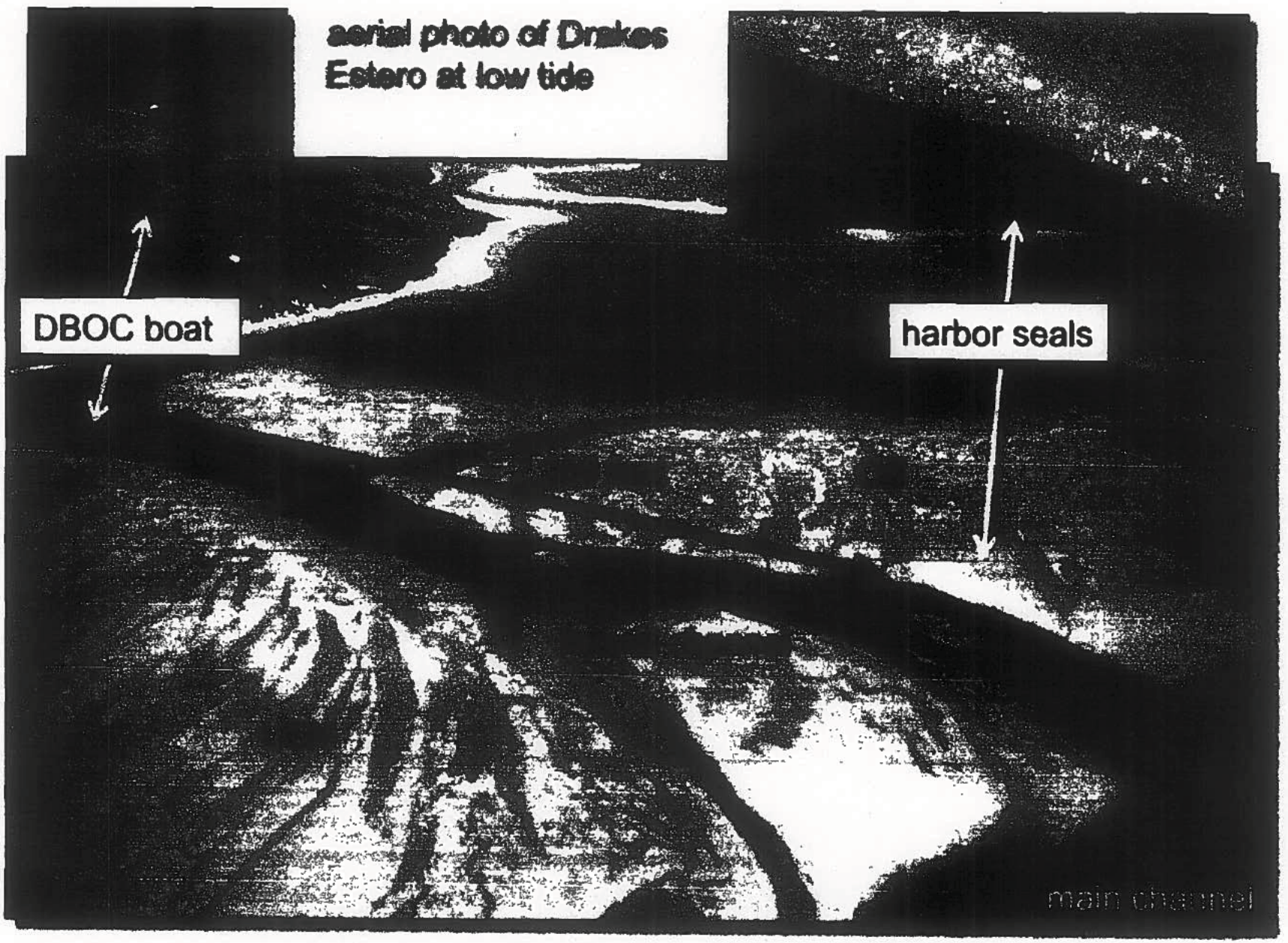
Dr. Corey Goodman is a scientist, educator, and biotech entrepreneur. With a B.S. from Stanford University and Ph.D. from U.C. Berkeley, he spent 25 years as professor of biology at Stanford and Evan Rauch Chair of neurobiology at U.C. Berkeley, where he was Howard Hughes Medical Institute Investigator and co-founder and director of the Wills Neuroscience Institute. He is currently on the faculty at U.C. San Francisco. He is an elected member of the National Academy of Sciences, American Academy of Arts and Sciences, and American Philosophical Society, and recipient of many honors including, amongst others, the Alan T. Waterman Award, Canada Gairdner Award, March-of-Dimes Prize, and Reeve-Irvine Research Medal.

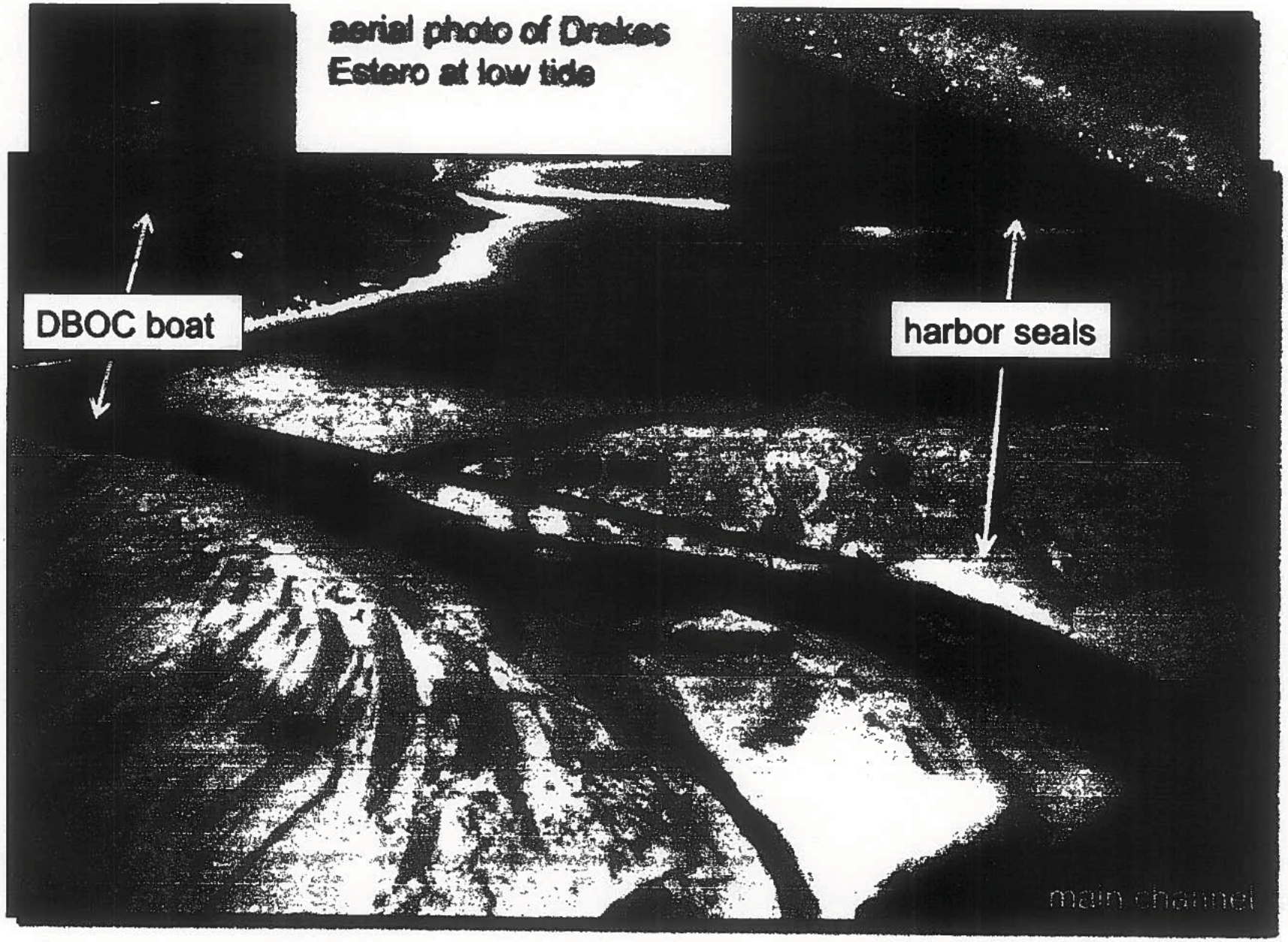
Dr. Goodman moved into biotechnology to help apply biomedical discoveries to human and environmental health. He co-founded Exelixis, Renovis, and Second Genome, was CEO of Renovis, and President and founder of Pfizer's Biotherapeutics and Bioinnovation Center. While at Pfizer, he designed a new entrepreneurial R&D model with a focus on fostering innovation in drug discovery for major unmet medical needs.

He is Managing Director and co-founder of venBio LLC, a strategic capital biotech investment firm based on a new model of strategic collaboration with pharmaceutical and biotechnology companies. He is Chair of the Board of five biotech companies, Board member of two others, and advises other public and private companies.

Amongst his many public policy roles, Dr. Goodman is on the Board of the California Council on Science and Technology, Pacific Institute, Bay Area Science and Innovation Consortium, QB3 (UCSF-UCB-UCSC) Advisory Board, and is former Chair of the National Research Council's (NAS) Board on Life Sciences. He is on the board of a number of biomedical disease foundations and editorial boards of scientific journals.

Dr. Goodman has lived in West Marin since 1993. He and his wife Marcia Barinaga live on the Barinaga Ranch in Marshall (www.barinagaranch.com) where Marcia oversees their organic pastures, farmstead sheep dairy, and produces artisanal sheep cheese in her family's Basque tradition.


aerial photo of Drakes Estero at low tide
DBOC boat
harbor seals
main channel


aerial photo of Drakes Estero at low tide
DBOC boat
harbor seals
main channel

For a map of the Point Reyes National Seashore, go to www.nps.gov/pore and click on "View Map."

EXHIBIT E

Declaration of William T. Bagley as follows:

For the purpose of some credibility, my educational and professional background includes: 1949 graduate of the University of California – Phi Beta Kappa and Class Valedictorian; UC Boalt Hall Law School – Board of Editors, California Law Review, 1952; law practice 59 years, admitted to practice before the United States Supreme Court. Public offices, among others: Assemblyman, Marin and Sonoma counties, 1961-1974; First Chairman, Commodity Futures Trading Commission, Washington, DC, 1975-79; Member, California Public Utilities Commission, 1983-1986; Member and then Chairman, California Transportation Commission, 1983-1989; Member, UC Board of Regents, 1989-2002.

Recently my daughter Lynn Bagley, who started the Farmers Market movement in Marin County, reminded me of the fact that I authored Assembly Bill 1024 in 1965. Thus I called the UC Berkeley Bancroft Library, where approximately 500 of my 14 years of authored statutes and related files are stored, and received a packet of AB 1024 materials.

As the local Assemblyman, I received a request, dated January 4, 1965, from the Point Reyes National Seashore asking that I introduce legislation granting State-owned tidelands surrounding Seashore properties to the National Park Service. The request made no mention of fishing rights.

Since I was raised in West Marin (Woodacre) and had hunted brant (a small goose) in Limantour Bay, fought rural fires for the Marin County Fire Department as summer employment to pay for college (1945-1952), I knew of the existing oyster propagation and fishery in Drake's estuary. I was acquainted with oysterman Charlie

Johnson and his wife who he had brought back from Japan after the war. He was my constituent and ran an important local enterprise. I certainly would not have done anything to jeopardize his oyster fishing operations as his Assemblyman and as his friend and constituent representative.

In 1965, the legislature met in General Session every other year – sessions limited to 180 legislative days, members had no individual professional staff, just one secretary during the session. (There were no caucus staffs telling members "how to vote" and no partisan aisles.) Without personal staff, it was my practice to personally visit Legislative Counsel's office to deliver bill requests and discuss drafting. I have no present recollection of those discussions, but when the draft bill was delivered to me for introduction (across the Assembly desk), it reserved the "absolute right to fish." When I noted this provision (constitutionally required), I believed that the oyster operation was thus included and preserved, especially since I had earlier authored and passed AB 767 as requested by the Department of Fish and Game. AB 767 made many administrative changes regarding planting and propagation, but one major provision was to specify that "shellfish" included "oysters" and to expand "fish" to include all shellfish, not just oysters. To me and to the entire legislature, AB 767 included oyster propagation and stated that allotments must be "in the public interest", a finding to be made only by the Commission. AB 767 was signed by the Governor on July 12, 1965, three days after the signing of AB 1024. Further, and most relevantly in 1965, there existed on-going allotments and a lease or license, all having been granted by the Commission to Charlie Johnson.

All of the above was confirmed by the Department of Fish and Game Director's letter of October 22 – two weeks after these bills became effective. The Department wrote to the Seashore, to me and to Johnson: "[t]hat all State laws and regulations pertaining to shellfish cultivation (including planting requirements, land rentals, etc.) remain in effect since the conveyance by the Legislature reserves fishing rights to the State." This memorandum followed a September 30, 1965 Attorney General's Opinion (46 Cal. Atty.Gen.Ops. 68) addressed to the Director of the Department, advising that "oysters and shellfish are 'fish'", within the meaning of Fish and Game Code Section 45 . . . and "as such are subject to the prerogative of the sovereign [the State] to protect and preserve them in such a manner and upon such terms as the Legislature deems best . . .". Had these authoritative statements not been issued, I certainly would have taken corrective action to prevent possible damage to the oyster operations in my District. All of this was re-confirmed by the National Park Service in a 1974 environmental review of possible "wilderness" status which described the oyster operation: "This the only oyster farm in the Seashore, control of the lease [called a license at times] from the California Department of Fish and Game, with presumed renewal indefinitely, is within the rights reserved by the State on these submerged lands." [1]

Almost 40 years later, from about 2004 forward, other memoranda and opinion pieces began to be issued making claims that the reservation in my AB 1024 only applied to "wild fish" and further that "oysters were not fish." None of those writings, repeated by others within State agencies, makes any reference to any of the above

[1] I did not see this item at the time as there was then no controversy and I was not following this process.

related facts and of the evidence of legislative intent. Interestingly, and in the face of some of those contentions, the Fish and Game Commission continued oyster allotments and issued a new lease/license – in the public interest – in 2004 for a term of 25 years until 2029.

As the relevant National Park Service ostensible deadline year 2012 approaches re the reissuance of its own version of an oyster permit, interest in this matter accelerates. (The "Wilderness Act" is technically not controlling since Senator Dianne Feinstein, by a 2009 amendment, allowed a renewal for 10 to 15 years.) Former Congressman Pete McCloskey (1967-83) became immersed in efforts to determine whether the continuation of the oyster farm in Drake's Estero would endanger the seal population as claimed by the Park Service as the basis for terminating the oyster permit. He had been asked by a neighboring rancher to check into the question. He was acting *pro bono* in this inquiry. It was then I was reminded that it was my AB 1024 that effected the reservation of the "absolute right to fish" which prompted my own *pro bono* research and involvement.

Those who attempt to revise history perhaps did not know of the contemporaneous background facts recited here, and at times have avoided comment on the open public record available. They also avoid any discussion of the State's long-held public policy of fostering oyster culture and retrieval commencing with Fish and Game statutes first enacted in 1851. (See material developed by retired public law attorney Judith Teichman reciting this history and referencing multiple constitutional and statutory materials – also all *pro bono*).

The true meaning of the 1965 reservation of "absolute right to fish" is derived from 1965 legislative action and contemporaneous execution by authorized agencies and not by a much later interpretation by those never involved in and not aware of the 1965 process. What was reserved in 1965 was and is the extant of rights as they existed in 1965 – related in detail above. Subsequent references to "aquaculture" and other such descriptions by some State authorities in the late 2000 decade may be true today but are irrelevant to what was in fact and law reserved in 1965. Most recently one of those State commentators stated in a media interview that, "You have to look at the ink on the page. It is difficult to come to any other conclusion than this Tideland belongs to the United States." This, however, was uttered before any review of this declaration and all of the contemporaneous ink cited above.

As set forth in *Martin v. Szeto*, 32 Cal.4th 445 (2004) – headnote:

> "When statutory text is ambiguous, or it otherwise fails to resolve the question of its intended meaning, the Court looks to the statutes legislative history and the historical circumstances behind its enactment. Finally, the Court may consider the likely effects of a proposed interpretation because, where uncertainty exists, consideration should be given to the consequences that will flow from a particular interpretation." [emphasis added]

That consequence would be the complete obliteration of the rights reserved by the Legislature meant to encompass existing rights then extant and then described when the Legislature acted. I will leave it to others to fully brief this subject if necessary, but here add words to describe California's rules when interpreting legislative tideland grants. These seem to be broader and more result-oriented than those applied to ordinary statutes. *National Audubon Society v. Superior Court,* 33 Cal.3d 419 (1983) at

437-438 quotes favorably from *People v. California Fish Co.*, 166 Cal. 576, a case involving the grant of tidelands, stating:

> "The court first set out principles to govern the interpretation of statutes conveying that property: '[S]tatutes purporting to authorize an abandonment of ... public use will be carefully scanned to ascertain whether or not such was the legislative intention, and that intent must be clearly expressed or necessarily implied. It will not be implied if any other inference is reasonably possible. And if any interpretation of the statute is reasonably possible which would not involve a destruction of the public use or an intention to terminate it in violation of the trust, the courts will give the statute such interpretation.'"

While an absolutist would argue that the Drake's oyster operation's "absolute right" exists independent of any Seashore restraints, I am not such an absolutist. A both legal and practical conclusion would and should be a State accommodation to effect the 2009 Congressional action sponsored by Senator Dianne Feinstein – to allow renewal of National Park Services processes leading at least to a continuation of the contested use pursuant to that enactment. To reconfirm again, all of the above, I enclose and attach this letter of March 14, 1966 from the Department of Fish and Game to the Seashore and the Seashore's reply of March 25 totally agreeing with the Department.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Signed this 2nd day of August, 2011 in San Rafael, California.

William T. Bagley

March 14, 1966

Mr. Leslie P. Arnberger, Superintendent
Point Reyes National Seashore
Point Reyes, California 94956

Dear Mr. Arnberger:

Thank you for your recent letter requesting advice on regulation of the Johnson Oyster Company now within the bounds of Point Reyes National Seashore.

Upon reviewing this matter it becomes apparent that the legislation transferring the submerged lands at Point Reyes to the Federal Government specifically reserved the fishing rights to the State. (AB 1024 (Bagley) Ch. 983, Stats. of 1965).

It thus appears that all State laws and regulations pertaining to shellfish cultivation remain in effect and are applicable to the operations of Johnson Oyster Company. This would include annual rental, privilege taxes, planting requirements, etc. - in short all current sections of the Fish and Game Code, and of Title 14, California Administrative Code, which relate to shellfish cultivation.

We will appreciate your interpretation of this legislation and suggest that, if differences in opinion do exist, you so advise us and that a discussion be arranged between representatives of our agencies.

As you request, we are including copies of the maps and complete descriptions of shellfish allotments numbers 2 and 72 which are now held by the Johnson Oyster Company.

Sincerely,

Director

cc Mr. Johnson
Assemblyman Bagley
Mr. Edgerton
Mr. Savage
Mr. Ralph Scott
Region 3
MMO

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
POINT REYES NATIONAL SEASHORE
Point Reyes, California 94956

NATIONAL PARK SERVICE 1916 1966 50TH ANNIVERSARY

IN REPLY REFER TO:

L1425

March 25, 1966

MAR 29 1966

Mr. Robert L. Jones, Deputy Director
Department of Fish and Game
1416 Ninth Street
Sacramento, California 95814

Dear Mr. Jones:

Thank you for your letter of March 14, in regard to the Johnson Oyster Company. This office is quite agreeable with the interpretation your department has placed upon the legislation transferring the submerged lands at Point Reyes to the Federal Government. I have discussed the matter with Mr. Charles Johnson, and this is in accord with his understanding also. Accordingly the Johnson Oyster Company will continue operation under appropriate sections of California Fish and Game Code as in the past.

Copies of this exchange of correspondence are being provided to our Regional Office for their review. Should their conclusion be different from that stated above, I will notify you promptly.

Your cooperation in this matter is greatly appreciated.

Sincerely,

Leslie P. Arnberger

Leslie P. Arnberger
Superintendent

MAR 29 1966

17

DIANNE FEINSTEIN
CALIFORNIA

SELECT COMMITTEE ON INTELLIGENCE · CHAIRMAN
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United States Senate
WASHINGTON, DC 20510-0504
http://feinstein.senate.gov

September 2, 2011

The Honorable Ken Salazar
Secretary
Department of the Interior
1849 C Street, N.W.
Washington, DC 20240

Dear Secretary Salazar:

I understand that the Park Service is finalizing a Draft Environmental Impact Statement regarding the Special Use Permit for oyster operations at Point Reyes National Seashore. Given the ongoing controversy about the Park Service's use of scientific data at Point Reyes National Seashore, I believe it is very important that all scientific papers in this environmental review are independently evaluated. The Marine Mammal Commission asked statisticians to review a recent paper by Point Reyes scientist Ben Becker. Director Tim Ragen is convening a meeting with Marine Mammal Commission statisticians to review and discuss the findings. I believe that the Commission must have an opportunity to report their findings before the Draft Environmental Impact Statement is released. The Park Service has refused to delay its release in order to incorporate this review. This action shows a continued lack of accountability at the Point Reyes National Seashore.

Several reports have shown that Point Reyes scientists have not been objective in their analysis of harbor seal impacts in Drakes Estero. In 2008, the Inspector General for the Department of the Interior concluded that the Park Service's scientific reports contained several factual inaccuracies on sedimentation and that a leading Park Service scientist had "misrepresented" the research of others. In 2009, the National Academy of Sciences found that the Park Service "selectively presented, over-interpreted, or misrepresented the available scientific information on potential impacts of the oyster mariculture operation." In 2011, a Department of the Interior solicitor found that the scientific "mistakes stem from the refusal, by some NPS employees, to modify their intuitive, but statistically and scientifically unproven, belief that DBOC mariculture activities either disturb

harbor seals in upper Drakes Estero or deter pinnipeds from hauling-out at historically preferred subsites there." Taken together, these reports send a clear message to the Park Service and the Department of the Interior that steps must be taken to address this lack of scientific integrity.

The Draft Environmental Impact Statement must incorporate the findings of a review of the Park Service's scientific work when it is in question especially given their history of misrepresenting science. I fear that unless the Department of the Interior stands behind the independent analysis of this scientific paper, then it will be another example of a lack of credibility at Point Reyes National Seashore. The delay would only be approximately one month, but not incorporating the Marine Mammal Commission's report would threaten the validity of the environmental review.

I hope that you will take steps to address my concerns.

Sincerely,

Dianne Feinstein
United States Senator

DF: gb

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October 20, 2011

The Honorable Kenneth L. Salazar
Secretary of the Interior
1849 C Street NW, Mail Stop 7329
Washington, DC 20240

Dear Mr. Secretary:

It has come to my attention that scientific misconduct by National Park Service (NPS) personnel may be jeopardizing the right of a small business to operate in Marin County, California. Since 2007, the NPS has been advocating that the Drakes Bay Oyster Company (DBOC) cease operations at Point Reyes National Seashore because – according to NPS – the oyster farm is harming the local harbor seal population. Allegations that NPS knowingly relied on flawed science to support that conclusion as part of an effort to remove DBOC have come from a wide range of stakeholders and disinterested parties.[1] If true, the NPS, a bureau of the Department of the Interior (DOI), will have closed the doors of a family-owned small business without a valid scientific basis.

The Lunny family bought the oyster farm in 2005, subject to a reservation of use clause set to expire in 2012.[2] Their reservation of use – the provisions which have allowed the family to remain on the land after the previous owner sold it to NPS in 1972 – can be extended at your discretion.[3] With that in mind, it is imperative that the information you receive from the NPS to make that decision is reliable and unbiased. I am concerned it is not.

Shortly after the Lunny family purchased the oyster farm, NPS scientists claimed DBOC mariculture activities were significantly harming the harbor seal population in Drakes Estero, a

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[1] *See, e.g.*, Felicity Barringer, *A Park, an Oyster Farm and Science*, N.Y. TIMES, Mar. 24, 2011, http://green.blogs.nytimes.com/2011/03/24/a-park-an-oyster-farm-and-science/#more-96457.

[2] *Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California* Committee on Best Practices for Shellfish Mariculture and the Effects of Commercial Activities in Drakes Estero, Pt. Reyes National Seashore, California; Ocean Studies Board, Division of Earth and Life Studies, Nat'l Research Council of the Nat'l Academies, May 5, 2009, at 3, *available at* http://www.nap.edu/catalog.php?record_id=12667 [hereinafter NAS Committee Report].

[3] NPS, Draft Environmental Impact Statement for the Drakes Bay Oyster Company Special Use Permit, Point Reyes National Seashore, Calif. (Sept. 2011).

Marin County estuary.[4] The Marin County Board of Supervisors held a hearing on May 5, 2007 to examine DBOC's impact on the local harbor seals. According to witnesses present at the hearing that have spoken with my staff, NPS representatives misrepresented scientific data and made unsupported allegations against DBOC to justify the removal of the farm.

A subsequent examination by the National Academy of Science's (NAS) National Research Council found that NPS "selectively present[ed] harbor seal survey data in Drakes Estero and over-interpret[ed] the disturbance data which are incomplete and non-representative of the full spectrum of disturbance activities in the estero."[5] NAS also suggested a detailed camera record would help resolve the controversy.[6] Unbeknownst to the NAS panel, the NPS had maintained a secret camera system in Drakes Estero since 2007.[7] This camera system took minute-by-minute pictures during the pupping season in an attempt to capture photographs of DBOC workers disturbing the harbor seals.[8] NPS failed to disclose these photos and logs for three years, even in response to FOIA requests.[9] NPS's failure to disclose, or even acknowledge, the existence of potentially exculpatory data captured by the cameras creates the appearance of a cover-up.

In fact, the NPS Solicitor's Office addressed the data collected by the hidden camera in a March 2011 report (the "Frost Report") intended to examine allegations of scientific misconduct reported to the DOI Office of Inspector General.[10] According to the Frost Report, the photos show no evidence that DBOC harmed the harbor seals.[11] Additionally, the report found that, "Even without the photos and accompanying logs, the research record accurately represents their content (i.e., no DBOC-caused disturbances) for most of 2007 and 2008, and for all of 2009 and 2010."[12]

Despite finding apparently exculpatory evidence with respect to DBOC's alleged harm upon the harbor seal population, NPS continues to advocate for the removal of the oyster farm. NPS maintains this position despite the fact that an internal investigation found several individuals within NPS violated the NPS code of scientific conduct.[13]

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[4] NAS Committee Report at 3; Marin County Board of Supervisors Hearing, May 8, 2007, video available at http://www.co.marin.ca.us/depts/BS/Archive/Meetings.cfm (last accessed Sept. 13, 2011).
[5] NAS Committee Report at 3.
[6] *Id.* at 46-47.
[7] *See* Memo from Gavin M. Frost, Attorney-Advisor, to Will Shafroth, Acting Assistant Secretary for Fish and Wildlife and Parks at 4 (Mar. 22, 2011) [hereinafter Frost Report].
[8] Frost Report at 18. "VI's mission was to identify digital photos showing DBOC boats present in Drakes Estero on Sundays in 2008;" *Id.* at 21. Volunteers "strict[ly] confined attention to DBOC mariculture activities, disturbances, and potential disturbances of harbor seals in upper Drakes Estero."
[9] *Id.* at 22-23, 30. NPS did mention the cameras in a May 1, 2009 briefing paper (NAS Briefing Paper at 1, 2, Appendix A.) The paper was finalized the day before NAS's May 2009 report was publicly distributed (Frost Report at 18-19). However, the NPS staff failed to deliver the briefing paper to any NAS committee members, and as a result, the data referred to in the paper remained unavailable to the public.
[10] *See id.*
[11] *See id.* at 22-23, 28.
[12] *Id.* at 28.
[13] *See id.* at 35.

In this matter, the alleged misconduct is serious, and it could result in the loss of the Lunny family's business, which employs a number of local residents. Time is of the essence, as the family's reservation of use expires next year. In light of a damaging draft Environmental Impact Statement (EIS) released by NPS on September 23, 2011,[14] it is imperative that a thorough, objective review of whether NPS's conclusions are based on flawed science occur immediately.

To assist the Committee's investigation of this matter, please provide the following documents and information as soon as possible, but by no later than November 4, 2011 at noon:

1. All correspondence to or from Gavin Frost regarding the Frost Report.

2. All interview notes or transcripts compiled by Gavin Frost during the course of his investigation.

3. All draft versions of the Frost Report.

4. All photographs and corresponding analyses, in any form, captured by the NPS cameras hidden at Drakes Estero from January 1, 2007 – December 31, 2010.

5. All draft versions of the Environmental Impact Statement released on September 23, 2011.

6. All communications, including email and memoranda, to or from DOI employees regarding or relating to the Drakes Bay Oyster Company.

Additionally, please make the following DOI employees available for transcribed interviews beginning the week of November 7, 2011:

1. Gavin Frost, Solicitor's Office

2. Jonathon Jarvis, NPS Director

3. Don Neubacher, Former Superintendent, Point Reyes National Seashore

4. Dr. Marcia McNutt, Science Advisor to the Office of the Secretary

5. Dr. Sarah Allen, NPS Scientist

6. Dr. Ben Becker, NPS Scientist

7. Cicely Muldoon, Superintendent, Point Reyes National Seashore

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[14] *See supra* note 2.

The Committee on Oversight and Government Reform is the principal oversight committee of the House of Representatives and may at "any time" investigate "any matter" as set forth in House Rule X.

When producing documents to the Committee, please deliver production sets to the Majority Staff in Room 2157 of the Rayburn House Office Building and the Minority Staff in Room 2471 of the Rayburn House Office Building. The Committee prefers, if possible, to receive all documents in electronic format. An attachment to this letter provides additional information about responding to the Committee's request.

If you have any questions about these requests, please contact Jean Humbrecht or Jonathan Skladany of the Committee staff at (202) 225-5074. Thank you for your attention to this important matter.

Sincerely,

Darrell Issa
Chairman

Attachment

cc: The Honorable Elijah E. Cummings, Ranking Minority Member

DARRELL E. ISSA, CALIFORNIA
CHAIRMAN

ELIJAH E. CUMMINGS, MARYLAND
RANKING MINORITY MEMBER

ONE HUNDRED TWELFTH CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

2157 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–6143

Majority (202) 225–5074
Minority (202) 225–5051

Responding to Committee Document Requests

1. In complying with this request, you should produce all responsive documents that are in your possession, custody, or control, whether held by you or your past or present agents, employees, and representatives acting on your behalf. You should also produce documents that you have a legal right to obtain, that you have a right to copy or to which you have access, as well as documents that you have placed in the temporary possession, custody, or control of any third party. Requested records, documents, data or information should not be destroyed, modified, removed, transferred or otherwise made inaccessible to the Committee.

2. In the event that any entity, organization or individual denoted in this request has been, or is also known by any other name than that herein denoted, the request shall be read also to include that alternative identification.

3. The Committee's preference is to receive documents in electronic form (i.e., CD, memory stick, or thumb drive) in lieu of paper productions.

4. Documents produced in electronic format should also be organized, identified, and indexed electronically.

5. Electronic document productions should be prepared according to the following standards:

   (a) The production should consist of single page Tagged Image File ("TIF"), files accompanied by a Concordance-format load file, an Opticon reference file, and a file defining the fields and character lengths of the load file.

   (b) Document numbers in the load file should match document Bates numbers and TIF file names.

   (c) If the production is completed through a series of multiple partial productions, field names and file order in all load files should match.

6. Documents produced to the Committee should include an index describing the contents of the production. To the extent more than one CD, hard drive, memory stick, thumb drive, box or folder is produced, each CD, hard drive, memory stick, thumb drive, box or folder should contain an index describing its contents.

7. Documents produced in response to this request shall be produced together with copies of file labels, dividers or identifying markers with which they were associated when they were requested.

8. When you produce documents, you should identify the paragraph in the Committee's request to which the documents respond.

9. It shall not be a basis for refusal to produce documents that any other person or entity also possesses non-identical or identical copies of the same documents.

10. If any of the requested information is only reasonably available in machine-readable form (such as on a computer server, hard drive, or computer backup tape), you should consult with the Committee staff to determine the appropriate format in which to produce the information.

11. If compliance with the request cannot be made in full, compliance shall be made to the extent possible and shall include an explanation of why full compliance is not possible.

12. In the event that a document is withheld on the basis of privilege, provide a privilege log containing the following information concerning any such document: (a) the privilege asserted; (b) the type of document; (c) the general subject matter; (d) the date, author and addressee; and (e) the relationship of the author and addressee to each other.

13. If any document responsive to this request was, but no longer is, in your possession, custody, or control, identify the document (stating its date, author, subject and recipients) and explain the circumstances under which the document ceased to be in your possession, custody, or control.

14. If a date or other descriptive detail set forth in this request referring to a document is inaccurate, but the actual date or other descriptive detail is known to you or is otherwise apparent from the context of the request, you should produce all documents which would be responsive as if the date or other descriptive detail were correct.

15. The time period covered by this request is included in the attached request. To the extent a time period is not specified, produce relevant documents from January 1, 2009 to the present.

16. This request is continuing in nature and applies to any newly-discovered information. Any record, document, compilation of data or information, not produced because it has not been located or discovered by the return date, shall be produced immediately upon subsequent location or discovery.

17. All documents shall be Bates-stamped sequentially and produced sequentially.

18. Two sets of documents shall be delivered, one set to the Majority Staff and one set to the Minority Staff. When documents are produced to the Committee, production sets shall be delivered to the Majority Staff in Room 2157of the Rayburn House Office Building and the Minority Staff in Room 2471of the Rayburn House Office Building.

19. Upon completion of the document production, you should submit a written certification, signed by you or your counsel, stating that: (1) a diligent search has been completed of all documents in your possession, custody, or control which reasonably could contain responsive documents; and (2) all documents located during the search that are responsive have been produced to the Committee.

Definitions

1. The term "document" means any written, recorded, or graphic matter of any nature whatsoever, regardless of how recorded, and whether original or copy, including, but not limited to, the following: memoranda, reports, expense reports, books, manuals, instructions, financial reports, working papers, records, notes, letters, notices, confirmations, telegrams, receipts, appraisals, pamphlets, magazines, newspapers, prospectuses, inter-office and intra-office communications, electronic mail (e-mail), contracts, cables, notations of any type of conversation, telephone call, meeting or other communication, bulletins, printed matter, computer printouts, teletypes, invoices, transcripts, diaries, analyses, returns, summaries, minutes, bills, accounts, estimates, projections, comparisons, messages, correspondence, press releases, circulars, financial statements, reviews, opinions, offers, studies and investigations, questionnaires and surveys, and work sheets (and all drafts, preliminary versions, alterations, modifications, revisions, changes, and amendments of any of the foregoing, as well as any attachments or appendices thereto), and graphic or oral records or representations of any kind (including without limitation, photographs, charts, graphs, microfiche, microfilm, videotape, recordings and motion pictures), and electronic, mechanical, and electric records or representations of any kind (including, without limitation, tapes, cassettes, disks, and recordings) and other written, printed, typed, or other graphic or recorded matter of any kind or nature, however produced or reproduced, and whether preserved in writing, film, tape, disk, videotape or otherwise. A document bearing any notation not a part of the original text is to be considered a separate document. A draft or non-identical copy is a separate document within the meaning of this term.

2. The term "communication" means each manner or means of disclosure or exchange of information, regardless of means utilized, whether oral, electronic, by document or otherwise, and whether in a meeting, by telephone, facsimile, email, regular mail, telexes, releases, or otherwise.

3. The terms "and" and "or" shall be construed broadly and either conjunctively or disjunctively to bring within the scope of this request any information which might

otherwise be construed to be outside its scope. The singular includes plural number, and vice versa. The masculine includes the feminine and neuter genders.

4. The terms "person" or "persons" mean natural persons, firms, partnerships, associations, corporations, subsidiaries, divisions, departments, joint ventures, proprietorships, syndicates, or other legal, business or government entities, and all subsidiaries, affiliates, divisions, departments, branches, or other units thereof.

5. The term "identify," when used in a question about individuals, means to provide the following information: (a) the individual's complete name and title; and (b) the individual's business address and phone number.

6. The term "referring or relating," with respect to any given subject, means anything that constitutes, contains, embodies, reflects, identifies, states, refers to, deals with or is pertinent to that subject in any manner whatsoever.

DRAKES BAY OYSTER COMPANY'S
COMMENTS & SUGGESTED REVISIONS

No.	Section / Appendix	Page	PROPOSED Draft EIS Text Revision	Justification
1.	Executive Summary	iii	**PURPOSE AND NEED** Action is needed at this time because pursuant to section 124 of Public Law 111-88 and the renewal clause included in the current DBOC RUO, the Secretary has the discretionary authority to issue a SUP for a period of 10 years to DBOC for its shellfish operation, ~~which consists of commercial production, harvesting, processing, and sale of shellfish~~ for the purpose of processing and selling wholesale and retail oysters, seafood and complimentary food items, the interpretation of oyster cultivation to the visiting public, and residential purposes reasonably incidental thereto, at Point Reyes National Seashore. The existing Reservation of Use and Occupancy (RUO) and SUP held by DBOC will expire on November 30, 2012. DBOC has submitted a request for the issuance of a new permit upon expiration of the existing authorizations.	The reservation of Use and Occupancy is one of the current authorities that should be correctly referred to. The DOI had the authority to extend the current use by way of the renewal clause. NPS should not omit the fact that DBOC is permitted to, and spends significant time and money on interpretation to the visiting public. NPS selected only the "commercial" aspects of DBOC to present to the public.
2.	Executive Summary	iv	The commercial shellfish operation in Drakes Estero, now operated by DBOC, is the only nonconforming use that prevents conversion of the waters of Drakes Estero from congressionally designated potential wilderness to congressionally designated wilderness. It was also determined that California's reserved rights also may also preclude full wilderness	

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			status.	
3.	ES	v	In December 2004, DBOC purchased the assets of JOC, assuming the remaining 7 years of the RUO and SUP that NPS had issued to JOC for the well and septic leach field. There were no changes to the terms of the RUO or to its expiration date. In April 2008, DBOC and NPS signed an SUP (NPS Permit No. MISC-8530-6000-8002) that would allow the oyster operation in Drakes Estero to remain, with provisions, until November 30, 2012, when it would expire concurrently with the RUO. The RUO is explicitly renewable by SUP and the 2008 SUP does not preclude renewal. DBOC also purchased the CDFG shellfish leases from JOC. The state leases expire in 2029.	It is misleading to omit the fact that the RUO is renewable by SUP. It is also misleading to omit the fact that DBOC purchased the state shellfish leases.
4.	ES	x	DBOC currently grows ~~two~~ three species of shellfish: Pacific oyster, purple hinged rock scallops and manila clam	DBOC is not currently selling scallops. Scallops have been raised and sold by JOC. DBOC is currently raising rock scallops for future use. See Sea Grant scallop grant application & communications. See native species request to FGC.
5.	ES	x	Currently, ~~six~~ five of these racks appear to fall outside the permit boundaries. DBOC has asked CDFG to correct this lease line error. This issue is not yet resolved.	This is misleading without proper explanation. See DBOC request to FGC for the correction.
6.	ES	x	DBOC onshore facilities support the processing, sale, and initial stages of shellfish culture as well as interpretive services (see figure ES-3). For the most part, these facilities are located within the 1.5 acres of the original RUO, the additional 1.1 acres established with the issuance of the 2008 SUP, and 2.0 acres encompassing the well	Interpretation to the visiting public is an important permitted use that should not be omitted.

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			and septic areas (shown on figure ES-4). DBOC packages its shellfish on site and operates the only on-site shellfish cannery in California. DBOC facilities currently outside the authorized area include unused setting tanks and some of the oyster shell storage mounds. See chapter 2 of the EIS for additional detail related to DBOC's onshore facilities. Interpretive services provided by DBOC occur throughout the onshore facilities.	
7.	ES	xiii	Visitor Experience and Recreation	Omits interpretive services provided by DBOC
8.	ES	xiii	Lightscapes In accordance with NPS *Management Policies 2006*, NPS strives to preserve natural ambient landscapes and other values that exist in the absence of human-caused light (NPS 2006d). There are two pole-mounted overhead lights within the project area to provide safety lighting after dark. Low levels of light also emanate from the DBOC residences. DBOC does not perform commercial shellfish operations after dark. In addition, visitor use of the area after dark is minimal. These low levels of light do not have a noticeable impact on natural resources or visitor enjoyment. Given the proximity of the project area to the San Francisco metropolitan area, the lightscape within the Seashore has already been degraded by the light pollution surrounding San Francisco. Furthermore, the buildings at DBOC are not the only source of light surrounding Drakes Estero. There are also several ranches and homes overlooking Drakes Estero which provide light. The impact topic of lightscapes is dismissed from further analysis in the EIS.	As written, the public may not be made aware that DBOC is only one source of light.
9.	ES	xv	Climate Change	See MBE state of the oceans report.

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			and Greenhouse Gas Emissions (Carbon Footprint)	Even though there is some local shellfish production, the SF Bay Area imports most of its shellfish via airplane. (we need to bind a source for this claim) Even if other local producer increased production (very speculative), they could not come close to meeting all of the SF Bay Area demand. It is not speculative to assume that all of the shellfish production lost from Drakes Estero resulting from the DOI discretionary decision will be replaced by flown-in shellfish – even if demand changes. I will also look for a source that predicts that shellfish demand in the Bay area is increasing.
10.	ES	xvi	Cultural Resources	Wrongly dismissed, see ENVIRON International Corporation report.
11.	ES	xvii	*Cultural Landscapes*	Wrongly dismissed, see ENVIRON International Corporation report.
12.	ES	xix	□ Subsequent to expiration of the SUP, the congressionally designated potential wilderness would be converted to congressionally designated wilderness, although the year in which this takes place ~~would vary between the no-action (2012) and action alternatives (2022)~~ is undetermined.	The language used in this document must allow for the possibility of a renewable SUP.
13.	ES	xx	□ By the date on which NPS's authorization(s) to DBOC expire ~~(either 2012 or 2022)~~, DBOC would remain responsible for the removal of certain buildings and structures and all personal property (including any improvements made to the area since 1972). ~~The year in which these removal and restoration activities would take place would vary between the no-action (2012) and action alternatives (2022).~~	
14.	ES	xx	□ DBOC would be responsible for removing all shellfish and shellfish infrastructure including	Shellfish infrastructure should be treated the same as all other improvements. All racks were built prior to 1972, therefore, DBOC will not be responsible for

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			racks from within Drakes Estero, constructed since 1972, as part of the closeout of the permit. There are a number of approaches to remove the racks, ranging from import of a small barge with hydraulic lift to pull the posts to deconstruction using existing barge and boats. While most of the removal activities would be manual, mechanized boats would be required for the duration of the removal activities. It is estimated that approximately 4,700 posts (2-inch by 6-inch boards) and more than 179,000 linear feet of pressure-treated lumber will be removed. It is likely that the removal may take one to two months. The timing of the rack removal would occur outside of the harbor seal closure period (March 1-June 30).	their removal. The racks have only been maintained since 1972. Just as the buildings listed in the above bullet point, the racks (permanent structures) were part of the property transferred to the NPS by the State in 1972.
15.	ES	xx	□ DBOC would be required to remove certain buildings and structures constructed since 1972, and all of its personal property and undertake steps to restore the area to good order and condition.	Must be consistent; see Comment #14.
16.	ES	xx	All closeout procedures, including removal of structures, personal property, items related to shellfish cultivation and processing constructed since 1972, ~~including all racks and bag arrays distributed within Drakes Estero~~, would be completed consistent with the terms of the existing RUO and SUP.	Must be consistent; see Comment #14.
17.	ES	xxiii	□ A new SUP authorized under section 124 of PL 111-88 would be issued to DBOC for a period of 10 years. Because these alternatives include the authorization for DBOC to continue operating for	"Existing authorizations" include a renewal clause. New SUP should allow for renewal.

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			10 years, the NPS would delay conversion of congressionally designated potential wilderness to congressionally designated wilderness ~~for 10 years~~ until DBOC ceases operations. ~~The new SUP would expire on November 30, 2022. No extensions or renewals would be issued because section 124 only authorizes one 10-year permit.~~	
18.	ES	xxiii	□ DBOC would continue to process, ~~and~~ pack shellfish and provide interpretive services in the onshore permit area. However, the scale of DBOC onshore operations would vary by alternative, and the configuration and condition of other onshore facilities would vary by alternative.	Must be consistent with existing authorities.
19.	ES	xxiii	□ DBOC would be required to pay the U. S. fair market value for the use of federal property, ~~which includes onshore and offshore areas~~ within the permit boundaries, as mandated by section 124. If the state water bottom lease continued after November 30, 2012, DBOC would be required to make lease payments to the state in addition to making fair market value payments to the United States. Fair market value for the NPS SUP will be based on the appraisal provided to NPS for this purpose by Yovino-Young Appraisers.	Offshore area fees are paid to the state of California. Section 124 does not specifically include the offshore portion of the DBOC operations. See appraisal by Michael Yovino-Young, as commissioned by the NPS.
20.	ES	xxiii	□ DBOC would be required to ~~surrender~~ operate under the terms of its state water bottom leases which expire in 2029. ~~effective~~	Agencies must avoid conflicting regulations and overlapping authorities.

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			~~November 30, 2012.~~ DBOC would ~~thereafter~~ also operate under the terms of the NPS permit for use of the on-shore facilities. ~~NPS would include certain provisions of the state water bottom lease directly into the new SUP, such as that relating to the escrow account for cleanup of aquaculture leases.~~ California Department of Fish and Game (CDFG) would retain authority under Fish and Game Code to regulate the importation and cultivation of aquatic organisms ~~into the state~~ by DBOC.	
21.	ES	xxiii	□ NPS would exercise oversight of DBOC operations in accordance with the terms of the new permit. NPS would oversee compliance with terms of the SUP and adherence to terms and conditions of the permit ~~including production levels, monitoring of boat operations, adherence to permit boundaries, etc~~.	See Comment #20.
22.	ES	xxiii	~~□ The new permit would require DBOC to remove certain buildings and facilities, any structures or improvements added to the property since 1972, and all its personal property (including shellfish and shellfish rack infrastructure) from the onshore and offshore operating areas. This includes the temporary office trailer, punching shed, temporary cannery, temporary storage, setting tanks, main dock, work platform, sediment basin, mobile homes, picnic area, shell storage, and all other~~	This requirement in not consistent with all action items.

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			~~equipment.~~	
23.	ES	xxiii	□ Any new structures developed under the authority of the new permit would be considered personal property and would be removed prior to the expiration of the permit.	In our experience with other NPS SUPs, new structures become the property of NPS. Please explain the basis for this determination.
24.	ES	xxiv	~~NPS would adjust the bounds of the permit area to better address areas within Drakes Estero required for shellfish operations. Boundary adjustments would be made to encompass reasonable boat travel routes between culture beds and include the six racks currently located outside the permit boundaries. Boat operations would not be allowed outside of permit boundaries. DBOC would develop a vessel transit plan for implementation pending NPS review, which may include mooring areas and access lanes.~~	Offshore lease is with FGC and regulated by CDFG. NPS can collaborate and negotiate with CDFG for any desired changes. No significant adverse affects have been shown in the DEIS, therefore, there is no basis for mitigation measures (restricted boat use).
25.	ES	xxiv	□ Permit boundary adjustments ~~also~~ would ~~exclude the harbor seal protection zones and~~ a known archeological site from the new permit boundary. Specific adjustments are described in more detail in chapter 2 of the EIS.	1. harbor seal protection area was created by CCC based only on the April 26, 2007 sarah allen trip report. CCC had no other harbor seal data. Nps adopted the ccc seal protection zone. Nps assured DBOC that the seal protection zone was temporary – until studied and supported by best available science. 2. seal protection zone was to be temporary – in place until a full coastal development permit is issued – when mitigation will be based on best available science. 3. No data or evidence has been provided in the EIS to support the need for the CCC temporary restriction. 4. Other agencies with regulatory authority over DBOC and the Marine Mammal Act

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				must agree that there is a significant adverse impact to harbor seals that needs mitigation.
26.	Figure ES-2	vii	Harbor seal protection area: This area was created as a temporary measure by CCC. CCC had only the April 26, 2007 trip report prepared by Sarah Allen. CCC has admitted that they had no other data – not even the NPS harbor seal database. It was meant to stand until studied. Final seal protection measures were to be included in the final CDP based on best available science. NPS picked up these "harbor seal protection areas" and assured us that these are temporary as well. Jon Jarvis personally reassured us (I don't think we have this in writing) that final seal protocols may be changed once the actual impacts are determined. He also stated that the rules will be based on best available science. The problem: it now appears that NPS intends to keep this restriction in place. It sends a message to the reader that the oyster farm operations have caused problems with the seals. Based on best available science, it appears that the 1992 seal protection protocols are working and should be the controlling protocols. The "harbor seal protection areas" should be removed, the 1992 inter-agency seal protection protocols should be adhered to and, as recommended by the Marine Mammal Commission, an adaptive management team, including NPS, NOAA, CDFG and DBOC should be created to further study harbor seals in Drakes Estero and, when appropriate, recommend changes to the seals protection protocols.	The NPS now has data that prove the oyster farm operations are not disturbing seals. There is no evidence included in the EIS that DBOC has, or is causing harm to seals – only "potential". Best available science does not identify a need for such restrictive mitigation measures. The 1992 seal protection protocols were created by a multi agency agreement – NPS, NOAA, CDFG, CDPH and JOC. In 2007, with no data or evidence of any harm to seals, CCC unilaterally overturned the multi agency agreement. NPS later adopted the unsubstantiated restrictions. Neither CCC nor NPS ever consulted with NOAA or CDFG – the two agencies with far more experience with harbor seals nationally, statewide and specifically in Drakes Estero. The CCC / NPS harbor seal protection area applies only to oyster operations. NPS harbor seal inventory and monitoring database identifies PRNS visitors, hikers, clammers, kayakers and other disturbances account for 99% of the seals disturbances in Drakes Estero. Oyster operations account for less than 1% (per NPS data). Additionally, 281,000 minute by minute photos taken by secret NPS surveillance cameras showed no DBOC caused seal disturbances and captured many kayak caused disturbances. DBOC, with boat operators trained in harbor seal protection, should be selectively restricted. It should be noted that while they are focused on restricting DBOC use, NPS has not made any effort to restrict any other (the main sources) source of seal disturbance (other than kayak closures during pupping season – which NPS does not enforce – as evidenced by the multiple kayak caused disturbances

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				identified during pupping season by the NPS secret surveillance camera photos.)
27.	ES	xxiv	□ DBOC operations would be subject to the harbor seal protection protocols, which ~~is part of the~~ were developed by a multi agency agreement, including NPS, NOAA, CDFG and CDPH in 1992. ~~current SUP~~ . This protocol prohibits boat travel and general operations, including placement of bags, moorings, and installation of floating racks, within 100 yards of hauled out harbor seals and prohibits the use of the lateral channel during harbor seal pupping season. ~~the established harbor seal protection areas (see figure ES-2)~~.	See Comment #26 above.
28.	ES	xxiv	□ NPS and CDPH would work to identify ~~an~~ appropriate ~~site or~~ sample timing (high tide) for paralytic shellfish poison (PSP) sampling that meets health and safety requirements, while reducing potential impacts on harbor seals. Additionally, NPS and CDPH would evaluate alternatives to the existing water sampling sites within ~~the seal protection area~~ Drakes Estero that could reduce the potential for disturbance related to required water quality sample collection.	There are no data, records or even any allegations that water sampling operations have caused any harbor seal disturbances. DBOC understands that the CDPH will not allow moving the PSP monitoring station without keeping the existing station for a number of years and running parallel sample before a move. Personal Communication Gregg Langlois, CDPH. CDPH opposes moving the PSP station because it would cost the state of California significant money and tie up laboratory resources. *Id.* This would also cost DBOC significant time and money. The DEIS must consider these factors when evaluating the feasibility of cutting off boat access to the existing PSP sampling station.
29.	ES	xxiv	□ DBOC would cultivate a maximum approximately ~~138~~ 147 acres of Drakes Estero using a combination of hanging, floating and bottom culture. Within the 138 acres of culture beds, DBOC would conduct hanging culture using the 95 existing racks in Drakes Estero. ~~and would conduct bag culture in up to 84 acres~~	The CCC in 2007 required DBOC not to expand beyond "current production" in its Consent CDO. CCC relied on the CDPH GPS data (see map) to arrive at current production footprint. The GPS data was taken around active shellfish beds – areas fallow at that point in time were not included in the map. The map identified 147 acres out of the 1060 acre lease were in active cultivation. DBOC has kept within the 147 acre limit. The important point here is

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			~~of~~ ~~Drakes Estero (although some of this 84 acres may be left fallow between uses).~~	that at another time, different areas may be in use and the areas within the map's 147 acres may be fallowed. Keeping to a 147 acre maximum active shellfish coverage constitutes "current levels of production" described by the NAS panel in their report. There have been no impacts identified that should require any reduction in "current use". We agree with the limitation to use only the 95 existing racks.
30.	ES	xxiv	□ Changes to the CDFG lease ~~permit~~ boundary would incorporate the ~~six~~ five racks currently outside the permit area. Any proposal for new racks would require additional review and compliance under the SUP. It is estimated that repair and replacement would occur on 5 percent of the rack structures per year.	See lease boundary correction request.
31.	ES	xxiv	□ As with the existing permit and RUO, the new permit would require DBOC to remove all its personal property at the end of the permit term, including ~~racks,~~ culture bags, and other commercial shellfish operations equipment from Drakes Estero. Shellfish owned by DBOC and remaining at the end of the new SUP term also would need to be removed.	The oyster racks are permanent structures that existed before 1965 when the submerged lands were transferred to NPS and before1972 when the onshore portion of land owned by JOC was purchased by NPS. These should be treated the same as other structures that existed previous to NPS involvement. See figure ES-3: note that all of the structures that were present when NPS took ownership still appear in the map as "owned by NPS". The SUP as well as this DEIS require DBOC to remove personal property – not the property of NPS. Similarly, NPS should not require DBOC to remove the racks. If the state still possesses the right to regulate shellfish aquaculture, the CDFG / DBOC lease includes a bond for cleanup of the estuary, if necessary. This agreement and guarantee is with CDFG, not NPS.
32.	ES	xxiv	□ DBOC would replace the existing dock, work platform, and associated structures subject to NPS	NPS missed these components of the storm damage repair request.

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			final review and approval due to the damage from the March 2011 storm. Rather than replacing these items in kind, DBOC has proposed to construct or install the following: □ A new wooden floating dock (12 feet by 32 feet) □ A new concrete work platform (approximately 55 feet by 24 feet) □ New wooden ramps to connect the dock and work platform □ A new conveyor □ A washing system A concrete sediment basin Repairs to stringing shed	
33.	ES	xxv	□ With the exception of slight reductions to Bed 17 (which currently extends into an area near a seal haul out area. ~~into the seal protection area~~), consistent with DBOC's requests, all existing shellfish growing areas would be included in the SUP area and would remain.	DBOC currently does not use the east end of bed 17 because of its proximity to the UEN haul out site. DBOC accepts the removal of the portion bed 17 that is within 200 yards of the haul out site – two times the minimum 100 yard distance as required by the 1992 harbor seal protection protocols, the current NPS SUP, NOAA and the Marine Mammal Protection Act.
34.	ES	xxv	□ Mariculture activities, including boat operations, would only take place within the established SUP area.	The NPS SUP should be limited to the onshore facilities.
35.	ES	xxv	□ Shellfish production would not exceed ~~600,000~~ 850,000 pounds annually (inclusive of all harvested species). This ~~level of~~ production limit is consistent with current production levels ~~the 2010 DBOC harvest~~.	The selection of maximum shellfish production seems to be arbitrary. Limiting shellfish production is a mitigation measure – for what impact? The NAS found that there were no major impacts at current production levels. Current level of production is defined in the current SUP "as determined under the California Coastal Commission consent order No. CCC-07-CD-04". DBOC provided detailed information regarding current production at that time.

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				See CCC 3.2.10 submittal (also submitted to NPS) DBOC prepared, and CDFG reviewed, a current production report based on current planting levels. Shellfish survivorship is influenced by many environmental conditions. It is impossible to predict exactly how many, or how many pounds will be harvested from a particular planting. A good year will produce much more than a poor year. This is farming and we have had several poor years in a row. Other Pacific Coast shellfish farms have been having similar difficulties due to poor larval performance. Based on the current farming practices and planting levels, it was determined that current production could be as high as 850,000 pounds of shellfish. Setting maximum level of production below 850,000 pounds would either put us out of compliance if we have a good year, or force us to reduce our planting levels, thereby reducing our financial sustainability. This is a serious mitigation proposed in alternative B and C. This mitigation is not required if the NPS is to consider the NAS report. The NPS has not shown evidence or data to justify the production restriction.
36.	ES	xxv	□ Pacific oysters, European flat oysters, purple hinged rock scallops and Manila clams could be cultivated on documented shellfish growing areas within ~~the main permit area, Area 1 (currently known as~~ CDFG Lease M-438-01). ~~Purple-hinged rock scallops could only be grown in the existing 1-acre plot, Permit Area 2 (currently known as Lease M-438-02).~~	DBOC has requested an amendment to the F&G lease M-438-01, to replace a portion of the existing Pacific oyster production with native Olympia oysters and native purple hinged rock scallops. First, this should be a decision made by CDFG and the F&GC. CDFG has approved the request and is recommending F&GC approval. NPS has not identified adverse impacts of the substitution of native shellfish species for the non natives. This mitigation measure appears to have no justification for inclusion in this alternative? This restriction will also cause financial harm to DBOC as other growers throughout the state are able to diversify and DBOC will not be able to compete effectively with only non native species.

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37.	ES	xxv	▪ DBOC would be required to pay the United States fair market value for the use of federal property, which includes onshore ~~and offshore~~ areas within the permit boundaries, as mandated by section 124. Fair market value will be derived from the appraisal recently prepared for NPS by Michael Yovino-Young Appraisers	Offshore lease fees will be paid to the state of California.
38.	ES	xxv	□ ~~By November 30, 2022~~, Upon expiration of this SUP, DBOC would be required to remove certain buildings and structures constructed after 1972 and all of its personal property and to undertake steps to restore the area to good order and condition.	Nothing in Section 124 precludes extension of the SUP beyond 11/30/22. Structures present in 1972 are NPS property and are the responsibility of NPS.
39.	Figure ES-7	xxvi	NPS has redrawn the shellfish lease boundaries.	CDFG & FGC must approve state shellfish lease boundary changes. This NPS lease boundary map ignores the DBOC boundary correction request made to CDFG and FGC. See DBOC request for lease amendment.
40.	Figure ES-7	xxvi	NPS has drawn boundaries that functionally eliminates access to some of DBOC's most important shellfish beds. NPS is trying to restrict boat traffic to the shellfish lease area (see item 24 above). This unprecedented mitigation measure would cripple DBOC and would function as a "gotcha" for NPS to take enforcement action against DBOC if it crosses one of these invisible lines out in the middle of the bay. The boat routes that have been arbitrarily eliminated include access to the required marine biotoxin sentinel station in the main channel. DBOC would not be allowed to harvest and sell shellfish without weekly sampling from this station. NPS is fully aware of the location of this sampling station and the state and federal requirements to access it weekly. This restriction would put DBOC out of business.	No adverse affects have been identified to justify this highly restrictive mitigation. DBOC boats should be able to access Drakes Estero (up to the wilderness line), while following the seal protection protocols, as it has for decades. This restriction is beyond reasonable and appears to be without justification. NPS should not unilaterally prohibit access to the FDA and CDPH required site. This is a mitigation measure instituted by NPS. What known facts, data or evidence does NPS have to justify this restriction? It appears that nothing is included in the DEIS to support this restrictive mitigation.
41.	Figure ES-8	xxvii	NPS has never told DBOC that the shell pile or the	If NPS is publicly demonstrating that DBOC is out of

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			unused tanks are off the SUP area. DBOC will remove the tanks and the portion of the shell pile that are off the SUP, but the map implies that DBOC has somehow violated an agreement to stay within a certain boundary. NPS has never told DBOC where the boundary line is.	compliance with its use of the SUP boundary, NPS should, at least, identify to DBOC where those boundary lines are.
			JOC and DBOC have always had picnic tables available for visitor use. The NPS has never before suggested that there is a problem with providing picnic tables. As a matter of fact, NPS pledged to place picnic tables at DBOC. The NPS did not, so DBOC has maintained the picnic tables. DBOC also keeps the tables maintained and polices the garbage. DBOC does not charge seashore visitors for the use of the tables (as most other oyster companies do) and the picnic tables are regularly inspected by CDPH. Seashore visitors, roughly 50,000 per year, visit DBOC. Many of those visitors enjoy the picnic tables. The tables most enjoyed – first to be occupied – are the ones nearer to the water. In this alternative, NPS has disallowed the most popular picnic area and restricted picnicking to a small area next to the buildings. This is a substantial mitigation / restriction that will reduce visitor enjoyment and will result in loss of business to DBOC and reduced enjoyment of PRNS.	What justification does NPS have to prohibit the enjoyment by seashore visitors using picnic tables near the water, as currently located? What adverse environmental impacts are caused by visitors sitting down to enjoy their oysters vs. standing in these locations? NPS has not provided adequate data or evidence to support this restriction of use by seashore visitors.
			Structures in this (and other) exhibit are not located properly. Buildings, platforms and docks have been arbitrarily "moved" in the drawings by NPS. Each incorrect location gives the appearance that these structures are not within the SUP area. The exhibits are not based on legal land and building surveys that have been made available to NPS.	The NPS has copies of the LA Stevens site survey and the William Kirsch, Architect, design that clearly locates these improvements. The NPS should produce site drawings that accurately reproduce the actual site conditions.
			This exhibit (as well as others) does not include the existing wet storage facility. Currently, DBOC has an above ground concrete structure, plumbing and underground tank that is omitted from the NPD	Site drawings provided to NPS by DBOC, prepared by William Kirsch, show the existing wet storage area. The Wet storage area has existed for many years (not sure when it was installed). The NPS has

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			exhibit in the DEIS. This existing system is vital to the operations of the oyster farm. The wet storage facility should be shown on the site drawings and allowed to continue. Restricting the use of this facility would be detrimental to DBOC. Is this an intended mitigation? If so, for what? What adverse effect does holding shellfish alive in tanks have on the human environment? Additionally, NPS has placed the arbitrary "picnic area" over the top of the wet storage facility. Both the wet storage area and the picnic area cannot occupy the same space. The NPS DEIS exhibit (as well as others) incorrectly shows an asphalt driveway where it is actually shell surfaced. Does not show the actual extent of asphalt surfacing.	also seen these improvements in operation during site visits.
42.	ES	xxviii	□ In contrast to alternative B, onshore infrastructure would be slightly reduced by removing unpermitted and nonessential facilities.	DBOC questions NPS removal of a picnic area that is absolutely essential in providing seashore visitors the experience that they have been afforded at this site for decades. What is the justification for this restriction / mitigation?
43.	ES	xxviii	□ The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 901 acres. Those acres not included in the permit area under this alternative are not currently available for production due to state water quality harvest prohibitions.	With more focused water sampling, CDPH and FDA could open the areas NPS characterizes as "not currently available for production". These determinations should be made by the CDPH and not NPS. Reasonably, if these areas were opened for production, and the annual production maximum was not changed, shellfish culture affects, both beneficial and adverse, would be more widely distributed. This NPS suggestion to reduce the area available for shellfish production only concentrates the affects. Does NPS have data or evidence that this restriction / mitigation? The DEIS does not seem to contain any rationale for this restriction. This is a F&G lease. F&G, along with CDPH and FDA should continue to make these determinations as they have for 8 decades.

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44.	ES	xxviii	□ Mariculture activities, including boat operations, would only take place within the established SUP area.	See Comment 40 above There is no substantiation to restrict boat operations to this arbitrary NPS offshore permit boundary. Without any data or evidence that boat use in these arbitrary "out of permit areas" is significantly causing adverse environmental affects, this restriction / mitigation is not necessary. NPS cut off important boat routes. NPS was provided both a hand drawn route map as well as gps tracking data.
45.	ES	xxviii	□ Shellfish production would not exceed ~~500,000~~ 850,000 pounds annually (inclusive of all harvested species). ~~This represents an approximately 10 percent increase above the average annual DBOC production for the period 2007 to 2009, which was approximately 450,000 pounds per year~~.	See Comment #35 above. NPS has ignored DBOC / CDFG current production submittal. DBOC is not producing widgets, it is farming. NPS must allow for variations in harvest levels due to variable environmental factors. Fluxuation in production from year to year can be expected, even if DBOC uses the same inputs and methods. This shows that this alternative (and all alternatives restricting production to a certain amount of pounds per year) are not designed to address an adverse impact.
46.	ES	xxviii	□ Pacific oysters and European flat oysters could be grown on documented shellfish growing areas within the main offshore permit area, Area 1 (currently known as Lease M-438-01). Manila clams and purple-hinged rock scallops could only be cultivated in the existing 1-acre plot, Area 2 (currently known as Lease M-438-02).	See Comment #36 above. What data or evidence does NPS have to create a restriction / mitigation to not allow manila clam production on M-438-01? None has been provided in this DEIS. CDFG has recommended approval of purple hinged rock scallop on M-438-01. What data or evidence does NPS have to create this restriction / mitigation? None has been provided in the DEIS. CDFG and FGC should remain as the regulatory authority over shellfish aquaculture in Drakes Estero an should continue to make these decisions.
47.	Figure ES-10	xxx	Alternative C Map prohibits all picnic areas. Map suggests that picnic area was not present in 2008: "onshore facilities and infrastructure and offshore	See Comment 41 above. Picnic areas existed in 2008 and before. What is

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			operations present in 2008 would be allowed for a period of 10 years"	wrong with seashore visitors enjoying the seashore?
48.	ES	xxxi	ALTERNATIVE D: ISSUE NEW SPECIAL USE PERMIT~~— EXPANDED~~ ONSHORE DEVELOPMENT AS PROPOSED AND EVALUATED IN A NEPA PROCESS, RESULTING IN A FINDING OF NO SIGNIFICANT IMPACT (FONSI), IN 1998. ~~AND OFFSHORE OPERATIONS WOULD BE ALLOWED FOR A PERIOD OF 10 YEARS~~	NPS omission of 1998 NEPA process suggests that this is a new onshore development proposal. DBOC simply requested what had been requested and evaluated by NPS in 1998. This omission misleads the reader.
49.	ES	xxxi	Alternative D considers ~~expansion of operations and development~~ replacement of ~~new~~ existing infrastructure as requested by DBOC as part of the EIS process. The existing SUP and RUO expire on November 30, 2012. Under alternative D, the Secretary would exercise the discretion granted to him under section 124 to issue a new 10-year SUP to DBOC, expiring November 30, 2022. Figures ES-11, ES-12, and ES-13 illustrate the ~~offshore and~~ onshore conditions under this alternative. Specifically, under alternative D:	This misrepresents the request by DBOC. DBOC did not request any expansion. It requested the building replacements as approved in 1998. As we understand, the 1998 EA is effective, and only changes to the project, or changes in the law, should be added to the existing NEPA document. It appears that NPS has wrongly dismissed the 1998 NEPA EA.
50.	ES	xxxi	□ Two development proposals submitted by DBOC are evaluated at the conceptual level in this EIS. Additional planning, design, environmental compliance (including NEPA), and approval would be required prior to proceeding with construction of proposed new facilities.	The two separate proposals should be broken into two different alternatives. It is highly confusing to present to the public two completely different development plans under the same alternative. One alternative should be described as the same project that was evaluated and resulted in a FONSI in 1998. The other alternative is the 2010 EDC plan that provides essentially the same use, but is greener, at an elevation above the flood zone, set back further from the water's edge, requires less grading, provides better visitor interpretation, etc.

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				The NPS should make any and all data requests of DBOC necessary in order to study the alternatives in detail. DBOC stands ready to respond. Before publication of the DEIS, NPS did not contact DBOC for more detailed project information to prepare alternatives.
51.	ES	xxxi	□ The total acreage of the SUP area, including both offshore and onshore areas, would be approximately 1,087 acres, which incorporates the boundary adjustment requested by DBOC.	Offshore boundaries should be up to F&G. What boundary adjustment requested by DBOC is included? The only boundary adjustment DBOC requested was requested to the FGC. The map (Figure ES-11 does not represent the adjustment requested of FGC. The boundaries in ES-11 is very different than the detailed request, created by Robert Reese Surveyor and submitted by DBOC, to the FGC. See DBOC amendment request - boundary correction.
52.	ES	xxxi	□ With the exception of slight reductions to Bed 17 (which currently extends into the seal protection area), consistent with DBOC's requests, all existing shellfish growing areas would be included in the SUP area and would remain.	See Comment #33 above
53.	ES	xxxi	□ Mariculture activities, including boat operations, would only take place within the established SUP area.	See Comments #40 & 44
54.	ES	xxxi	□ Shellfish production would not exceed 850,000 pounds annually (inclusive of all harvested species). This production level is based on DBOC's projections of ~~maximum~~ current production levels (submitted to CCC and NPS in 2007).	This information was also submitted to NPS. 850,000 pounds was submitted as the upper end of "current production level". Maximum production capacity of Drakes Estero is likely to be many times this harvest level.
55.	ES	xxxi	□ NPS would evaluate future requests from DBOC for consistency with the intent of this	This misrepresents the project description submitted by DBOC. DBOC did not request any "expanded operations" whatsoever.

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			alternative, which is to allow for expanded operations within the scope of the conceptual proposal; approval/compliance for future development would be through a tiered planning process.	
56.	ES	xxxi	☐ ~~By November 30, 2022~~ Upon expiration of this SUP, DBOC would be responsible for the removal of all infrastructure developed under this alternative, as well as all personal property. DBOC would be required to restore the area to good order and condition.	We would need to have a renewable SUP before we would consider building the new cannery…
57.	Figure ES-11	xxxii	Similar problems as other NPS DEIS offshore maps	See Comment #40 above
58.	Figure ES-12	xxiii	Shows requested seawater intake line	What is the reason for NPS denial of the DBOC request to replace the existing seawater intake in alternatives B and C?
59.	ES	xxxvi	Ongoing maintenance of racks~~, assuming 5 percent replacement or repair annually,~~ may include repairs ~~or replacement~~ as required. ~~of approximately 1,285 feet of rack and 8,900 feet of lumber per year.~~	Racks require major repairs approximately every 10 years. If all racks were currently in good repair, roughly 10% of the racks would be require maintenance each year. Currently, roughly 50% of the racks are in need of immediate repairs. Given that the life of the investment is roughly 10 years, and the proposed SUP is 10 years, the proper business decision would be to make the repairs to all of the racks as soon as possible. It is critical that NPS not limit the percentage of the racks repaired in any given year. Furthermore, there are no stated reasons why this restriction would reduce environmental impacts.
60.	ES	xxxvi	~~A vessel transit plan for DBOC boat use within Drakes Estero would be developed and submitted to NPS~~	A vessel transit plan, including GPS boat tracking reports, has already been completed and submitted to NPS. Either the NPS has disregarded what was submitted in the scoping process in creating the proposed arbitrary lease area and restricting boat use

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			~~for approval.~~ Current vessel routes shall be maintained. In the future, an adaptive management team, including representatives from NPS, NOAA, CDFG, CDPH and DBOC, will consider changes to the existing vessel routes.	to that area. The proposed restriction would make it impossible to access certain oyster beds. A vessel transit plan should be made a part of this EIS. Allowing NPS to ignore this important issue in the EIS and allowing NPS a chance in the future to "approve" or "not approve" a vessel transit plan gives them the authority to strangle DBOC without a public process. No data or evidence showing harm caused by the existing boat routes has been provided in this EIS. DBOC would agree to modify its vessel transit plan if agreed upon by an adaptive management team, including NOAA, CDFG, NPS, CDPH and DBOC. The MMC has recommended this adaptive management team, and the adaptive management team should be responsible for all offshore management change decisions – not NPS alone. Please explain why important, highly frequented boat routes were removed in every action alternative.
61.	ES	xxxvii	~~Two motorboats~~ Motorboats and ~~two~~ nonmotorized barges would be operated in Drakes Estero, approximately 12 trips per day. ~~, 8 hours a day, combined.~~	What justification does NPS have to limit the number of boats or barges? If DBOC has 3 boats used fewer hours of the day making the same number of overall trips, what is the difference? Currently, DBOC uses two boats – essentially all day, every day. This restriction / mitigation would make it almost impossible to conduct its business. DBOC actually has had 3 boats for much of the past 5 years. To limit boat use to a combine 8 hours per day would be devastating. What justification does NPS have to restrict boat use to a fraction of the current use? Restricting the number of non-motorized barges could actually cause an increase of boat traffic on Drakes Estero. What justification does NPS have to support this restriction / mitigation? (See photo of boat moving 3 barges at one time)

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62.	ES	xxxvii	Same as alternative B, ~~except boat operations may increase due to increased production limits.~~	DBOC has not requested any increase in production and therefore, does not expect boat use to increase. Additionally and importantly, additional production in Drakes Estero does not necessarily mean additional boat use. A planting trip into the bay may have more seed, but is just one trip. A harvest trip may return with more oysters on a barge, but still is just one trip. A maintenance trip may include flipping more bags, but still is just one trip. It is an incorrect assumption that there would be more boat impacts if production were to increase.
63.	ES	xxxvii	~~The existing protocol would be included in the new SUP~~, The 1992 multi agency harbor seal protocols will be adhered to, including seasonal closure of lateral channel and maintenance of a 100-yard buffer from any hauled-out harbor seal at any location and time by DBOC boats and staff. Any changes to the 1992 protocols will be agreed upon by the Drakes Estero adaptive management team including NPS, NOAA, CDFG, CDPH and DBOC.	The existing protocols include the temporary, arbitrary seal protection area that is not based on science or data. See Comment #26 above
64.	ES	xxxvii	~~A dozen p~~ Picnic benches and tables would be provided ~~for~~ by DBOC for visitors within the permit area.a	JOC and DBOC have always provided tables and benches for the visiting public. What evidence of environmental harm does NPS have to restrict this historic use? Has NPS evaluated the adverse impact to seashore visitors if they restrict this historic use? NPS should allow, as they always have previously, DBOC to place tables for seashore visitors anywhere within its SUP. NPS should not limit the picnic tables to a confined, arbitrary picnic area. Furthermore, the "designated picnic area" is on top of the existing wet storage facility. The two uses are incompatible.

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65.	ES	xxxvii	~~No picnic area would be provided at DBOC. NPS would provide tables outside the permit area.~~ Same as alternative B	See Comment #64 above
66.	ES	xxxviii	The existing single story processing plant and existing office/warehouse would continue to house shellfish processing, retail, and interpretive facilities at the existing scale.	All plans provided to CCC and NPS, prepared by Bill Kirsch, Architect, for the repairs and use of the existing buildings, have shown retail use in what NPS now describes as the office/warehouse. We have always needed this space so that the cannery can return to the processing building and the temporary cannery container can be decommissioned. This would qualify as "existing scale".
67.	ES	xxxviii	~~The cannery would continue to be housed in the existing shipping container.a~~ Following repairs to the single story processing plant, cannery operations will return to this building.	Shellfish shucking and packing has always occurred in the processing building. FDA and CDPH closed the facility in mid 2004 for health and safety reasons. JOC shucked and packed oysters off-site until DBOC took over. DBOC obtained permission from NPS, CDPH, FDA and received necessary permits from the County of Marin to install a temporary cannery in a shipping container. The plan has always been to move the cannery operations back to the processing plant once repairs have been made.
68.	ES	xl	Wetlands – Alt B Within the 138 acres of documented shellfish growing beds, actions associated with the placement of bottom bags on up to 84 acres of tidal mudflats/sandbars would continue under alternative B. Bottom bags have been placed in approximately 22 acres of mudflats and sandbars each of the past two years. Other impacts include pulse disturbances to mudflats and sandbars from the placement and rotation of bags/trays, DBOC staff walking across the mudflats/sandbars, and boat propellers and hulls scraping the bottom sediment.	Bottom bags are placed only in areas devoid of vegetation. These areas do not qualify as a wetland as defined on page 165 of the DEIS: "The identification of wetlands within the project area is necessary to ensure their protection in accordance with federal laws (section 404 of the CWA and the Rivers and Harbors Act of 1899) and state laws (the California Coastal Act of 1976 and the California Environmental Quality Act). At the federal level, EPA and USACE define wetlands as follows:

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				Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. (33 CFR 328.3[b]; 40 CFR 230.3[t])" Then, the DEIS goes on to justify intertidal mudflats as "wetlands" under the USFWS definition: "Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. (Cowardin et al. 1979)" The "water table" in the intertidal areas used by DBOC for bag culture is not "at or near the surface" or "covered by shallow water", it is covered by seawater up to 6' deep most of the time – all year long – not seasonal. It is only exposed above tide level for short periods of time. This area should have been classified as an "aquatic system", not "lands transitional between terrestrial and aquatic systems" as defined. The marshes qualify under this definition.
69.	ES	xl	Wetlands – Alt A	The racks are not within any agency's description of wetlands. This should be removed.

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			Specifically, the removal of approximately 5 linear miles of racks	
70.	ES	xl	Wetlands – Alt A The removal of personal property would increase the potential that the project area could be converted back to historic wetland habitat.	No DBOC personal property is impeding wetland habitat.
71.	ES	xl	Wetlands – Alt A and up to 88 acres of bags from nonvegetated sandbars and mudflats in Drakes Estero would allow benthic organisms in Drakes Estero to recolonize the space previously occupied by the bags.	The mesh bags do not block water or air, they have little effect on the benthos.
72.	ES	xl	Wetlands – Alt A Additionally, erosive forces on sediments caused by tidal water flowing across and around bags would be eliminated, restoring natural hydrodynamics in up to 88 acres of sandbars and mudflats available for use by DBOC.	DBOC has not observed either erosion or sedimentation around the bags that could infer that it was a result of the placement of bags.
73.	ES	xl	Wetlands Alt A Further, removal of the bags, racks, and other shellfish cultivation equipment from up to 142 acres of Drakes Estero would also reduce the potential for introduction and spread of invasive species such as the nonnative tunicate *Didemnum*.	1. DBOC does not believe that the bag areas are "wetlands" 2. Racks are certainly not in wetlands. 3. the non-native tunicate is found on the rack culture below low tide levels. 4. DBOC operations are not introducing or spreading invasive species such as didemnum
74.	ES	xl	Wetlands Alt B Lastly, any future actions would be reviewed by NPS under DO-77-1;	What future actions? DBOC would like to be sure that NPS and all other permitting authorities consider each alternative completely, so that later, even if an action alternative is selected and the Secretary, DOI, decides to issue a SUP, NPS (or others) won't use another process to further restrict DBOC after the EIS has been completed.
75.	ES	xl	Wetlands Alt B, C and D Actions associated with the placement of bottom	Why is NPS planning to restrict DBOC to 84 acres of bag culture on a 1060 acre lease? NPS plans to restrict total production. It seems that using more

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			bags on up to 84 acres of tidal mudflats/sandbars would continue under alternative C.	intertidal area with less bag density may be beneficial. Please explain why forcing DBOC to use a higher bag density for the same overall production is beneficial.
76.	ES	xl	Wetlands Alt D Because of the potential for higher production under this alternative (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), the impacts associated with these actions would likely be greater than alternative B or C, but are still expected to be at a moderate level.	NPS cannot assume that production levels would change in the area they consider wetlands. Production levels may change in areas other than wetlands (rack culture). NPS was highly criticized by the Marine Mammal Commission for making similar assumptions about where production happens in Drakes Estero.
77.	ES	xl	Wetlands Alt D As under alternatives B and C, onshore operations may cause a minor decrease in wetland functions and values from refuse and runoff along the shoreline if not collected and hauled offsite.	Please provide data to show that onshore operations have allowed refuse to enter Drakes Estero. Refuse is collected and hauled offsite. There is no reason to believe that operations under Alternative D would result in refuse entering Drakes Estero.
78.	ES	xl	Wetlands Alt D placement of a new 1,050-foot intake pipe along the bottom of Drakes Estero,	This is a one time, one day event that will not require equipment – in an area where, by most definitions, is not a wetland. DBOC will be performing hatchery operations under any action alternative. DBOC needs to replace its existing seawater intake line regardless of which action alternative is selected. This item should be included in each action alternative. What adverse impact would be caused by replacing this intake pipe – it seems that the impact would be limited to a very short term impact with no long term affects.
79.	ES	XI	Wetlands Alt D and construction of a new processing facility.	The processing facility is not in a wetland and would not result in impacts to wetlands. The reference to the processing and interpretation facility should be removed from the wetlands section of this report.
80.	ES	xlii	Eelgrass – Alt A alternative A would result in long-term	DBOC notes the doubling of eelgrass coverage over the past 15 years, which corresponds with oyster operations in Drakes Estero.

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			beneficial impacts on eelgrass habitat due to the termination of DBOC operations within Drakes Estero	
81.	ES	xlii	Eelgrass – Alt A as well as the removal of structures that currently inhibit eelgrass abundance and serve as potential points of introduction and added substrate for expansion of invasive species (e.g., tunicates)	Substrate for invasive species have nothing to do with eelgrass. This should be removed.
82.	ES	xlii		Quotes from Elliott-Fisk: Although pseudofeces from the suspended oysters may contribute to the amount of organic matter below the racks, adding to the system, the amount of organic matter resulting from eelgrass decomposition is likely far greater considering how expansive and dense the beds are within the estuary, making any significant organic inputs from the oysters undetectable in this study (Harbin 2004). Using even modified fishing methods for trawling in shallow waters with the prolific eelgrass beds in Drakes Estero was also challenging, and fishing techniques had to be modified several times. We found the oyster racks to have no pronounced impacts on the eelgrass beds, which existed both under and away from the racks as an incredibly rich habitat type.
83.	ES	xliii	Eelgrass Alt B DBOC activities in Drakes Estero under alternative B would allow the continuation of actions associated with commercial shellfish operations that could damage eelgrass habitat, such as propeller scarring (estimated at 8.5 miles based on 2010 aerial photography), boat wake erosion, and temporary increases in turbidity from	Please explain the NPS reference to 8.5 miles of eelgrass impacts. For example, 8.5 miles of impacts times a 6" wide propeller cut = .5 acres. Please also explain whether this measurement is per season? DBOC has never detected any boat wake erosion in Drakes Estero. Please document the existence of such erosion in Drakes Estero attributable to the

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			sediment resuspension given the area of boat operations within Drakes Estero.	DBOC boats.
84.	ES	xlii	Eelgrass Alt B Further, the continuation of DBOC activities would increase the potential for shellfish mariculture–related introductions of nonnative species (e.g., colonial tunicates) and epiphytic algae, which would have a long-term adverse impact on eelgrass.	This should be removed from the eelgrass section of the DEIS. According to Dr. Andy Cohen, SF Bay Estuary Institute who told the Point Reyes Light: "Andy Cohen, director of the Biological Invasions Program at the San Francisco Estuary Institute, said that Didemnum can only grow on hard surfaces. Since the bottom of Drakes Estero is soft sand and mud, he said, the organism is more likely to affect Lunny's oysters than any other marine life in the estuary. *"I wouldn't think that this is a big threat to the natural environment," he said. "Within Drakes Estero, the problem is probably more how it's going to affect the actual oyster operation."* And Dr. Mary Carman who told the Light: "*Dr. Mary Carman, who researches Didemnum at the Woods Hole Oceanographic Institute,* *said that she has found through experiments that the organism will not successfully grow on eelgrass. The organism can cling to eelgrass blades for about 10 days before sloughing off, she said, because the grass secretes a protective acid. She has never known Didemnum to harm eelgrass in the wild, she said.*
85.	ES	xlii-xliii	Eelgrass Alt B Beneficial ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would continue, but these beneficial impacts would be expected to be relatively small in a west coast estuary like Drakes Estero due to high sediment- nutrient content, extensive tidal flushing, and proximity to nutrient-rich upwelling zones along the Pacific coast.	Please see ENVIRON report regarding ecosystem benefits associated with bivalves in Drakes Estero.
86.	ES		Eelgrass Alt B Finally, maintenance of oyster	DBOC has not observed either erosion or sedimentation around the bags that could infer that it was a result of the placement of bags. The racks are

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			racks within Drakes Estero would prolong the erosional condition that is occurring under the racks	out in the section of the bay that is very wide and they are not in channels and are not in intertidal areas. Thick eelgrass has recruited around almost all the racks (all racks were originally place in areas devoid of eelgrass) the eelgrass under the racks is less dense. DBOC observes the tidal flow and currents around the racks and see that the water moves very slowly. DBOC has not seen scouring or erosion under the racks. Please provide evidence of such erosion to support this assertion.
87.	ES	xliii	Eelgrass Alt B With respect to eelgrass, alternative B does not further the goals set forth in existing law and policy because it would allow ongoing adverse impacts on (1) a special aquatic site, a category of waters of the United States afforded additional consideration under the CWA, (2) essential fish habitat (habitat of particular concern) under the Groundfish Plan, and (3) native species and natural processes (including native species management) under NPS Management Policies 2006.	DBOC believes that the 3-dimentional structure created by the hanging oyster culture on the racks provide significant habitat value, similar to what eelgrass provides.
88.	ES	xlv	Eelgrass Alt D All species that could be cultivated are nonnative with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is only likely to be found in Drakes Estero in larval form, and the Olympia oyster, which also prefers a hard substrate and is not present in Drakes Estero in large numbers. Additionally, DBOC's proposal to collect native shellfish larvae within Drakes Estero would not be consistent with the NPS mission, per Management Policies 2006 (NPS 2006d) or regulations.	Native oysters do exist in Drakes Estero in large numbers and have been sold by previous Drakes Estero CDFG leaseholders in large numbers. See CDFG harvest records. Adult purple hinged rock scallops exist in significant numbers in Drakes Estero. DBOC has told NPS that it planned to ask CDFG for a standard Broodstock Collection Permit. DBOC has never asked or implied that it would collect larvae from within Drakes Estero.
89.	ES	xliv	Benthic Fauna Alt B Specifically, the cultivation of nonnative species within Drakes Estero at production levels of 600,000 pounds of shellfish	Did NPS do a carrying capacity analysis? Can NPS justify declaring the different affects of different levels of production?

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			meat annually would result in approximately 7.06 million individual organisms being added to and subsequently harvested from Drakes Estero on an annual basis.	
90.	ES	xliv	Benthic Fauna Alt B Based on DBOC proof of use reports, the acreage of sand bars and mudflats occupied at this level of production is 50 percent greater than that reported for 2008 in the 2009 NAS report. This would appreciably affect the natural benthic community, the consequences of which could include nonnative species competitively excluding native species of bivalves and other benthic organisms, introduction of molluscan diseases, and other harmful nonnative species being imported unintentionally (such as the invasive tunicate Didemnum).	Please explain how proof of use (POU) reports were used to calculate that acreage of sandbars and mudflats occupied were 50% greater than that reported for 2008. Notably, the POU reports do not identify the production levels from each growing area. Overall Drakes Estero production, as reported in the CDFG POU reports, did not change much from 2008 to 2009. The NSP has claimed (DEASWE, 2007) "In addition, predominantly deposit-feeding *Macoma* clams are found in densities up to 250 per square meter in the outer, sandy tidal flats of Drakes Estero." There are approximately 9,000,000 square meters covered by water in Drakes Estero x 250 clams = 2.25 billion Macoma clams. The 7 million cultured oysters represent approximately .003, or .3 percent of the filter feeders, assuming the Macoma clams are the only filter feeders in Drakes Estero, which they obviously are not. Accordingly, the millions of cultured oysters in Drakes Estero represent only a small fraction of the filter feeders in Drakes Estero. NPS repeatedly dismisses positive effects of ecosystem services provided by cultured shellfish as "highly localized" and therefore insignificant, yet NPS alternatively treats similarly localized adverse effects as "appreciable affects"
91.	ES	xliv	Benthic Fauna Alt B	Slight. Detectable. Does NPS provide evidence that this slight decrease in benthic invertebrates is owing

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			Use of both bottom bags and racks has been implicated in detectable changes in benthic communities. The maintenance and continued use of DBOC offshore infrastructure would result in a slight decrease in benthic invertebrate abundance where the racks are currently located, owing mostly to the lack of eelgrass in these areas.	to the lack of eelgrass?
92.	ES	xliv-xlv	Benthic Fauna Alt B Further, the continued use of offshore infrastructure would maintain the potential for Didemnum expansion	JOC and DBOC has not seen any expansion of didemnum in 10 years. How can NPS claim that no change in offshore infrastructure has the "potential" for didemnum expansion? If didemnum "expanded" on the hard substrate of DBOC gear 2' hanging 2' above the bottom, would that cause any harm to the natural benthic fauna?
93.	ES	xlv	Benthic Fauna Alt B and associated mariculture activities (such as infrastructure maintenance, vessel traffic, and harvesting) would pose a risk for further dispersal of this nonnative invasive tunicate via colonial fragments. The potential for increase in overall cover of Didemnum would have an adverse impact on species diversity.	Didemnum does not colonize soft substrates as found in Drakes Estero. Didemnum has not expanded in the past 10 years. How can NPS claim that this tunicate has the potential to increase cover… cover what? Not the soft substrate of Drakes Estero where the benthic fauna exist… How can they say "Didemnum would have an adverse impact on species (benthic fauna) diversity? Experts
94.	ES	xlv	Benthic Fauna Alt B Lastly, the nonnative Manila clam would be produced on a much wider scale under this alternative than under existing conditions, which increases the chance of naturally breeding populations of this species becoming established in Drakes Estero (NAS 2004, 2009). These impacts would be clearly detectable and could appreciably affect individual species, communities, or natural processes. The cumulative impact would be long-term moderate adverse, and alternative B would contribute an appreciable adverse increment to the overall cumulative impact.	Please explain why NPS suggests that Alt B, or any action alternative, would be produced "on a much wider scale". Spatial scale, harvest level? DBOC has not asked to expand production of Manila clams. CDFG approved Manila clams on the main 1059 acre lease in 1993. There was an administrative error that was corrected by the F&GC in 2009 and NPS has referred to this correction as a "new authorization" by the FGC. This may be why NPS is suggesting that DBOC is producing clams on a "much wider scale".
95.	ES	xlv	Benthic Fauna Alt B	NPS is wrong. DBOC has easily and frequently

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			The introduction and maintenance of nonnative species in Drakes Estero does not further the goal of NPS Management Policies 2006, which is to minimize the impacts of human activities on native benthic fauna populations. All species that could be cultivated are nonnative with the exception of the purple-hinged rock scallop, which is native to the rocky California coast but is only likely to be found in Drakes Estero in larval form.	found both Native Olympia oysters and native purple hinged rock scallops in adult form in Drakes Estero. This is further evidence that NPS is unfamiliar with the resource and should leave the management to CDFG.
96.	ES	xliv	Benthic Fauna Alt D Specifically, the increase in shellfish production levels to 850,000 pounds shucked weight (approximately 10 million individual organisms harvested annually) represents a marked increase over alternatives B and C (approximately 40 percent greater than alternative B and 70 percent greater than alternative C); therefore, it is assumed alternative D would result in the greatest level of impact on native benthic fauna among all alternatives.	Drakes Estero is a productive 2250 acre embayment. Current production – based on current planting levels - could range up to 850,000 pounds of shucked meats. The oysters use only a small area within Drakes Estero and comprise a small percentage of the biomass of Drakes Estero according to NPS in this EIS. Please explain how NPS can differentiate the effects of 5.88 million cultured oysters vs. 10 million cultured oysters in an embayment that contains many billions of filter feeders.
97.	ES	xlv	Benthic Fauna Alt D Additionally, DBOC's proposal to collect native shellfish larvae within Drakes Estero would not be consistent with the NPS mission, per Management Policies 2006 (NPS 2006d) or regulations.	DBOC plans to collect native adults to be used as broodstock. CDFG will approve a broodstock collection permit. No NPS action is required here.
98.	ES	xlv-xlvi	Fish – all action Alts The maintenance of shellfish racks would continue to displace approximately 7 acres of natural fish habitat which would otherwise provide increased cover for fish from piscivorous birds and other fish as well as increased prey for larger groundfish, particularly those attributed to Pacific groundfish habitat in the Groundfish Plan. The cumulative impact would be long-term beneficial, and alternative B would contribute a noticeable adverse increment to the overall beneficial cumulative impact.	Did NPS consider the habitat value of the 3 dimensional hanging oyster culture? In DBOC's experience it provides an amazing habitat similar to eelgrass. DBOC has a short underwater video that shows fish using this habitat.

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99.	ES	xlvi	Fish – all action Alts Additionally, this alternative would not be consistent with the goals set forth in the Magnuson-Stevens Fishery Conservation and Management Act because damage to eelgrass designated as essential fish habitat (habitat of particular concern) within the Pacific Fishery Management Council's Groundfish Management Plan would continue.	Eelgrass never existed in the areas when racks were originally installed. Eelgrass subsequently expanded by over 100% in Drakes Estero – recruiting around most of the racks. Accordingly, it is unreasonable to say that the action alternatives would adversely impact eelgrass.
100.	ES-4	xlvii	Seals – Alt A Alternative A may also result in short-term minor adverse impacts due to impacts associated with rack removal, which would be localized and slightly detectable, but would not affect the overall structure of any natural community. These activities would be conducted outside of the harbor seal pupping season to minimize adverse impacts.	NPS infers that the racks are near seal haul our areas. They are not. They are far from seals haul outs. It appears that NPS is trying to create an illusion that racks exist near haul out areas.
101.	ES-4	xlvii	Seals – Alt A Additionally, the decrease in disturbance to this species would be consistent with MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107).	This sentence should be removed. It suggests that existing operations (the baseline) is disturbing seals. NPS should clearly identify: 1. it's own database shows oyster farm related disturbances in Drakes Estero represent less than 1% of the recorded disturbances (including all disputed records). 2. That all alleged DBOC disturbances have been challenged with data and evidence that show the facts 3. that most of the alleged disturbances attributed to DBOC have been removed from the record by NPS during the MMC process when they were proven to be false 4. the 281,000 NPS photos from the secret surveillance cameras show zero disturbances caused by DBOC and multiple disturbances during pupping season caused by seashore visitors in kayaks.
102.	ES-4	xlvi	Seals – Alt B	NPS suggests that using mudflats adjacent to the

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			Overall, alternative B would result in long-term moderate adverse impacts on harbor seals due to continuation of commercial shellfish operations within Drakes Estero year-round, for another 10 years, and the associated use of motorboats and bottom bag cultivation on sandbars and mudflats adjacent to the designated harbor seal protection areas.	harbor seal protection area is causing moderate adverse impacts. NPS should be clear that the seal protection area, arbitrarily imposed by CCC, as a temporary precaution, without reviewing the NPS inventory and monitoring database – having only been supplied a single NPS "trip report" with an alleged disturbance by DBOC on April 26, 2007. It should be clear that the seal protection area was created by CCC to give more than a 300 yard buffer from all hauled out seals. It should be clear that DBOC is allowed to culture oyster near the protection area because: 1. The Marine Mammal Act requires DBOC to maintain a 100 yard distance from hauled out seals 2. The 1992 interagency (NPS, NOAA, CDFG, CDPH) seal protection protocols for drakes Estero requires the oyster operation maintain a 100 yard distance from hauled out seals, and 3. The current (2008) NPS SUP for DBOC requires that DBOC operations maintain 100 yard distance from hauled out seals. The setback is built into the arbitrary and unnecessary seal protection area. DBOC is not required to maintain any setback from this area that has already arbitrarily tripled the legal setback. The DEIS must be clear about this. The DEIS must be clear that the seal protection area only restricts oyster boats and oyster operations. The primary source of seal disturbances – the seashore visitors: hikers, clammers, canoes, kayaks – are not restricted from using this area.
103.	ES-4	xlvii	Seals – Alt B alternative B would result in moderate adverse impacts on harbor seals due to the potential for displacement and	Becker 2011 that claims DBOC has displaced seals has been discredited. There is no evidence, other than Becker 2011, that suggests seals are, or have been displaced.

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			continued disturbances that are known to disrupt harbor seal behavior. The impacts associated with alternative B would be clearly detectable and could appreciably affect harbor seals and harbor seal habitat	DBOC is not disturbing seals. The record is clear – disturbances are caused by sources other than the oyster farm. The secret camera photos prove this fact. DBOC does not agree that any action alternative would result in "clearly detectable impacts" or "could appreciably affect harbor seals and harbor seal habitat".
104.	ES-4	xlvii-xlviii	Seals Alt B Additionally, the continued disturbance to this species would be subject to regulation by the MMPA (16 USC 1361 et seq., 1401–1407, 1538, 4107). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens, and the importation of marine mammals and marine mammal products into the United States. Under the MMPA, "take" is defined as "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." "Harassment" is defined as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." Under the MMPA, if an activity is defined as harassment under the above criteria, a specific permit called an Incidental Harassment Authorization may be required.	These are not new laws to be applied to new action alternatives. These laws have been in place for a long time. DBOC has never violated these rules. It should be made clear in the DEIS that there should be no reason to expect that continued use, under any of the action alternatives, would result in any violation of these rules. DBOC has never been required to obtain an Incidental Harassment Authorization because DBOC does not harass seals.
105.	ES-4	xlvii	Seals – Alt D The adverse impacts associated with alternative D would be of greater magnitude than those associated with alternatives B and C due to the likely increase in boat traffic in Drakes Estero associated with increased production levels (approximately 40 percent greater than alternative B and 70 percent greater than alternative C), but are still expected to be moderate in intensity and	The NPS was highly criticized by the MMC panel for using total production for Drakes Estero and assuming that it infers activity anywhere near the seals. NPS now, unilaterally and arbitrarily set limits on estero-wide production and again tries to suggest that it will effect the level of activity near the seals. It is entirely possible for DBOC to produce 850,000 pounds of shellfish while reducing production and activity near the seals. As detailed in other sections

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			would be clearly detectable and could appreciably affect harbor seals and harbor seal habitat. The cumulative impact would be long-term moderate adverse, and alternative D would contribute an appreciable adverse increment to the overall cumulative impact.	of the DEIS, DBOC has about 95 racks in Drakes Estero, far from any seal haul out areas. Because of current CCC and NPS restrictions, DBOC is not allowed to make repairs to the racks. Because of this restriction, DBOC is only able to utilize about 50% of the racks. All action alternatives specifically authorize DBOC to repair the racks. If DBOC is allowed to use an additional 2.5 linear miles of racks away from the seals, how can they suggest an increase of activity near the seals? BTW – all references to adverse affects caused by 7 acres of racks included the unused 2.5 linear miles of racks. Currently, DBOC uses roughly 2.5 miles of racks = 3.5 acres. The exact detail of each rack, gps location, current condition and current use was provided to NPS during scoping.
106.	ES-4	xlviii	Birds - Alt A Intertidal areas previously used by DBOC for the bottom bag cultivation in commercial operations would result in up to 88 additional acres of foraging and resting habitat for resident and migratory birds.	NPS infers that bag culture eliminates foraging and resting habitat for birds – studies show otherwise. Generally, at DBOC, bag culture, when present, uses approximately 20% of the bottom – leaving 80%
107.	ES-4	xivii	Birds – Alt A Alternative A may result in adverse impacts to birds from rack removal, but the impacts would be short-term and minor because they would be highly localized and would not affect the overall structure of any natural community.	DBOC has witnessed many birds using the racks for resting and foraging. Please explain how the racks (which are not in intertidal areas) have any adverse impact on birds.
108.	ES-4	xlviii	Birds – Alt B Noise disturbance from DBOC operations would also alter other biological activities of birds using Drakes Estero, such as predator avoidance.	Please explain how DBOC operations are altering biological activities of birds.
109.	ES-4	xlix	Special status species Alt A within designated critical habitat.	Please explain what special status species critical habitat exists in the project area.

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110.	ES-4	l	Flood Alt B Offshore structures and materials could be damaged and/or dislodged during a flood event,	Offshore structures include oyster racks and bags that are roughly 3' below the high tide level. NPS should not include the offshore structures because they are not in a flood zone.
111.	ES-4	l	Flood Alt B Shell piles would reduce flood storage capacity in the area	DBOC disagrees that shell piles would reduce flood storage capacity in the area. Please explain how this determination was reached.
112.	ES-4	li	Flood Alt B Wastewater collection tanks would also be inundated during a 100-year flood event, potentially causing leaks of untreated wastewater to enter Drakes Estero.	Even if a 100 year flood occurred, DBOC's wastewater collection tanks would not leak untreated wastewater. The wastewater tanks have all been approved water-tight by Marin County Environmental Health Services, are continuously monitored and are inspected annually by a registered sanitarian and a County EHS official. Please refer to the inspection reports, which were submitted to NPS during scoping.
113.	ES-4	l	Flood Alt D Compared to alternatives B and C, alternative D would result in increased flood zone impacts from the offshore facilities due to additional racks and bottom bags to accommodate the higher shellfish production level.	Intertidal and subtidal areas are not properly "flood zones" because they flood two times every day or are continuously under seawater. Alt D does not approve any additional racks over and above Alt B or C
114.	ES-4	l	Flood Alt D The construction of new facilities may take place within the flood zone if alternative site locations outside of the flood zone but within the SUP area were determined to be infeasible through a subsequent planning process.	DBOC requests that NPS conduct the appropriate planning process during this DEIS process.
115.	ES-4	li	Flood Alt D An increase in production would likely result in additional shell being added to the shell piles located within the flood zone, resulting in a reduction of flood storage capacity.	If production increases: 1. it would likely be an increase of live oysters for sale and there is only a small market for shucked oysters – the shell piles are a by-product of shucked oysters. 2. shucked product could increase or decrease

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				under any action alternative – impossible for NPS to speculate on this 3. if shucked product marketing increases, thereby producing more shell, more shell would be regularly moved off site – just as DBOC currently moves the shell off site – mostly donated to enhance endangered species habitat. 4. If the shell pile size is a concern, why doesn't NPS suggest a maximum shell pile size?
116.	ES-4	li-lii	Water Quality Alt A Overall, alternative A would result in long-term beneficial impacts on water quality as a result of reduced non-point-source runoff and the elimination of future disturbances to the Drakes Estero bottom from boats and offshore structures. Bivalves filter and process suspended solids, nutrients, and phytoplankton from the water column resulting in cleaner, less turbid water. Drakes Estero is not a highly turbid coastal embayment (NAS 2009), so bivalve contributions to water clarity would likely be limited relatively minor and limited. Based on west coast research (Dumbauld, Ruesink, and Rumrill 2009), the positive ecosystem effects typically attributed to bivalves, such as nutrient cycling and water clarity, would be expected to be relatively minor in west coast estuaries like Drakes Estero. This is because the nutrient dynamics in these systems are driven by coastal upwelling and a strong tidal cycle which flushes small estuaries like Drakes Estero on a daily basis. However, to the extent that localized beneficial effects from DBOC bivalves influence eelgrass productivity near DBOC beds and racks (see discussion under alternative B), the removal of DBOC-cultured bivalves under alternative A would result in adverse impacts on eelgrass at these sites. Thus, minor adverse impacts to water quality in Drakes Estero would be expected to occur under this alternative. Removal of the racks and bags would	DBOC disagrees that non-point source runoff is contaminating Drakes Estero. The NPS claims that the benefits provided by the millions of DBOC filter feeders in up to 42 different growing areas in Drakes Estero are localized and insignificant. The boats rarely disturb the bottom of Drakes Estero. The existing racks (offshore structures) do no disturb the bottom – as a matter of fact, because of the racks, DBOC is allowed to plant and harvest from vessels – never touching the bottom. Bottom bags are maintained at low tide when they're out of the water, which does not cause any noticeable turbidity.

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			cause a short-term minor adverse impact on water quality due to the sediment disturbances from personnel removing the offshore structures. These adverse impacts would be temporary and localized. The cumulative impact would be longterm beneficial, and alternative A would contribute a noticeable beneficial impact to the cumulative impact.	
117.	ES-4	lii	Water Quality Alt B Point-source discharges would include small amounts of marine sediments and fouling organisms removed at the washing station;	DBOC has asked for permission to install a sediment basin with filter to trap sediment and fouling organisms removed during washing. This mitigation should be properly recognized in the water quality section.
118.	ES-4	lii	Water Quality Alt B Non-point-source pollution from runoff is currently very small (less than 3 acres of impervious surface within a watershed of several square miles).	Please clarify whether the DEIS is suggesting that DBOC has 3 acres of impervious surface? The entire SUP is less than 3 acres. DBOC has only about 2,000 square feet of paved surface.

Comments on Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

Point Reyes National Seashore

Prepared for:
Draft EIS DBOC SUP c/o Superintendent
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On behalf of:
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Prepared by:
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Date:
December 9, 2011

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Tables

Table 1. Summary of DEIS Comment Topics Discussed. 3

Figures

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Appendices

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1 Introduction

ENVIRON International Corporation (ENVIRON) has reviewed the Draft Environmental Impact Statement (DEIS) Drakes Bay Oyster Company Special Use Permit (ID: 43390), and appreciates this opportunity to report our technical comments to the National Park Service (NPS) in print form. ENVIRON regularly participates in NEPA processes such as this, and respects the effort put forth by the NPS in order to develop this draft document. The purpose of these comments is to assist the NPS in developing a more scientifically accurate and complete final document that is consistent with NEPA and NPS policy.

In general, the structure of the DEIS is unusual in that there is no alternative that represents the proposed action. Neither is there an alternative that represents a continuation of current conditions. In the current structure of the DEIS, the public is left to glean unknown conditions without the Drakes Bay Oyster Company (DBOC) as the no action scenario. Consequently, the impacts resulting from conditions under alternatives that depart from this unknown status (Alternative A) are even more difficult to understand. No explanation is provided for this deviation from standard NEPA protocol, and ENVIRON questions the efficacy of this approach.

Setting aside the DEIS structure, comments have been developed in several topic areas. ENVIRON found consistent omissions and mistakes that err in a way that exaggerates potential negative impacts and understates potential positive impacts benefits. NEPA protocol requires the author to apply a net impact analysis – an assessment of both positive and negative impacts. Without this net approach, results could point toward a 'least negative' alternative which might in fact be worse for the environment than another option that had more negatives, but more positives that potentially balance out or mitigate for the negative impacts.

Our findings with respect to select comment topics are summarized briefly below in Table 1. In the final column, a statement of the overall impact conclusion reported in the DEIS for Alternative D is shown for each receptor. The assessment is followed by a recommended overall impact conclusion based on our review of the subject material (presented in bold). Alternative D is chosen since it anticipates the largest SUP area and highest levels of oyster production. Therefore, our recommendations apply also to Alternatives B and C, which may be assumed to be even more benign.

Table 1. Summary of DEIS Comment Topics Discussed.

Subject	**Comment Themes**	DEIS Impact Conclusion	**ENVIRON Recommendation**
Eelgrass	• Incomplete measurement techniques • Inappropriate references used to support impact claim • Unsupported claim of sediment resuspension • Misattribution of natural impacts to DBOC • Failure to consider the net result regarding invasive species • Misinterpretation of references regarding epiphytic algae	LT moderate adverse	**LT neutral or beneficial**

Subject	Comment Themes	DEIS Impact Conclusion	ENVIRON Recommendation
	• References not relevant to the action • Omission of mariculture/eelgrass positive interactions		
Benthic Fauna	• Misleading description of bivalve competition • Misunderstanding of invasive dispersal impact • Misrepresentation of sessile organisms • Omission of oyster rack benefits to the benthic community • Inappropriate impact description regarding non-catch mortality	LT moderate adverse	**LT neutral or beneficial**
Bird Interactions	• Conclusion completely unsupported by scientific record • No credit given for use of donated shells for snowy plover and least tern restoration	LT moderate adverse	**LT beneficial**
Habitat Restoration	• No credit given for beneficial use of shells in habitat restoration projects	LT moderate adverse (wildlife habitat)	**LT beneficial**
Water Quality	• Failure to mention shellfish contribution to water clarity • Omission of cattle related nutrient mitigation feature of mariculture • No mention of biosequestration of nitrogen and phosphorus • No mention of denitrification benefit • Failure to discuss marine debris mitigation by current owners and DBOC staff patrol program • Incorrect analysis of impacts that do not change with alternative (wastewater; impervious surfaces) • Exaggeration of runoff impact found safe by CDH • Exaggeration of impacts from CCA leaching and pesticides	ST minor adverse and LT minor adverse	**ST and LT moderate beneficial**
Wetlands	• Completely ignores NWP 48 analysis that there are minor impacts to wetlands from shellfish operations • Unsupported claims that wetlands are impacted	ST minor adverse and LT moderate adverse	**ST minor and LT neutral**
Coastal Flooding	• Floodplain analysis is inappropriate because DBOC is not in a flood zone	LT moderate adverse impacts	**LT neutral or unknown**

Subject	Comment Themes	DEIS Impact Conclusion	ENVIRON Recommendation
Noise	• Noise Measurements Consistently Underestimate Background Noise • Noise Measurements Consistently Overestimate DBOC Noise	ST moderate and LT major adverse	**ST and LT neutral or negligible**
Recreation	• Underestimated Value of Visitors to DBOC	LT moderate adverse	**LT neutral or beneficial**
Culture	• Cultural Value of Last Shellfish Processor in CA under emphasized		
Socioeconomics	• Dismissive approach to job and housing loss • No mention of Ecosystem Service value	LT beneficial	**Agreement**
Environmental Justice	• Differential impact will hit Hispanic workers		

ST = short term impact; LT long term impact

Author Biographies

Bud Abbott, PhD – Fisheries and Ecology

A Senior Principal Environmental Biologist at ENVIRON, Dr. Abbott has more than 30 years of experience performing assessments of fisheries and aquatic resources for government agencies and the private sector. He specializes in fisheries ecology, marine bioacoustics, underwater explosive impacts, and natural resource modeling. He has managed large teams of scientists and field technicians designing monitoring programs, collecting and entering field data, performing modeling based on field data, and analyzing model outputs and databases. He is an authority on Sacramento-San Joaquin River Delta and San Francisco Bay fisheries issues and is an expert in threatened and endangered species of fish, dam removal permits, underwater explosive and pile driving impacts on fish, and aquatic pest control. He has worked in the Sultanate of Oman, Egypt, Burma, Chile, and Kiribati on various fisheries, aquaculture, and development projects.

Prior to joining ENVIRON, Dr. Abbott worked for many international institutions, including Asian Development Bank, World Bank, USAID, and the U.S. Peace Corps. He is a registered Professional Engineer in the states of New Jersey, Connecticut, and New York; a Licensed Environmental Professional in the state of Connecticut; a Certified Ground Water Professional; and has obtained New Jersey Department of Environmental Protection Certification in Subsurface Evaluation. He holds both a PhD in Fisheries and a MS in Fisheries from the University of Washington, and a BS in Biology from California Western University.

Rabia Ahmed, M.S. – Environmental Justice

Ms. Rabia Ahmed has over nine years of experience in policy and regulatory economics, natural resource economics, and community/development economics. She has a Master's degree in economics from Portland State University. Ms. Ahmed has extensive experience in conducting socioeconomic and environmental justice impact analyses for National Environmental Policy Act (NEPA), State Environmental Policy Act (SEPA), and California Environmental Quality Act (CEQA) projects, studying water laws and water markets in the Western states, water demand analysis, valuation of ground and surface water, economic impact analysis of critical habitat designations under the Endangered Species Act (ESA), survey design, and participatory research methods, using tools such as focus group discussions and open-ended questionnaires. She has successfully managed a number of projects involving multi-disciplinary teams.

Ms. Ahmed has conducted a number of socioeconomic and environmental justice analyses required under NEPA and CEQA relating to power and energy projects, recreation, proposed residential and commercial developments, industrial projects, and land management plans. In addition, she has worked directly with communities in many countries to understand and evaluate impacts of development projects on these groups. Ms. Ahmed has also been involved in studies on the economic impacts, costs, and benefits of critical habitat designation under the ESA, focusing on impacts of such designations on commercial, governmental, and private activities. Her quantitative background includes statistical analysis, including linear regression, using SAS and Gauss. She is also experienced in facilitating community meetings and conducting focus groups.

Gretchen Greene, PhD - Socioeconomics

Dr. Gretchen Greene is a Senior Manager and Economist with more than 15 years of diverse economics experience in community and natural resource economics. She is a senior practitioner in ENVIRON's Ecology Sediment Group. She has expertise in natural resource damage assessment (NRDA), ecosystem service valuation, net environmental benefit analysis (NEBA), remediation cost analysis, and natural resource management. She also brings experience in regulatory analysis and National Environmental Policy Act (NEPA) processes (Environmental Assessments and Environmental Impact Statements) (EAs and EISs); endangered species economics; water demand and water resources planning; conservation planning and sustainable economic development; cost-benefit analysis; population projections and forecasting; decision analysis with uncertainty; survey design and data analysis; and agricultural trade and markets. She has worked with numerous federal, state, and municipal agencies throughout the U.S., tribal authorities in the U.S. and Canada, as well as private industrial clients and law firms. She has worked as a teacher, trainer, and facilitator in the U.S. and internationally. Gretchen received a PhD. and MS degree from the Food and Resource Economics Department at the University of Florida. She has an undergraduate degree from Wellesley College in Religion Studies.

Dr. Felix C. Kristanovich, PE, CFM – Flooding

A manager in the Seattle office, Dr. Felix Kristanovich is a senior water resources engineer with experience in the Pacific Northwest and California. Felix is a lead hydraulic engineer, and has worked on numerous streamflow restoration projects, including Skagit River Delta, Nisqually Wildlife Refuge, Chinook River/Estuary, Black River, and Goldsborough Creek in Washington, and numerous wetland mitigation sites and rivers in California. He has performed flood insurance studies for FEMA via LOMR, CLOMR, and LOMA processes, and prepared dam

design documents in compliance with the Department of Ecology Dam Safety. As a hydrologist and hydraulic engineer, Felix specializes in development and application of hydraulic models HEC-RAS, HEC-HMS, and HEC-6, hydrologic models HSPF, MGSFlood, and WWHM, and hydraulic/water quality models SWMM, CORMIX, RMA2 and QUAL2K models. Felix also regularly uses HEC-RAS, HY-8, and other hydraulic models for design of culverts and bridges for fish passage.

As a water quality engineer, Felix organized and implemented water quality monitoring programs (including water quality monitoring at Meadowbrook Pond facility, and several post-construction water quality monitoring projects), coordinated numerous field investigations for hydrologic reports, environmental impact studies, and also provided water quality modeling of pollutants from various developments. As a costal design engineer, Felix designed shoreline protection against wind-waves, ship-waves and river currents on the Columbia and Willamette rivers, and along shorelines at different Puget Sound harbors. As a stormwater engineer, Felix was the lead engineer in development and application of HSPF models for the Port of Seattle Third Runway Master Drainage Plan, and for the City of Kent storm-drain master plan. Felix also used MGSFlood, WWHM, and KCRTS models to recommend and size stormwater facilities and BMPs.

Felix is professionally registered as a Civil Engineer in California, Oregon and Washington. He is actively involved in the AWRA, where he helped organized 2005 and 2009 AWRA conferences in Seattle. He organized numerous dinner meetings, and served as an acting Secretary, Treasurer, and the President of the AWRA Washington State Section. Felix is the member of the Seattle Section of the ASCE and of Northwest Regional Floodplain Manager Association (NORFMA). Felix has a PhD in Civil Engineering from Louisiana State University, a MS in Civil Engineering from CALTECH, and a BS in Civil Engineering from the University of Zagreb. Felix is a registered professional engineer (civil) in Washington, Oregon, and California.

Scott Luchessa, M.S. - Wetlands

Scott Luchessa is a senior wetland scientist and certified ecologist with more than 24 years' experience in aquatic, wetland, and terrestrial ecology. He currently leads ENVIRON's wetlands and stormwater management services in the Pacific Northwest. He has a comprehensive knowledge of local, state, and federal government permitting processes pertaining to wetlands and water resources. Scott has successfully provided permitting assistance and regulatory compliance services to a wide range of public and private sector clients, including many port authorities; other state, federal, and local government agencies; large corporations; and non-profit organizations. Among some of the clients Scott has successfully served are the Ports of Seattle and Portland; the U.S. Navy; National Park Service; Weyerhaeuser, Taylor Shellfish, and Dow; Trust for Public Land and The Nature Conservancy. Scott is an expert in wetland restoration and mitigation and has designed compensatory wetland mitigation plans and specifications as part of National Resource Development Assessment (NRDA) settlement claims and Section 404 of the Clean Water Act (CWA) permitting processes. He has led and overseen multi-disciplinary investigations required to demonstrate compliance with the CWA, Endangered Species Act (ESA), National Environmental Policy Act (NEPA) and other federal, state, and local government laws and regulations. Scott received an MS in environmental studies from the University of Montana and BS in biology from San Diego State University.

Erica McCormick , M.Sc., RPA /Cultural Resource Specialist

Erica D. McCormick, M.Sc., RPA, has extensive experience in GIS technologies, cadastral mapping, and tribal consultation. Her expertise is reflected in a Graduate Certificate in GIS and in her membership in the Register of Professional Archaeologists (RPA). As a GIS Analyst and Consulting Scientist, she routinely processes and georeferences Indian Lands and General Land Office (GLO) cadastral data, the products analogous to the Canada Lands Digital Cadastral Data which will be critical to the success of this project. Similarly, she has specialized knowledge of Donation Land Claims (DLCs)-the American equivalent of the Land Claim Settlement Lands, utilized in Canada-and is competent interpreting historical administrative and cultural features on early maps as well as the historical field notes commonly included by the original cadastral surveyors. She regularly directs large-scale cultural resources research projects, incorporating ethnographic and geospatial data from numerous archival, online, and first-person sources.

Ms. McCormick's tribal coordination has included government-to-government relations as a representative of the BLM as well as for the Confederated Tribes of Warm Springs, where she served as Tribal Archaeologist. Consultation has included oral histories, research of traditional plant and animal resources, protection and identification of traditional plants, surveying for and mapping Tribal trails demarcated by early surveyors by tree blazes, and the creation of GIS Deliverables for Tribes. She has access to a range of data sources, which have been significant to her research of aboriginal land use patterns and ethnographic lifeways. Erica has a Graduate GIS Certificate from Portland State University, an MSc in Paleopathology from University of Durham (UK), and a BA in Anthropology from the University of Oregon. Erica is also a registered RPA

Marlene Meaders, M.S. – Fisheries and Ecology

Ms. Meaders is a fisheries biologist with over 11 years of experience. She specializes in environmental risk assessment, habitat analysis, population dynamics, invertebrate ecology, and fish health. Ms. Meaders has a diverse background in identifying habitat conditions for an array of biota, including marine mammals, anadromous and resident fish, and marine invertebrates. In addition, she has created numerous reports and models to aid in the consultation process for fisheries management, aquaculture operations, and environmental permitting. Ms. Meaders is well-versed at baseline studies that require thorough evaluation of background literature related to Environmental Impact Statements (EIS), Environmental Risk Assessment (ERA), Habitat Conservation Plans (HCP) and Biological Assessments/Evaluations (BA/BE). Ms. Meaders holds a master's of science in fisheries biology, focusing on invertebrate biology, from Humboldt State University, and a bachelor's of science in Biological Oceanography from the University of Washington.

Greg Reub, M.S. – Fisheries and Ecology

Mr. Reub has over 27 years' experience related to impact assessment, mitigation, and restoration of natural resources. His expertise is currently focused on integration of science-based strategies to expedite resolution of complex natural resource issues. He has been involved in numerous large and small environmental assessments that encompass aquatic, estuarine, marine, riparian, and terrestrial environments as project manager, lead and contributing scientist, technical negotiator, and expert witness. Mr. Reub has extensive

experience related to Natural Resource Damage Assessments (NRDA), habitat restoration, landscape-level conservation planning, Endangered Species Act (ESA) compliance and environmental assessment and permitting. His projects have focused on determining physical and/or chemical impacts to habitats and then developing innovative restoration/conservation measures for cost effective resolution. Mr. Reub is known for developing and working with interdisciplinary teams to solve interrelated issues ranging from physical and biological relations such as instream flows, fish passage, water and sediment quality, geomorphic changes and vegetation interactions to the social, cultural and political realities associated with natural resources. Mr. Reub has worked in diverse geographic locations including most of the contiguous United States, Alaska, Canada, Colombia, Bolivia, Brazil, Panama, Ecuador, Chile, the Philippines, and Guam. Greg has a MA in Ecology and Systematic Biology and BS in Wildlife and Fisheries Science from South Dakota State University.

Richard Steffel, PhD - Noise

A Principal Consultant at ENVIRON, Mr. Steffel has over 28 years of experience evaluating impacts and mitigation related to mobile and area sources of air pollution, including 15 years conducting transportation and general conformity assessments under state and federal air quality rules. Many of these were transportation projects and/or transit or transit-oriented development or redevelopment projects that included project-level air quality conformity determinations. Mr. Steffel also has over 18 years of experience conducting and managing a wide variety of environmental noise compliance, impact, and mitigation assessments. He has conducted and overseen numerous evaluations of roadway, transit, and development projects which have included consideration of compliance with state and local noise rules along with both federal and state noise impact and mitigation criteria established by the Federal Transit Administration (FTA), the Federal Highway Administration (FHWA), the US Department of Housing and Urban Development (HUD), and various state transportation agencies including the Washington State Department of Transportation (WSDOT). Mr. Steffel has also conducted numerous air and noise studies for new and modified marine port and intermodal facilities. Mr. Steffel has managed and conducted hundreds of air quality and environmental noise studies at the behest of state, county, and municipal agencies and private interests that have included reviews required by the State Environmental Policy Act (SEPA) and/or the National Environmental Policy Act (NEPA). Richard has a MS in Environmental Studies from the University of Montana (Air Quality/ Energy Conservation) and a BA in Anthropology from Georgia State University.

2 Comments

Below are summary statements regarding the comments that ENVIRON addressed from the DEIS. Comments are addressed in several topic areas, including:

A. eelgrass,
B. benthic fauna,
C. bird interactions,
D. habitat restoration
E. water quality
F. wetlands
G. coastal flooding
H. noise

I. recreation

J. cultural value

K. socioeconomics

L. environmental justice

There is an extended discussion of comments for eelgrass, water quality and benthic invertebrates presented in Appendix A. These topics were determined to need special attention because the negative impacts stressed in the DEIS centered around these topics.

A Eelgrass

A1. Propeller Scarring – on page 265 of the DEIS, the authors attempt to compare aerial photography of "propeller scars" in eelgrass beds between 2007 (NAS 2009) and 2010 (NPS data). Although they provide a value for the estimate of area impact in 2007 (50 acres) they do not provide a corresponding area impact value for 2010, even though the data is based on higher resolution photography, which should provide a more accurate estimate of this impact. Further, there is no indication in the DEIS of how long these impacts potentially persist.

It is our contention that the DEIS did not provide a comparative value in 2010 because it is substantially lower than the 2007 estimation, which was "loosely quantified." In fact, calculating the area based on the distance reported for the 2010 data (8.5 miles), and providing a range of possible widths, the area of impact is a minimum of 91% lower than calculated in 2007. Additionally, the maximum area of impact calculated (4.1 acres) represents 0.2% of the total Drakes Estero waterbody and 0.6% of eelgrass habitat available in the estuary.

Finally, and most importantly, the impact is in two forms: temporary and longer term. The majority of the impact from boat use is temporary and minor. This involves grazing the tops of eelgrass leaves; similar to mowing a lawn, which stimulates growth. Regrowth of eelgrass from this type of impact would take approximately 2-4 weeks to recover the original biomass (J. Ruesink, pers. comm., 2011). Further to the point, shoot density remains unchanged, and no long term damage occurs in terms of density. The longer term impact is from the removal of the meristem, which may occur occasionally. Regrowth from this type of impact would typically occur at a rate of 1cm/2 weeks (J. Ruesink, pers. comm., 2011).

Although the majority of impact is temporary, the scars observed from aerial photography represent an accumulation of longer term impact. In other words, the 8.5 mile estimate is not over a single day, but over a much longer period of use (likely over a period of a year or more). (Note that this is based on the fact that the average width of impact would be 3 ft, which would require approximately a year to regrow based on the 1cm/2wk growth rate.) In general, boating in the Estero typically occurs in water deep enough to avoid interactions with eelgrass that would pull up the entire plant. Where these few occurrences occur, plants would be able to regrow within a year if not continuously disrupted.

In summary, this impact should be considered short-term and minor based on the intensity of impact, persistence, and how little of the waterbody is affected.

A2. Boat Use and Transit Plan – on page xxxvi of the DEIS, the authors state that a transit plan must be created by DBOC and submitted to NPS for approval. Additionally, there is language in the DEIS on page xxxvii that would limit boat use by DBOC to two motorboats and two barges, approximately 12 trips per day, 8 hours a day combined. These restrictions are not substantiated and would cause undue burden on DBOC operations.

A vessel transit plan, including GPS boat tracking reports, has already been completed and submitted to NPS. The NPS has disregarded what was submitted in the scoping process and has created an arbitrary lease area in the DEIS (Figures ES-7, ES-9, ES-11). The proposed restriction would make it impossible to access certain oyster beds. A vessel transit plan should definitely be a part of the EIS. However, allowing NPS in the future to "approve" or "not approve" a vessel transit plan gives them the authority to strangle DBOC without a public process. No data or evidence showing harm caused by the existing boat routes has been provided. DBOC would agree to modify its vessel transit plan through use of an adaptive management approach. Adaptive management recommendations would be made by an adaptive management team composed of individuals representing NOAA, CDFG, NPS, CDPH and DBOC. The Marine Mammal Commission (MMC) has recommended this adaptive management team, which should be responsible for all offshore management change decisions.

The boat use restriction would make it almost impossible for DBOC to conduct its business. DBOC actually has had 3 boats for much of the past 5 years, and is on the water for most of the day in order to complete operations. To limit boat use to a combine 8 hours per day would be devastating to operations. There is no justification for this restriction, and it appears that it is in place to functionally debilitate operations if they are allowed to proceed through the SUP.

A3. Uprooting Eelgrass – on page 265 of the DEIS, the authors claim that eelgrass biomass and abundance is compromised because of boat activity and damage from propellers. However, as discussed above, although this may occur to a minor extent, the majority of interactions with eelgrass do not remove the entire plant, and regrowth occurs within 2-4 weeks. Additionally, the references used to discuss this potential impact do not have any similarity with conditions in the estuary.

The disturbance to seagrass discussed in Preen et al. (1995) was related to two major storms and a cyclone, all in succession. These disturbances are, at minimum, several orders of magnitude greater than the disturbance created by boat traffic associated with tending culture operations in the Drakes Estero. Further, the turbidity that remained in the system following these major storm events was related to 1000 km^2 of eelgrass being uprooted. In the second citation provided in the DEIS to support the conjecture of impact, Fonseca and Bell (1998), the only mention of how storms can influence beds was from the quote "We did not determine whether acute wind events periodically act to organize seagrass bed formation through extensive reductions in seagrass coverage, although some systems (e.g. Tampa Bay) can experience marked changes in cover after large storm events." Notably, there is no discussion in the paper regarding scarred beds.

In summary, there is no evidence that eelgrass habitat is being moderately impacted relative to boating activities, and the implication that boating can create turbidity that will further affect eelgrass growth is based on events that are infinitely more intense. Based on the information presented, this impact appears to be negligible in Drakes Estero and has no bearing on the overall quality of eelgrass habitat.

A4. Boat Wake Erosion – on page 266 of the DEIS, the authors discuss how propeller wash can erode eelgrass in navigation channels. The authors are using the cited references inappropriately to try to attribute propeller wash in Drakes Estero. The propeller wash noted by Thom et al. (2003) was based on pleasure crafts (yacht) and ferryboats, which displace much larger volumes of water than the 20-ft long skiffs used in DBOC operations. Koch (2002) was based on more recreational type boating, but they ultimately concluded that negative effects to seagrass were minimal, and even further reduced when boats moved at high speeds during a high tide. Further, Koch (2002) commented that the strongest impact

was from resuspension of a small amount of sediment, and that it was "redeposited within minutes." There is no evidence that propeller wash is occurring in Drakes Estero, and trying to compare navigation channels with the habitat in Drakes Estero, or reporting the results incorrectly, is simply poor science.

A5. Sediment Resuspension – on pages 265 and 266 of the DEIS, the authors claim that sediments are destabilized in Drakes Estero due to the removal of eelgrass from DBOC operations. There is no evidence, and no supporting data, to these claims. First, the work by Anima (1991) was done when Johnson Oyster Company was working in Drakes Estero, and the only mention of disturbing the bottom was associated with the boat dock in Schooner Bay. Second, the reference to boat-generated waves in Koch (2001) was from Stewart et al. (1997), a study completed in the Upper Mississippi River in a major navigation channel. Third, as discussed above, Koch (2002) noted minimal impact generated from a 21-ft V-hulled boat to seagrass habitat.

A6. Introduction of Invasive Species – on page 263 and 266 of the DEIS, the authors attribute the introduction and expansion of *Didemnum* to DBOC operations and mariculture structure. Further, the authors claim that *Didemnum* has the ability to colonize eelgrass. The authors fail to recognize, (1) *Didemnum* was not introduced by mariculture operations, (2) there are many colonial tunicate species in Drakes Estero, (3) because it has the ability to colonize eelgrass, taking out the mariculture structure would only make eelgrass a more attractive substrate for attachment, and (4) current minimization measures that manage for invasive species. In general, colonial tunicates are more problematic for the oyster industry (Jamison 2007) than the local biota in Drakes Estero, and it is in the best interest of DBOC to control the organism. It should also be noted that, even though the NPS claims that they have been monitoring this species, they do not provide any data that it has expanded in abundance in Drakes Estero since initiation of monitoring. In summary, DBOC is not responsible for the introduction of this species, which could just as likely have been introduced by recreational activity, and it provides a service to the NPS through control measures taken during harvest and maintenance activities associated with the farm. If the NPS is serious about managing for invasives, then it should be working with DBOC rather than implicating it in a problem that they did not originate and for which they are improving.

A7. Epiphytic Algae – on page 263, Chapter 4 of the DEIS, the authors suggest that removing the DBOC would reduce potential harm to eelgrass by removing mariculture structures that stimulate the growth of epiphytic algae. In fact, mariculture is more likely to reduce algae production through consumption of nutrients. Further, the authors use inappropriate scientific references to support the mistaken claim.

For example, when Hauxwell et al. (2001) and Dumbauld et al. (2009), cited by the DEIS authors, were discussing vegetation that grows on mariculture structures, they were not talking about epiphytes, they were talking about epiphytic *macro*algae. There is a big difference. Epiphytic macroalgae (e.g., *Ulva*, *Fucus*, *Enteromorpha*) are algal species that colonize on structures and can outcompete eelgrass by shading it out, especially newly recruiting shoots (Hauxwell et al. 2001). Epiphytes (e.g., diatoms) that colonize eelgrass blades are a result of natural processes, but can be overproduced due to nutrient loading in a system (Hauxwell et al. 2001, Nielsen et al. 2004). Shellfish aquaculture can actually control the growth of epiphytes by reducing water column nutrients.

A8. Eelgrass under Oyster Racks – on page 266 of the DEIS, the authors state that bags and racks used for shellfish cultivation have been shown to reduce coverage and density of eelgrass due to shading. To support their claims, they use a number of references from

California and the Pacific Northwest that were interpreted incorrectly. Interactions between shellfish cultivation and eelgrass are not as simplistic as presence/absence. Although there may be space competition in a small portion of the estuary associated with the racks and bags (1%), the water filtration and sediment enrichment benefits that shellfish provide positively benefit more than 92% of the Estero and associated benthic communities. (Note: this value is based on the figure presented in NAS (2009) that DBOC has impacted 8% of eelgrass resources, although 7% was based on boating impacts to eelgrass, which more recent data does not support, as discussed above).

For reference, Rumrill and Poulton (2004) found that spacing oyster longlines more than 5 feet apart resulted in no significant reduction in eelgrass density relative to reference areas: the eelgrass spatial coverage among long lines spaced at 5 or 10 ft intervals was within the range of variability found in reference plots. Longlines spaced closer than 5 feet were found to reduce the spatial coverage of eelgrass. Thus, appropriate spacing was found to reduce the space competition found between mariculture gear and eelgrass, and allowed for the coexistence of mariculture operations and suitable eelgrass habitat. The distance of the most densely clustered oyster racks in Drakes Estero are separated by 16 to 20 feet (K. Lunny, pers. comm., 2011). In addition, many authors have reported that bottom culture can increase eelgrass growth rates, even if the plants are less dense (Peterson and Heck 2001, Newell 2006, Tallis et al. 2009). At most, effects from the presence of aquaculture gear in Drakes Estero can be considered neutral if you consider the amount of space that is impacted due to space competition (1%) compared to the amount of benefits it provides through water filtration, sediment enrichment, and predator refugia (92%).

A9. Erosion under Oyster Racks – on page 267 of the DEIS, the authors claim that oyster racks promote erosion and/or sedimentation. There is little value in this statement. First of all, it is unclear if the authors feel that sedimentation or erosion is problematic in relation to the oyster farm. Second, both of these processes are typical of tidally-driven systems. According to numerous researchers, tidal action is the dominant driver in sediment distribution in Drake Estero (Anima 1991, Elliott-Fisk et al. 2005). Anima (1991) reports that there is an overall sedimentation trend in Drakes Estero. The rate of sedimentation has varied over the history of the estuary. From 8,000 to 3,000 yrs BP the sedimentation rate was 37.5 cm/100 yrs; from 1,200 to 1,700 yrs BP the rate was 3.8-6.4 cm/100 yrs; and finally a calculated short-term deposition rate of 9-60 cm/100 yrs. In general, Anima (1991) reports that sedimentation has increased in the last 150 yrs, which he attributed to increased land use as a result of population growth. Actions that he attributed to the sedimentation rate included trail and road use, road building, increase in paved areas that increase the amount of surface runoff, and cattle grazing. However, overall, the rate of filling was similar to other West Coast lagoons.

Anima (1991) also described how the estuary can be dominated by sedimentation processes in some years and erosional processes in others. Drakes Estero is an open-coast system, which have direct influence on the distribution of sediment inside the estuary. When the entrance is to the extreme west (as in 1953 and 1974), oceanic wave and tidal approach is nearly aligned with the main arm of the tidal channel and carries sediment suspension further into the lagoon. When the mouth is in a west side configuration, incoming waves and tides attack the adjacent cliffs, and result in increased erosion.

Finally, filter feeders play an important role in the deposition of fine grained sediment. Suspended matter removed by oysters is deposited as feces and pseudofeces (biodeposition). The rate of biodeposition has been reported to be seven times faster than

the deposition of solids by gravity or settling from suspension (Haven and Morales-Alamo 1966 as cited in Anima 1991). The authors also observed that the biodeposition rate of other common invertebrates equals or exceeds that of oysters. Further, according to Harbin 2004 as cited in Elliot-Fisk et al. 2005), the amount of organic matter resulting from pseudofeces produced by suspended oysters is far less than the amount of organic matter resulting from eelgrass decomposition, considering how expansive and dense the beds are within the estuary, making any significant organic inputs from the oysters undetectable (Harbin 2004 as cited in Elliott-Fisk et al. 2005). The Elliot-Fisk et al. (2005) report went on to conclude that "We found the oyster racks to have no pronounced impacts on the eelgrass beds, which existed both under and away from the racks as an incredibly rich habitat type." Overall, DBOC oyster racks account for 0.6% (7 acres out of 1,152 acres) of the total intertidal habitat within the Estero. Therefore, the increased sedimentation rate associated with the racks is an insignificant portion of the overall sedimentation in the estuary contributed by tidal action, eelgrass habitat and other invertebrates. More importantly, the presence of oyster racks is not inhibiting eelgrass growth in Drakes Estero.

A10. Expansion of Eelgrass Habitat – on page 262 of the DEIS, the authors note that eelgrass habitat in Drakes Estero has expanded from 1991 to 2007, but that this expansion cannot be attributed to the shellfish operations (they do not attempt to explain what other cause could be related to this expansion). Shellfish have been shown by multiple researchers to provide benefits to eelgrass habitat (Reusch and Williams 1998, Peterson and Heck 2001, Newell 2006). Additionally, areas that see expansion of culture (as long as it is within carrying capacity of the system) have also seen an increase in seagrass habitat (Ward et al. 2003). Even if the benefits that shellfish provide are not recognized, it is obvious that, under the environmental baseline, DBOC operations are not having a negative impact on eelgrass, as eelgrass coverage has doubled in the last 16 years (Figure A-1).

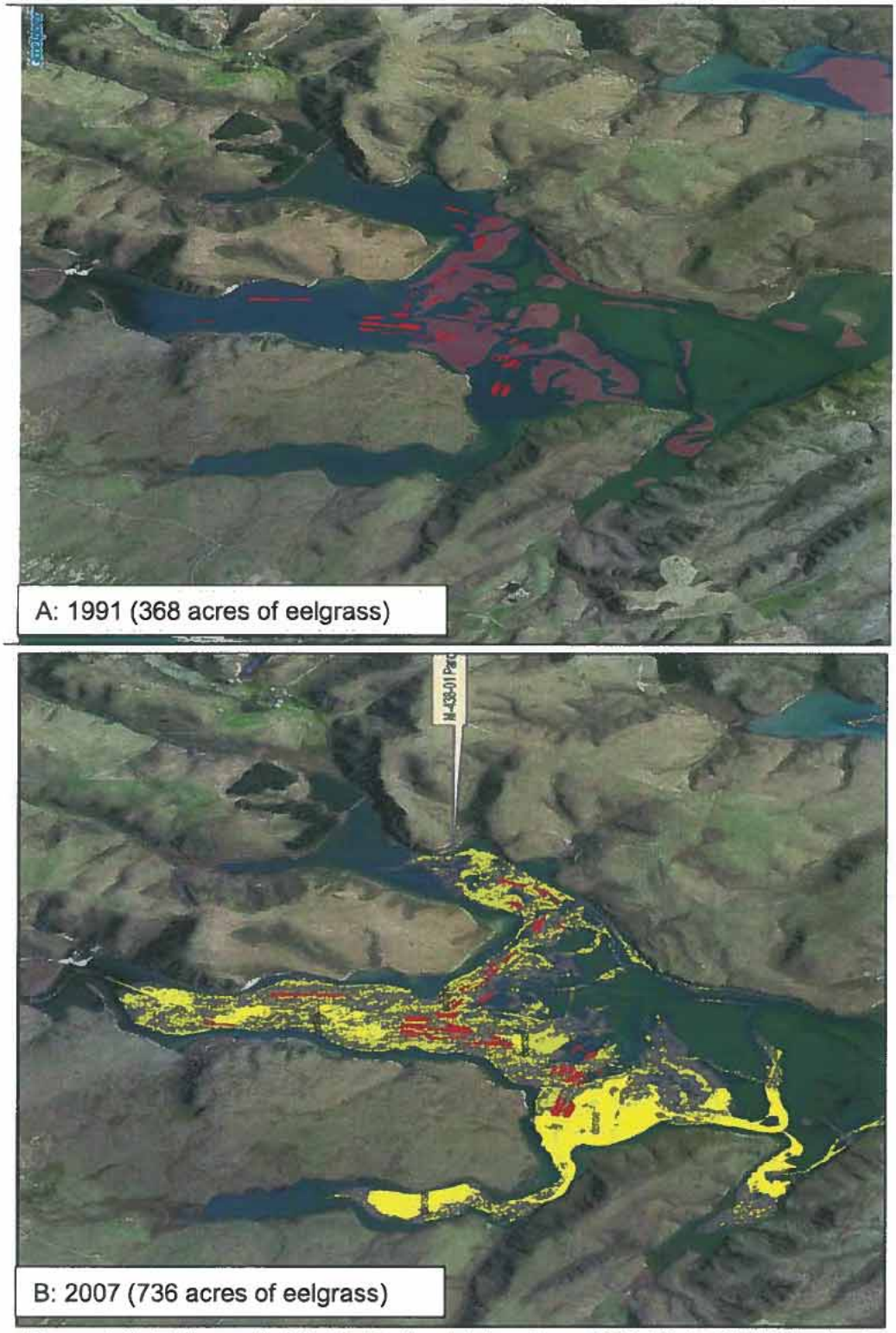

Figure A-1. Eelgrass habitat in Drakes Estero from 1991 (A) to 2007 (B). Aerial photography shows a doubling of eelgrass habitat in sixteen years. Red = the location of oyster racks (7 acres).

A11. Failure to Note Potential Eelgrass-Mariculture Relationship – Scientists at San Francisco State University are studying the synergistic relationship between the native oyster and eelgrass. The native oyster filters the water and allows better light penetration that benefits the eelgrass. The large patch of eelgrass shown in Figure A-2 is directly adjacent to one of the Marin Rod and Gun Club (MRGC) oyster reefs (see section D for additional information on the MRGC project.

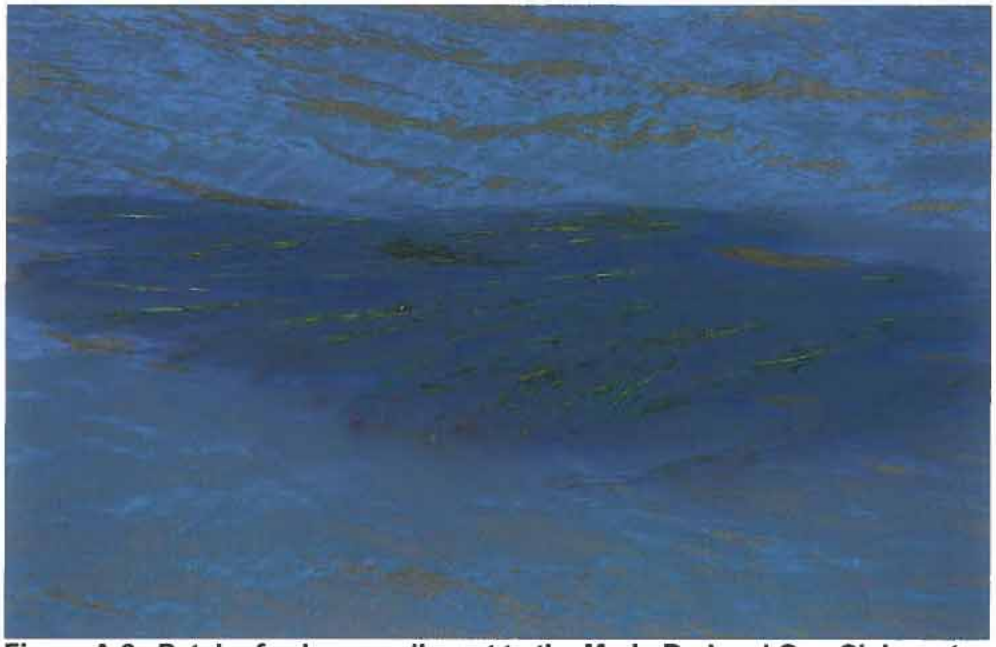

Figure A-2. Patch of eelgrass adjacent to the Marin Rod and Gun Club oyster reefs.

B Benthic Fauna,

B1. Bivalve Competition–on page 274 and 278 of the DEIS, the authors claim that mariculture in Drakes Estero will result in the escape of non-native bivalves from cultivation, which would become established in Drakes Estero and outcompete native benthic species. This contention does not make sense biologically or in terms of potential carrying capacity in the estuary.

Elliott-Fisk et al. (2005) reported that the water temperature in Drakes Estero is too low for Pacific oysters to successfully reproduce (per Fred Conte, University of California, Davis), which leads to these species being incubated on shore for several weeks before they are placed on the wooden racks for grow-out. In contrast, the Manila clam has been shown to successfully naturalize in a system in which it was introduced. However, when populations of feral clams dominate a system conditions are typically eutrophic (Pranovi et al. 2006, Humphreys et al. 2007). In other words, Manila clams thrive in poor water quality conditions. This is not the case in Drakes Estero. Although there is nutrient loading from freshwater sources, it is not in a quantity that is causing eutrophication (Anima 1991).

The second claim that non-native oysters will outcompete native benthic species is also misinformed. Although it is true that aquaculture adds bivalves to a system that will directly compete for space and resources with native bivalves, there is no indication that Drakes Estero is at or near carrying capacity. In a study by Elliott-Fisk et al. (2005), the authors reported that, "the relative abundance of ostracods and bivalves approximately doubles between the racks and 50 meters away." If the system were at carrying capacity, then there would be signs of nutrient limitation and even a stimulation of algal growth rates (Prins et al.

2006). If there is consistent tidal flushing, an increase in benthic invertebrates and bivalves in association with oyster racks, and additional inputs from upland habitat, Drakes Estero is unlikely to be close to carrying capacity. Although there is no data that can be presented to fully support this claim, it cannot be stated that oysters are outcompeting native benthic species.

B2. Introduction of Shellfish Diseases – on page 274 of the DEIS, the authors claim that mariculture in Drakes Estero has the potential to introduce bivalve diseases into the estuary. As noted above, regulations are in place to control the possibility of disease or species introduction from the transport of oyster seed. The 1998 FONSI for the NPS EA for construction and replacement of facilities at Johnson's Oyster Company (JOC) stated, "to mitigate any impacts related to this issue ["hitch-hiking" alien species], both JOC, and the CDFG have agreed to establish a policy of zero tolerance, develop a risk assessment, and protocols for importing Mexican oysters into Drakes Estero." As detailed above, the current measures that minimize the risks of invasive species introductions are principally associated with the use of larval seed from West Coast hatcheries that are prescreened for pathogens and invasive species, and authorized for interstate export only after review by state agencies. The seed is certified free of disease and pests by a USDA/APHIS certified veterinarian. All shellfish seed imported into California must be certified disease free by a USDA/APHIS certified veterinarian and are regulated by the CDFG by an importation permit. All of the seed comes from hatcheries in Washington, Oregon, and Hawaii. Growers no longer import wild seed from out of the country. These hatcheries submit seed inspection reports on a regular basis to the CDFG. CDFG only allows importation of seed from established hatcheries with a minimum two-year history of documented absence of disease. In view of these precautions, and shellfish growers ongoing interest in keeping their growing waters free of hazardous exotic species, current shellfish farming practices at Drakes Estero pose little risk of causing new introductions of invasive or exotic species. The continuation of claims that diseases are introduced by practices employed at the Drakes Estero are simply not supported by existing data, nor do they recognize the best management practices and regulatory regimes in place for many, many years that address and significantly minimize this risk.

B3. Invasive Tunicate, *Didemnum* – on page 274 of the DEIS, the authors discuss the invasive tunicate, *Didemnum* sp., which is found in Drakes Estero and has the potential to smother habitats and inhibit normal biological functions of benthic fauna. In addition, on page 275, the claim was made that maintenance activities can fragment *Didemnum* and thus increase their dispersal. The concept that *Didemnum* is "smothering" habitat is misleading. The reference associated with this information, Mercer et al. (2009), indicated that *Didemnum vexillum* was able to colonize cobble-pebble substrates and form mats on the seafloor. As a result, there were "subtle shifts" in the benthic community, and the authors state in the conclusions that "the abundance of epifaunal organisms was not significantly affected by presence of the ascidian mats."

The second comment that DBOC operations will fragment and spread *Didemnum* is also misleading. It is true that colonial tunicates will fragment, but it is also true that because *Didemnum* is primarily isolated to mariculture structure in Drakes Estero, DBOC is able to effectively control this species through harvest and maintenance activities. While *Didemnum* has been observed among the oyster racks in the Estero, what is not recognized is that this species has been established in many locations along the entire West coast from southern California to British Columbia. It was first recognized in San Francisco Bay in 1993 (http://woodshole.er.usgs.gov/project-ages/stellwagen /didemnum/htm/page10. html) and culture operations were not the source of its introduction. It is clearly a structure-associated

species, but as such creates a nuisance for principally the grower, not the Estero environment, as other hard substrate is extremely limited in the Estero. If NPS is serious about trying to control colonial tunicates, then they should be working with DBOC to remove the species from the system rather than implicating them in causing a problem that they did not originate.

B4. Fouling Organisms – on page 274 of the DEIS, the authors indicate that shellfish mariculture can support a variety of fouling organisms. Aquaculture gear is well known for providing artificial reef habitat for a variety of organisms. However, the use of the term "fouling" (a.k.a., sessile organisms) is a misnomer in terms of the local biota in Drakes Estero. The reference used in the DEIS (Light et al. 2005) is related to freshwater organisms (*Cordylophora caspia* (the "sponge", really a hydroid), *Urnatella gracilis* (the goblet worm), and *Balanus improvisus* (the barnacle)) associated with ship fouling. None of these organisms have any relation to Drakes Estero. Although organisms do colonize mariculture gear in Drakes Estero, the only "fouling" and nonnative organisms reported are the colonial tunicates (*Didemnum lahilei*), bryozoans (*Schizoporella unicornis* and *Watersipora subtorquata*), and sponge (*Halichondria bowerbanki*) (Elliott-Fisk et al. 2005). Common organisms that were likely native, but because they were only identified to genus their status was left as unknown, included *Balanus* (barnacle), *Botrylloides* (chain tunicates), *Botryllus* (colonial tunicates), *Obelia* (hydroid), and *Spirorbis* (polychaete worms).

Organisms that colonize aquaculture gear are typically sessile organisms that require hard substrates for attachment (Dealteris et al. 2004; Pinnix et al. 2005); however, the result is typically a diverse biota of organisms that provide additional food resources for fish and larger invertebrates.

B5. Benthic Fauna Abundance – on page 275 and 277 of the DEIS, the authors cite references that indicate that certain benthic species are lower beneath oyster racks relative to other natural habitats. In one sense they are correct. *Certain* organisms are lower in abundance (i.e., those that prefer mudflat habitat over hard structures). However, the overall benthic biota typically increases from mudflat assemblages to more reef-like assemblages with the introduction of mariculture structure. This occurrence was recognized in Elliott-Fisk et al. (2005; of which Harbin was an author), which stated, "the relative abundance of ostracods and bivalves approximately doubles between the racks and 50 meters away." Additionally, many researchers have reported that oyster beds or aquaculture gear are equal (or superior) to adjacent eelgrass habitat in terms of the diversity and abundance of benthic fauna and fish (Meyer and Townsend 2000, DeAlteris et al. 2004, Pinnix et al. 2005, Powers et al. 2007).

Although these changes are a product of mariculture structure, it is false to state that the benthic biota is lower. Additionally, the influence of mariculture structure to the benthic biota in Drakes Estero does not extend significantly beyond the structures themselves. Aquaculture in the Estero represents a total of 12% (142 acres out of 1,152 acres) of potential intertidal habitat for benthic fauna. (Note: there were many figures presented in the DEIS for intertidal habitat, this figure was reported on page 166 from Anima (1991)). Therefore, this effect can be considered at worst minimal, even though it provides a benefit to food resources for fish and larger invertebrates

B6. Non-Catch Mortality – on page 275 of the DEIS, the authors quote a term from Kaiser (2001) called "non-catch mortality". Non-catch mortality is a term used in fisheries biology for mortality caused by fish that are not collected, but affected by the fishing process. This makes sense since the Kaiser (2001) reference is in relation to fish aquaculture. It has no meaning in shellfish aquaculture. The fact that benthic organisms that have colonized the

bags, which in other locations of the DEIS are called "fouling organisms," are a product of aquaculture structure. Because these organisms would not be present in the densities observed without the presence of the oyster bags, taking them out of the system during harvest does not impact the population. In addition, some of these organisms are returned to the environment before bags are processed, thereby reducing this potential effect even further.

B7. Displacement of Benthic Fauna in Schooner Bay – on page 275 of the DEIS, the authors indicate that there is direct destruction of native benthic fauna by boat propellers and dredging. Although motor boats would not be present in Drakes Estero if DBOC is not operating, there is no indication that disturbance of sediment would cease at the boat dock in Schooner Bay. On page 353 of the DEIS, the authors indicate recreation by kayakers would continue, and even increase, following removal of DBOC facilities. In addition, on page 276 of the DEIS, the authors indicate that recreational clamming would continue in the Estero, which would also result in disturbance of the benthic fauna. According to Logan (2005), recreational clamming was shown to have a significant impact on the abundance of macrofauna in a mudflat in Maine. Therefore, there would still be a disruption of sediment from recreational activities.

In terms of dredging, DBOC has never dredged. They have asked for a one-time permission to dredge at the dock as a part of the EIS (Lunny, pers. comm., 2010). The insinuation that dredging is a part of typical operations is a gross misrepresentation of information. Because no option would change these recreational activities, and because dredging would occur as a one-time event, this statement should be taken out of the EIS.

B8. Purple-hinged Rock Scallops – on page 279 of the DEIS, the authors claim that purple-hinged rock scallop is only likely to occur in Drakes Estero in larval form. This statement is false. They can be found at all low tides in many parts of Drakes Bay in adult form. It is difficult to not step on them in some places. In addition, purple-hinged rock scallops and the Olympia oyster (native oyster) were historically harvested by JOC for commercial sale. This misrepresentation was brought to the attention of the Inspector General of the National Parks Service. In fact, Drakes Bay Oyster Company has tried to obtain authorization to cultivate both the native Olympia oyster and the purple hinge rock scallop, but the NPS has inappropriately resisted authorization to cultivate these species even though they grow naturally in Drakes Bay. These are native species that are important ecologically and commercially. They are found all along the Pacific Coast and recently they have become a candidate for commercial cultivation.

The native Olympia oyster is considered a keystone species because they create hard vertical structure off the bottom that becomes the essential microhabitat for many species of invertebrates and fish. Because they are so important ecologically, there has been a major effort to restore them to San Francisco Bay. They are also commercially sold as a specialty oyster product at oyster bars. The Hog Island Oyster Company in Tamales Bay is aggressively moving ahead with plans for cultivation and marketing of the Olympia oyster (see www.fiesta.bren.ucsb.edu/~oyster/Native%20Oyster%20Aquaculture/). The University of California at Santa Barbara is considering supporting a research program for the aquaculture of the Olympia oyster to support restoration (Hudson et al. No Date)

The same holds true for the purple-hinge rock scallop. Although they are slow growing, they would provide a product diversification option for the farm. The purple-hinge rock scallop has recently become a serious aquaculture candidate as scientists have worked out methods to induce spawning and provide nutrition during the early life history of this species while they are free swimming (Leighton and Phleger 2009).

The commercial culture of the Olympia oyster and purple-hinged rock scallop by DBOC would allow the farm to re-establish native species in Drakes Estero (a NPS goal), fulfill a market need, and diversify their product line. This is particularly important now that there is a crisis in the oyster seed production industry. Growers are dependent on hatchery in Washington, Oregon and Hawaii, and in 2011 hatcheries were forced to provide only a fraction of the orders since they were not able to keep the larvae alive. The causes are under investigation.

B9. Mud Snail, *Batillaria attramentaria* – on page 279 of the DEIS, the authors state that the nonnative mud snail, *Batillaria attramentaria*, was introduced by JOC and that it is detrimental to the native snail. The introduction of *B. attramentaria* was from the import of Pacific oysters from Japan in 1932 (Byers 1999). Byers (1999) goes on to report that Drakes Estero contained predominantly Cerithidea with a few populations of Batillaria in Schooner's Bay. In fact, the author indicates that "The population of *Batillaria* in Drakes, however, remains very restricted – likely a major reason for its apparent absence from previous surveys." As noted above, the introduction of seed from outside Drakes Estero is highly regulated, and the importation of oysters from Japan no longer occurs. Given the limited distribution of this species, it does not pose a problem to the biota of Drakes Estero.

B10. Invasive Species Management – on page 280 of the DEIS, the authors claim that the presence of the DBOC in Drakes Estero hinders the NPS efforts to management invasive species and influence the amount of time that a natural benthic faunal community can be re-established. This statement is both misleading and falsely emphasized. The NPS does not provide any indication in the DEIS of what they actually do for invasive species management. DBOC does nothing to prevent them from exercising their right to provide such management. In fact, it would be beneficial for both parties if NPS were willing to work with DBOC to further control invasive tunicates. DBOC is currently managing invasives associated with their farm and structures, as discussed above, which is more efficient than any program that NPS could provide for the Estero, including:

1. They are able to remove organisms that colonize structure from the Estero during harvesting and processing of shellfish.

2. DBOC has long abandoned past practices of importing shellstock from overseas, the primary vector for past invasive species introductions from shellfish aquaculture.

3. Boats and gear used in DBOC operations are not moved outside of the Estero, thus preventing spread through hull fouling or gear introduction. Incidentally, there is more potential to introduce organisms through recreational boaters or clam harvest due to unwashed gear that was used in other waterbodies.

4. The DBOC project description includes a sediment basin and filter system to further reduce the release of invasive tunicate fragments in shellfish wash water discharge.

In terms of natural benthic faunal community re-establishment in areas of DBOC aquaculture, the farm affects 12% (142 acres out of 1,152 acres) of potential intertidal flat habitat, much of which native species are thriving due to the benefits provided by aquaculture structure and filter-feeding organisms. Additionally, as discussed in above, there is a recorded increase in native benthic fauna associated with mariculture structure (Meyer and Townsend 2000, DeAlteris et al. 2004, Pinnix et al. 2005, Powers et al. 2007). The presence of DBOC in Drakes Estero is at most a minimal impact on benthic fauna, and more likely provides a benefit to foraging resources for fish and larger invertebrates. As previously stated, if NPS is serious about trying to control invasive species, then they should

be working with DBOC to remove the species from the system rather than implicating them in causing a problem that they did not originate.

B11. Tidal Cycling and Eelgrass – on page 278 of the DEIS, the authors claim that nutrient cycling in West Coast estuaries has more to do with the tides and upwelling, and that the eelgrass population in Drakes Estero controls the cycling of organic materials to the sediments. Although we do not disagree that Drakes Estero has a short residence time for water in most of the estuary, and that eelgrass is a major contributor to the cycling of organic materials, it should be recognized that the shellfish present in the Estero provide a benefit to the environment, even if in more localized areas.

The combined filtering activity of the millions of filter-feeding shellfish being grown in the Estero clears as much as 350,000 m^3 each day, removing particles as small as 2 microns (R. Rhealt, pers. comm., 2010). This represents 4% of the volume of water in Drakes Estero (est. total volume of 7,680,000 m^3 by NOAA 2011), which is small, but not an insignificant amount.

Finally, Dumbauld et al. (2009) is consistently misused throughout the DEIS. Dumbauld et al. (2009) never claim that West Coast estuaries are controlled by the tides and upwelling. They state that, "water column and sediment nutrient concentrations are generally relatively high and greatly influenced by the proximity to deeper nearshore ocean waters where upwelling controls production during summer months" [emphasis added], in other words, when freshwater inputs are at their lowest. To make the jump that shellfish filtration has no beneficial influence on water quality (or only localized benefit) is a false statement.

C Bird Interactions

C1. Foraging Birds – With regard to impacts to foraging birds, the scientific record does not support a conclusion that shellfish farming negatively impacts bird use as posited in the DEIS. In fact, there is strong evidence that shellfish, whether cultured or wild, forms an important source of food for a wide variety of marine shorebirds, marine seabirds, and raptors (Dankers and Zuidema 1995, Norris et al. 1998, Hilgerloh et al. 2001, Lewis et al. 2007).

Studies have shown either positive impacts—increasing avian species richness and abundance due to increased forage opportunities, or benign impacts—eliciting no significant difference in use from natural beds. Through their foraging habits, migrating marine shorebirds can significantly alter the community structure of wild bivalve populations in soft-bottom intertidal areas (Lewis et al. 2007). At shellfish aquaculture sites, some species of marine shorebirds feed directly on the shellfish products themselves (e.g., Dankers and Zuidema 1995), while others feed on the macrofauna and flora that colonize shellfish aquaculture gear (e.g., Hilgerloh et al. 2001). Taylor Shellfish in Washington State has documented many bird species foraging on their shellfish beds, including dunlins, killdeer, godwits, sand pipers, eagles, great blue herons, and gulls. Figure C-1 presents a few of the species mentioned using shellfish beds for foraging.

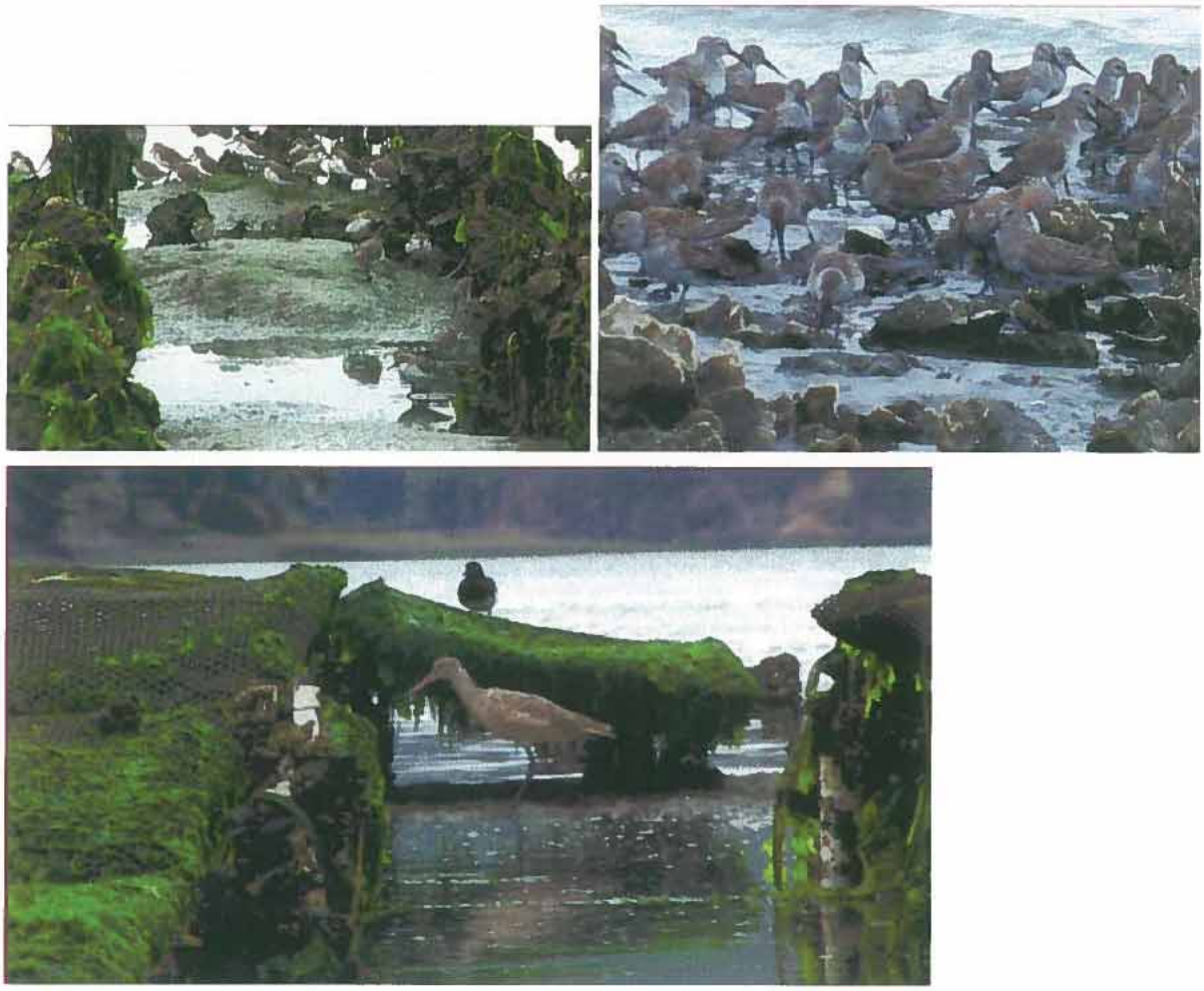

Figure C-1. Marine shorebirds, sand pipers (top left), dunlins (top right), and godwits (bottom), foraging on Taylor Shellfish oyster and clam beds.

Furthermore, shellfish aquaculture sites influence the abundance of marine shorebirds. For example, Connolly and Colwell (2005) reported that seven of 13 marine shorebirds and three of four wading birds were more abundant on oyster longline plots compared to reference sites. Although marine shorebirds feed at shellfish aquaculture sites, the aquaculture sites themselves do not necessarily attract larger numbers of birds than non-cultured areas (Hilgerloh et al. 2001). For instance, Zydelis et al. (2006) found that natural environmental attributes were the primary determinants of densities of wintering surf scoters and white-winged scoters in Baynes Sound, B.C. Moreover, the authors found that shellfish aquaculture variables did not necessarily predict bird densities for both scoter species. According to Zydelis et al. (2006), these findings suggest that winter scoter populations and the shellfish aquaculture industry may be mutually sustainable. In other words, there was no evidence of a negative impact on winter scoter populations at the current level of shellfish farming practiced in Baynes Sound, B.C. Indeed, Connolly and Colwell (2005) found that shellfish aquaculture in Humboldt Bay, California did not negatively affect the foraging behavior of most marine shorebirds studied.

C2. Use of Oyster Shell by ESA-list Species – The DEIS failed to recognize some significant use of oyster shell that DBOC donates for the habitat restoration of ESA-listed bird species. DBOC donates oyster shell to the San Francisco Bay Observatory and the Pt. Reyes Bird Observatory to improve hatching and fledging success of the Western snowy plover

(federally threatened species). These efforts have been highly successful. In an article printed in the *Chinook Observer* by Long (2005), oyster shell was shown to be ideal for plover nests. USFWS reported nearly a doubling in successful chick hatching from 2001 to 2002 with the addition of oyster shell in a restoration area on Leadbetter Point, Washington (Long 2005). WDFW and USFWS have reported consistently successful nesting populations as a result of oyster shells to the restoration site in 2006 and 2007 (Pearson et al. 2007, 2008). Figure C-2 provides photographs sent by Caitlin Robinson at the San Francisco Bay Bird Observatory of snowy plover use of oyster shell for nesting success and predator refugia.

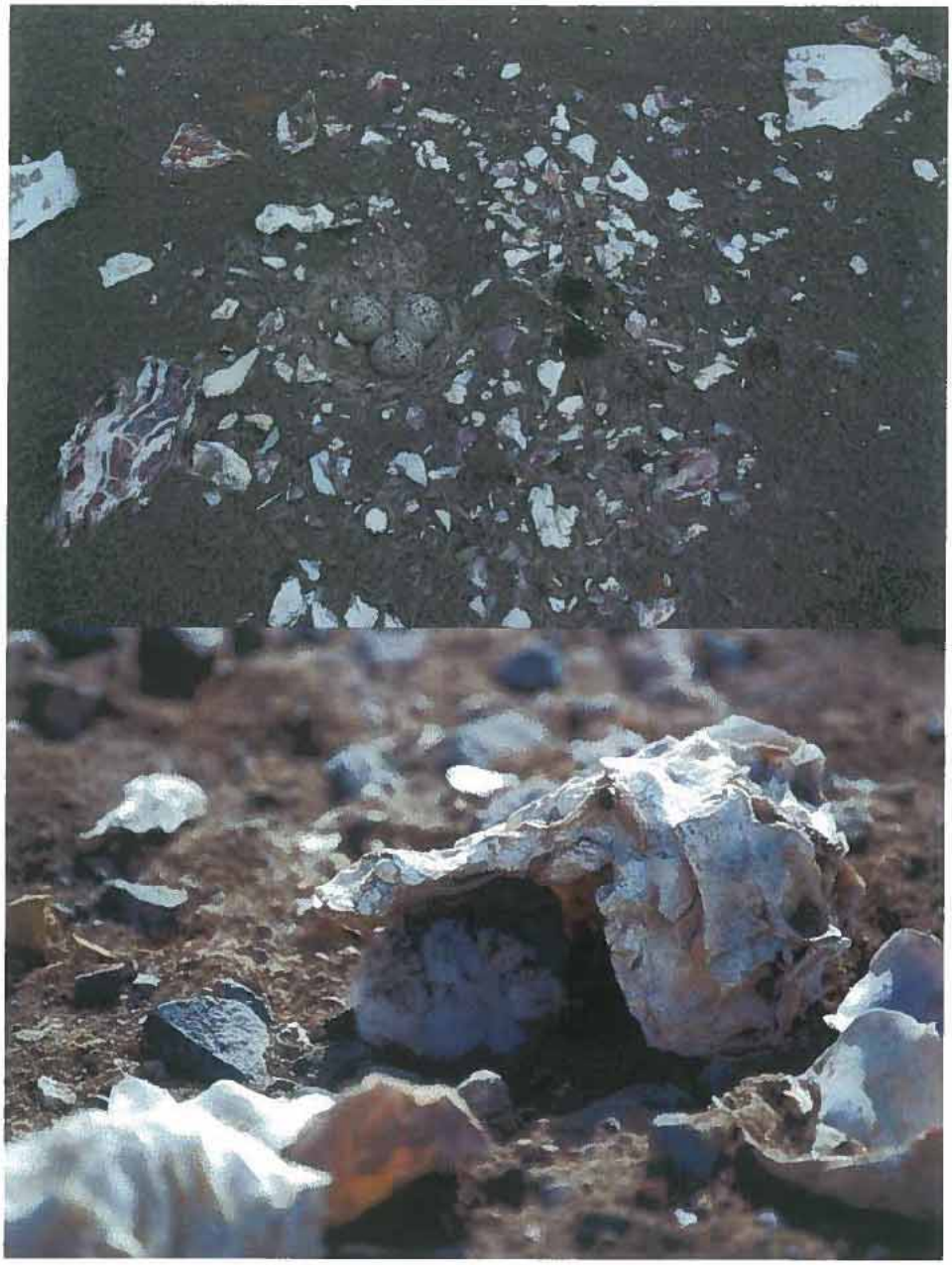

Figure C-2. Photographs of snowy plover (federally threatened species) using oyster shell for nesting success (above) and predator refugia (below).

The second program for which DBOC donates shell is the least tern (federally endangered species) habitat enhancement through the California Department of Fish and Game. This program has also been highly successful.

It is interesting that the NPS fails to recognize that the wilderness area and Limantour spit (about a ½ mile from the end of the shellfish lease) were locations of snowy plover nesting until 2000. The likely reason for the loss of snowy plovers has been attributed to human disturbance from seashore visitors to the park (Lunny, pers. comm., 2011). It is also interesting that the 1998 EA written by NPS declared that no special status species would be affected from the same project interactions from which it is all of a sudden claiming negative impacts. In summary, DBOC is doing a great deal of habitat restoration that is positively affecting the success of ESA-listed bird species. If DBOC operation no longer existed, these programs would require trucking in shell from out-of-state sources to continue because there is no other shellfish company with the capacity to donate oyster cultch. In that case, some of these programs may fail due to the prohibitive cost of trucking in shell.

D Habitat Restoration

D1. Failure to Discuss Benefits of Habitat Restoration – The National Park Service has omitted the importance of the oyster shells provided by DBOC to restoration projects in San Francisco Bay for habitat restoration. Without DBOC's contribution of shells for restoration projects the shells would have had to be imported from Washington State, and it is uncertain whether the restoration project would have gone forward.

The Marin Rod and Gun Club (MRGC) has supported a native oyster restoration project since 2005. The restoration project uses oysters cultch donated by DBOC (~100 cubic yards of oyster shells) to build reef mounds that approximate the ecological functionality of a coral head or a constructed reef ball (a.k.a., an artificial reef) in San Francisco Bay (Figure D-1). The artificial reefs, created with the bagged oyster shells (Figure D-2 and D-3), were constructed near the Port of Redwood City, in the South Bay, near Berkeley Marina in the Central East Bay and at the MRGC in the North Bay. The reef mounds were then seeded with native oysters (Olympia oysters) that use the shell for attachment. The reefs are anticipated to support nearly 250,000-500,000 oysters.

There is evidence that the reef-like habitat created by shellfish aquaculture gear or oyster beds can be equivalent to the biodiversity observed in eelgrass beds (Dumbauld et al. 2000, Meyer and Townsend 2000, Pinnix et al. 2005, Powers et al. 2007, Dumbauld et al. 2009). The reefs provide a substrate for the colonization of numerous organisms, creating an invertebrate community that increases prey resources. For example, the spawn of Pacific herring, a common forage fish for salmon, seals, marine mammals, and marine sea birds, has been observed on the reef mounds (Figure D-4). Salmon use of MRGC artificial reefs is being tracked by radio-tagged hatchery smolts to understand the extent of utilization. Anecdotally, fishermen claim that they catch more fish near the reefs. Volunteers have also observed seals and marine sea bird use of the reefs for foraging.

The value of these donated oyster shells is both in terms of the shells that provide the necessary structure for attachment and the comparable cost and greenhouse gas effect of transporting these shells from out of state. If DBOC is not allowed to continue operations, the cost of obtaining this shell from a different source may prohibit the continuation of this highly successful project.

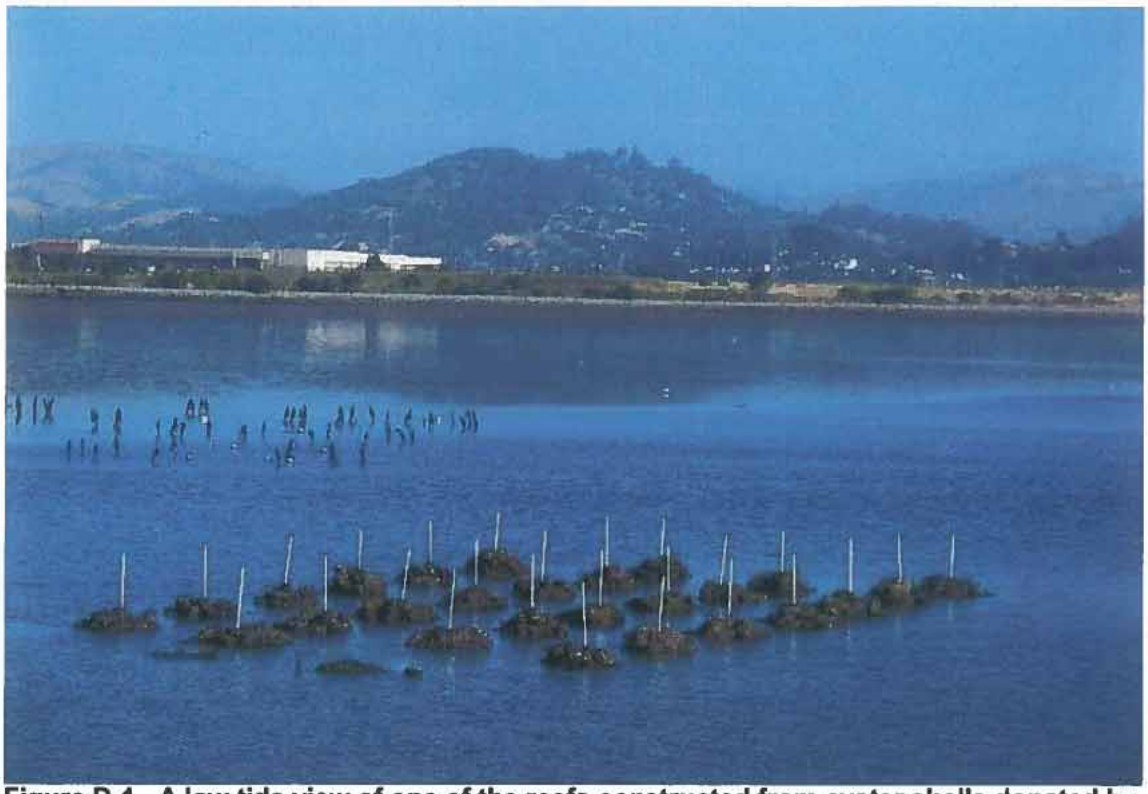

Figure D-1. A low tide view of one of the reefs constructed from oyster shells donated by Drakes Bay Oyster Company.

Figure D-2. Volunteers bagging oyster shells donated by Drakes Bay Oyster Company. These are middle school students that had a great time and learned a lot about oyster biology.

Figure D-3. A truck load of bagged oyster shells donated by Drakes Bay Oyster Company that were used in the construction of artificial reefs at the Marin Rod and Gun Club and near the Berkeley Marina.

Figure D-4. Herring eggs laid on oyster shells donated by Drakes Bay Oyster Company.

E Water Quality

F1. Bivalve Contribution to Water Clarity – on page 337 of the DEIS, the authors claim that the bivalves in Drakes Estero do not contribute significantly to water clarity because the estuary is not a highly turbid system and has low residence time in most of the Estero. There are three basic points that contradict this statement: (1) the shellfish in Drakes Estero are in the best possible position to control the pathogen levels and nutrient loading from cattle ranching and other terrestrial input sources (e.g., the 2.4 million visitors to the national park every year), (2) if the benefits from shellfish are considered local and minor, then by the same token the impacts should be considered local and minor, and (3) tidal flushing is not the same for the entire estuary, and protected pockets at the upper arms of the Estero stand to benefit the most from the presence of DBOC shellfish.

F2. Water Quality Monitoring – on page 339 of the DEIS, the authors claim that removal of shellfish mariculture will not modify the water quality appreciably. However, even though it is admitted on page 342 of the DEIS, in this section the authors are failing to recognize that shellfish are currently providing mitigation for nutrient loading in the system from cattle ranching upstream. As indicated above, pathogen and nutrient loading has been documented by CDPH in association with cattle ranching in the upper portion of the basin. Further, the shellfish in the Estero are positioned to control these influences to water quality through filtration, biosequestration, and denitrification. If the shellfish are removed, then how does NPS intend to counteract this issue?

Tidal flushing of the upper arms of Drakes Estero is not as significant as the main part of the estuary. Although there are native species of bivalves in the system, they are not as efficient at treating nutrient loading as the species and densities provided by DBOC. Further, eelgrass habitat has doubled in the last 16 years in Drakes Estero, which has been attributed to the presence of DBOC shellfish (Bartley et al. 2009, NAS 2009)--a finding that the DEIS does not recognize, and does not provide any other reason for its occurrence. In summary, the evidence supports that DBOC operations improve and mitigate water quality impacts to the Drakes Estero, not impact it as contended in the DEIS.

F3. Omission of Biosequestration Benefit – shellfish cultivated at the Estero help to mitigate for excessive nutrient contributions through harvest. No mention is found of the Nitrogen (N) and Phosphorous (P) removal benefit associated with the action alternatives.

The rate of nitrogen removal from harvest is dependent on species-specific filtration rates, which may be modified as well by local water quality conditions that affect physiological parameters of the shellfish (e.g., water temperature, zooplankton abundance, etc.). Thus, estimates for total nitrogen in oysters, including shell, range from around 0.2 to 0.5 g N/oyster, with variation depending on species, condition, size, and geographical location. The harvest of approximately 4.3M oysters and 1M clams annually from the DBOC results in the direct removal of approximately 2,500 kg N and 750kg P from these sensitive waters (R. Rhealt, pers. comm., 2010). Excessive contributions of inorganic nitrogen (ammonia and nitrate) is recognized as the primary cause of degraded water quality, hypoxia, habitat loss and biodiversity in our nation's coastal ecosystems (NOAA 2009). Shellfish cultivated at the Estero help to mitigate for these excessive nutrient contributions through harvest.

F4. Omission of Denitrification Benefit – mariculture causes denitrification, which makes nitrogen available to be fixed by different microbes in the terrestrial rhizosphere. This environmental benefit would be gained in the action alternatives, but no mention is made of the benefit in the DEIS.

Anthropogenically enhanced sources of N and P, such as agricultural run-off and septic-tank discharge, can result in enhanced phytoplankton production and blooms of both toxic and nontoxic microalgae (Newell et al. 2005). Bivalve filter-feeding serves an important role in improving water quality conditions through benthic-pelagic coupling, which is the consumption of nutrients and creation of biodeposits (feces and pseudofeces). N and P that are not digested and incorporated into tissue are processed through the bivalves and excreted as soluble ammonia and biodeposits of mucous-bound feces and psuedofeces. When these biodeposits become incorporated into aerobic surficial sediments, microbially-mediated processes facilitate nitrification-denitrification coupling to permanently remove sediment-associated nitrogen as nitrogen gas (N_2) (Newell 2004). According to Newell et al. (2005), "the species of bivalves that can exert the greatest influence on benthic-pelagic coupling are those, such as oysters and mussels, which maintain high clearance rates and reject relatively large amounts of POM as pseudofeces." Newell et al. (2002) calculated that under aerobic conditions in a laboratory, oysters resulted in denitrification of ~20% of the added N. Therefore, oysters are very effective in achieving the long-term goal of improving water quality in Drakes Estero.

F5. Mariculture Debris – on page 339 of the DEIS, the authors indicate that mariculture debris has been found on mudflats and shorelines of Drakes Estero. Mariculture debris mentioned in the DEIS is an issue that DBOC inherited from the previous owners (Johnson Oyster Company (JOC)), for which they have made dramatic strides to clean-up. JOC began using plastics in the early 1960s in its rack and stake culture. Both culture methods used the black plastic spacers, and the stake culture also used plastic coffee can lids. The spacers and coffee can lids were lost during storm events. Due to the extensive loss of plastic into the environment, CDFG required JOC to stop stake culture in Drakes Estero. By the mid-1990s all stake culture had ceased and had been replaced by bag culture.

In 2005, DBOC took over the shellfish farm in Drakes Estero. Fully aware of the legacy plastic debris problems, DBOC made several changes in farm practices to further reduce the chances of losing culture gear into the environment, including:

1. Immediately implementing a policy that no wires would be cut when harvesting strings from the racks until above the high tide line (above the stringing shed). DBOC removes the oysters from the wires without cutting the wire. Using this technique, the black plastic spacers are not subject to loss into the environment.

2. Beginning in 2006, DBOC began to replace the Japanese Hanging Cultch wire string culture method with "French tubes". These French tubes reduce consumables (i.e., the wire strings which can only be used for one growing season), and do not require the black spacers. It should be noted that DBOC, EAC, or NPCA have never found a fugitive French tube anywhere in Drakes Estero. Over the past five years, approximately 100,000 strings have been replaced with the French tube method, and this technique now represents the majority of the rack culture. DBOC will, however, continue to cultivate a portion of its oysters with the traditional wire string and spacer method. The description of this historic culture method during DBOC's interpretive on-farm tours is of great interest to the visiting public.

3. DBOC checks the oyster racks regularly to remove any loose materials so they are not lost into the environment.

4. DBOC anchors all oyster bags in areas where there is potential for tidal energy to displace bags.

5. DBOC initiated a program whereby all floating culture is anchored in a least two places and all floating bags are attached to at least two anchored lines (a DBOC "redundancy program").

Additionally, DBOC made a commitment to pay staff to clean-up the beaches to address JOC's legacy debris problem. DBOC's staff patrols the beaches of Drakes Estero on a regular basis to pick up any marine debris. It is notable that most of the trash retrieved is unrelated to mariculture (i.e., it is a product of recreational activity in the park). DBOC also pays for refuse disposal fees. The majority of the plastic mariculture debris that is currently being picked up and disposed of by DBOC includes the plastic coffee can lids that have not been used in Drakes Estero for almost 20 years. It is evident that these efforts are paying off because DBOC is finding less and less of this legacy mariculture debris each year.

F6. Wastewater – on page 340 of the DEIS, the authors try to indicate that potential risk from wastewater entering Drakes Estero is only associated with DBOC operations. However, as indicated on page 344 of the DEIS, the authors state that, "the risk of discharges from a lack of capacity appears unlikely." Further, by their own admission (page 340), NPS will not remove any of these structures if DBOC operations do not exist in the area. Given the fact that: (1) there have been no releases of wastewater into the Estero, (2) there was only one violation of water quality criteria as a result of a failed septic system in the last 77 years of shellfish operations (a new system was constructed in 1998 to resolve this problem), and (3) none of the alternatives discussed will eliminate this risk, this impact is negligible and cannot be attributed solely to DBOC operations.

F7. Impervious Surfaces – on page 340 of the DEIS, the authors try to indicate that there is potential risk of run-off from impervious surfaces associated with DBOC operations. However, by their own admission, NPS will not remove any of these structures, or abandon any of the road network that contributes to impervious surfaces in the basin, if DBOC operations do not exist in the area, which means that this impact, considered minimal anyway, is the same for all alternatives. Further, the mitigating role of the cultured oyster biomass to any runoff from impervious surfaces will be effectively eliminated with the removal of DBOC operations.

F8. CCA Leaching – on page 343 of the DEIS, the authors attempt to indicate that maintenance and repairs to racks and the dock would introduce chromate copper arsenate (CCA)-treated wood to Drakes Estero. This comment is completely false and lacking any understanding of current procedures related to DBOC operations. By their own admission (page 343 of the DEIS), NPS understands that wood treated in the past is no longer leaching CCA into the environment. Any new wood used to repair existing racks in need of maintenance would be subject to approval by NOAA Fisheries (WWPI 2011). DBOC is currently trying to find new construction materials that would be more benign in terms of environmental effects for use in their oyster racks. They have looked into biodegradable materials, plastics that wouldn't leach into the water, and are open to new ideas that improve their stewardship of the environment (Lunny, pers. comm., 2011).

It should also be noted that on page xxxvi of the DEIS, the NPS states that "Ongoing maintenance of racks, assuming 5 percent replacement or repair annually, may include repairs or replacement." However, according to the operator, racks require major repairs

approximately every 10 years. If all racks were currently in good repair, roughly 10% of the racks would require maintenance each year. Currently, roughly 50% of the racks are in need of immediate repairs. Given that the life of the investment is roughly 10 years, and the proposed SUP is 10 years, the proper business decision would be to make the repairs to all of the racks as soon as possible. It is critical that NPS not limit the percentage of the racks repaired in any given year.

F9. Pesticides and Herbicides – on page 343 of the DEIS, the authors claim that offshore activities would potentially release DDE (no other compound was found above the detection limit) into Drakes Estero. This contention is both misleading and the reference is used inappropriately. Although DDE can be found in Drakes Estero in small quantities, it was noted by Anima (1991) that the levels of traceable DDE in the sediment are "below the limits set by the National Academy of Sciences and the U.S. Environmental Protection Agency for organisms." The limits set include 1,000 µg/kg ΣDDT (the sum of ODD, DDE, and DOT) wet weight for the protection of fish-eating wildlife (NAS 1973) and 150 µg/kg ΣDDT wet weight in fish (EPA 1980). The maximum of amount of DDE sampled from Drakes Estero represents approximately 1% of the USEPA limit established for this compound. Even if DDE is disturbed, which is unlikely given that it was sampled from "deeper tidal channels in which the research vessel could transit" (Anima 1991), it does not represent a risk to aquatic organisms in the Estero.

F10. Runoff Water – on page 344 of the DEIS, the authors indicate that water from spray-wash at the conveyor station and outdoor setting tanks is returned to the Estero, which results in a minor adverse effect. Within the same section, the authors concede that the replacement of the existing conveyor washing station with a new system, as proposed by DBOC, would filter the water before it re-enters Drakes Estero. This system would decrease the sediment load and local turbidity entering the Estero. Further, the discharge from the spray-wash was tested by California Department of Health Services and found to be non-hazardous (Baltan 2006, DEIS p. 200).

In addition to direct testing of water discharge from DBOC operations, California Department of Health Services looked at potential sources of contamination in Drakes Estero. As reported on DEIS p. 198, "Baltan (2006) and Zubkousky (2010) list five source types of bacterial pollution potentially affecting the water quality of Drakes Estero. These sources include cattle operations, septic systems, industrial waste, wildlife, and watercraft. The primary source of pollution is from cattle waste originating from the six cattle ranches within the watershed." It is notable that the shellfish industry was not listed as a contributing factor to water quality concerns in Drake Estero. In summary, these impacts, which were reported to be minor based on existing conditions, would be further reduced with proposed improvements by DBOC.

Finally, it should be noted that on DEIS p. xxxi, the NPS states that, "Alternative D considers expansion of operations and development replacement of new existing infrastructure as requested by DBOC as part of the EIS process." In fact, the replacement is not an expansion of operations; it is the replacement of the conveyor station agreed upon in the 1998 NEPA EA and FONSI (NPS 1998, PRNS 1998). This should be considered as part of Alternative B, which assumes that operations will not change from current conditions.

F Wetlands

F1. Nationwide Permit (NWP) 48 – The NPS identifies (page 249 of the DEIS) that the USACE has a Nationwide Permit for shellfish aquaculture, but fails to provide a sufficient explanation of the Nationwide Permit program. By definition, Nationwide Permits, such as NWP 48, are

for permitting activities that have gone through a thorough programmatic evaluation of potential impacts on the Waters of the United States, including wetlands, and have been determined to have a minimal impact. As stated on the San Francisco District's website and in the Special Public Notice reauthorizing Nationwide Permits published in the Federal Register, "The purpose of the Nationwide Permit Program is to streamline the evaluation and approval process throughout the nation for certain types of activities that have only *minimal* impacts to the aquatic environment [emphasis added]." The suggestion that ongoing aquaculture has "minor" or "moderate" long-term impacts is in direct opposition of this thorough NWP 48 review. At best, it is misleading and is not supported in the DEIS.

F2. Adverse Impacts – On pages 253, 255, and 257 of the DEIS, it is suggested that Alternatives B, C, and D would continue to have long-term adverse impacts on 138 acres of intertidal wetlands. This statement is misleading for several reasons. First, 138 acres seems like a relatively large number when no context is provided. Second, it implies that shellfish aquaculture is detrimental to eelgrass beds, estuarine intertidal unconsolidated shore-mud, and estuarine intertidal unconsolidated shore-cobble-gravel-sand without providing any evidence of any impacts. Lastly, though it is acknowledged that bottom bags are not allowed in eelgrass beds, subsequent statement suggests that floating culture, including bags and seed trays have an adverse impact, which has not been demonstrated.

It is important that more context is provided to accurately convey the relative diversity and complexity of "wetlands", particularly those that are actively in cultivation, compared to the overall distribution and availability of these habitats within Drakes Estero and the Estero de Limantour. As noted on page 166 of the DEIS, "The total area of Drakes Estero, excluding Estero de Limantour, below the high tide line (an area that includes both subtidal and intertidal areas) is approximately 1,958 acres (NPS 2011n)." So, even if the entire 138 acres is considered, that represents only seven percent (7%) of the total subtidal and intertidal wetlands below the high tide line. At 22 acres, the total bottom bag culture area that has been in production the last two years is 1% of the "wetlands" below the high tide line. However that too would be misleading, as there are many different types of "wetlands." This is clear from the DEIS on pages 166 and 167, which states:

> *At low tide, much of the Drakes Estero bottom is exposed as intertidal wetlands, most of which contain no vegetation (i.e., the sandy shorelines, sandbars, and mudflats) (Anima 1991xiv). The intertidal sand and mudflat wetland types are the most common wetlands within the study area. Intertidal vegetated marshes (E2EM1 systems) can be found within the upper, shallow-water reaches of each of the bays interlaced by shallow tidal creeks (E2SB systems). Palustrine systems occur landward of the tidal zone dominated by freshwater marshes (PEM) with pockets of scrub-shrub (PSS) in low-lying guts and valleys along streams and/or groundwater seeps.*

Figures 3-1 and 3-2 on pages 168 and 169 of the DEIS show the distribution of wetlands within Drakes Estero and in relation to DBOC's onshore facilities.

The implication that bottom bag culture is adversely affecting non-vegetated mudflats and tideflats is not supported by the information provided. In fact, documentation provided by ENVIRON under the categories of eelgrass, wildlife habitat and benthic fauna, water quality, and nutrient cycling, clearly show that shellfish aquaculture can provide a benefit to wetland habitat. For example, benthic invertebrate abundance and diversity in these cultivated tideflats has been shown to increase in relation to mariculture structures (Elliot-Fisk et al. 2005), which provides additional foraging opportunity for fish and birds.

A more transparent and meaningful evaluation would be to provide a quantitative matrix to show the acreage and relative percentage of sand and tideflats, or estuarine, intertidal, unconsolidated shore, and sand/mud wetlands (using the Cowardin classification system) and each of the other "wetland" types in the Estero that would be under cultivation under each of the action alternatives. It is uncertain why such an analysis was not provided when the NPS clearly has such GIS data available.

Furthermore, potential wetland changes or impacts should have been compared to the baseline condition, which for all intents and purposes should be with some level of shellfish cultivation. The conclusion for Alternatives B, C, and D of short-term minor adverse and long-term moderate adverse impacts on wetlands is an artifact of the intensity definitions used, misleading, and does not appear to be supported by the best available science.

F3. Identification of a Wetland – On pages 165 of the DEIS, the definition of a wetland is presented as such:

> *Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. (33 CFR 328.3[b]; 40 CFR 230.3[t]).* AND
>
> *Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowardin et al. 1979).*

It should be noted that, based on these definitions of a wetland, the lands have to be *transitional* between terrestrial and aquatic systems. The lands where DBOC has mariculture structures are below the high water mark, which is considered completely aquatic. According to Tom Moore, an associate marine biologist at California Department of Fish and Game, DBOC is not farming in a wetland. His response when asked by Kevin Lunny was, "No, Drakes Estero is subtidal…below the mean high tide." Therefore, any reference to wetland impacts in Drakes Estero in the DEIS should be deleted, as this is not a valid definition of a wetland. Additionally, because DBOC aquaculture is not within a wetland, it meets the *NPS Management Policies 2006* of "no net loss" of wetlands.

G Coastal Flooding

G1. FEMA Does not Recognize Drakes Bay as a Flood Zone – The DEIS section "Impact on coastal flood zones" in Chapter 4: Environmental Consequences, is entirely based on implementing policies associated with protection of structures and facilities in a flood zone. However the flood zone was not mapped in that area by FEMA or any other federal agency even on the most recent FEMA maps (Flood Insurance Rate Maps (FIRM) 06041C0210D and 06041C0205D, FEMA 2009). FEMA usually designates even potential flooding in a coastal zone as Zone V, or similar zone (VE). The National Flood Insurance Program (NFIP) usually implements and adopts FEMA procedures. The NPS states that the FEMA map was not "available". FEMA does not map certain area, until it confirms through different sources and through detail hydrologic and hydraulic analyses the extent of the aerial flooding. That has not been confirmed for the Schooner Bay area of the Drakes Bay area.

The Executive Order 11988 on Floodplain Management allows any federal agency to make determination of the location of the floodplain based on the best available information.

However, the entire mapping and all of the consecutive conclusions in the DEIS were entirely based on only one storm of March 20, 2011 (pages 194-196 of the DEIS), with an unknown frequency, and conclusions were extrapolated from measurements taken at Bolinas Bay, a site 17 miles away. It was assumed by NPS that this storm, which was approximately a 100-year storm for Bolinas Bay, is similar to a 100-year storm for Drakes Estero.

The NPS is based on an unreliable methodology with a high potential for error. There are two problems with the extrapolation that NPS used in their evaluation: (1) the evaluation was based on only one storm recorded 18 miles away; and (b) there is significant change in bathymetry and shoreline between Bolinas Bay and the Drakes Bay area. Therefore, local conditions in between the two bays can significantly influence tidal and storm surge signatures. To be completely certain in this evaluation, the 100-year storm recorded at Bolinas Bay should have had at least 18-mile radius, covering both bays during the recorded event. Also, and again, 18 miles is significantly long distance, where it is possible for bathymetry and shoreline to substantially change. What if that was a 200-year storm? Would the consecutive floodplain mapping still be applicable? Impacts from different management actions entirely based on this mapping would simply be invalid.

A better methodology, with less potential for error, would be for NPS to collect tidal measurements simultaneously at Bolinas Bay, at Drakes Bay, and at another location midway (i.e., 9 miles from each site). Tidal signatures should be recorded throughout winter season in order to record changes in water level at these locations during several significant storms, which would preferably include a 100-year storm, 20-year storm, and an average annual storm. In that way, a correct relationship could be developed for different ranges of water levels during different storm events at these locations.

H Noise

H1. Background Sound Levels Misrepresented and Understate Existing Conditions – The NPS DEIS used the median daily sound level (i.e., the median L_{50} from 30 days of measurements) to represent the existing condition. The L_{50}, while a sometimes somewhat meaningful metric indicating the sound level exceeded ½ the time of a measurement period, is not particularly meaningful in this context for establishing an existing level against which to compare facility noise because ½ the time the measured sound levels were higher than reported. A more useful and representative metric would be the 30-day equivalent sound level (L_{eq}, or sound energy average) because the L_{eq} considers sound energy and duration of all noise events. It is therefore more useful for comparison purposes. The 30-day L_{eq} measured by Volpe was about 6 dBA higher than the 30-day L_{50} (Volpe 2011, Table 2, page ES-23), so comparing the existing L_{eq} to facility-related noise would change the conclusions of the analysis. In addition, the DEIS included discussion of only the summertime L_{50} while the available data included information for winter, and the measured wintertime 30-day L_{eq} and L_{50} were both about 2 dBA higher than the respective summer levels. Available data also include daytime-only L_{eq}s, which would better represent the period of DBOC operations that could be used for comparison with calculated facility-related noise to provide a more representative context. The data presented in the DEIS are incomplete and misrepresentative of the existing soundscape, and appear to have been selectively chosen to indicate lower existing sound levels that then artificially inflate the potential impact of DBOC operations noise. This flawed approach should be rectified to present a more complete and genuine discussion of existing noise sources and levels.

H2. Used Data from a Single Sound Level Measurement in the Vicinity to Estimate Existing Ambient Levels Throughout The Large Study Area (Volpe 2011) – The DEIS noise impact assessment was based on the assumption that a single sound level measurement (SLM location #4, see Figure H-1) provided an adequate representation of existing ambient levels throughout the large study area. Measured ambient sound levels at this location do not account for traffic noise on Sir Francis Drake Blvd., and so may understate ambient levels near this road, i.e., in the northern end of study area. A comprehensive noise impact assessment would include additional specific data regarding both sound levels and sources throughout the area for which impacts are being assessed.

Figure H-1. Drakes Estero Area Showing DBOC Facility Location and Volpe SLM Location #4

H3. DEIS Omitted Adequate Description of Existing Sound Sources as Documented In Volpe SLMs – The Volpe report provided a breakdown of observed noise sources, noted percentage-of-time contributions from aircraft, and indicated aircraft noise was audible more than 10 percent of the time (i.e., 13% summer; 18% winter; Table 3, page ES-24, Volpe 2011), which was the percent time contribution used as indication of "major" noise impacts from DBOC sources. But the DEIS ignored this fact and included no discussion of aircraft noise or the fact that it would remain a substantial contributor to the future soundscape, with or without DBOC. Because aircraft noise is already a substantial contributor to the existing soundscape in the study area and is unlikely to decrease in the future, even entirely removing DBOC-related noise from the area might have much less of an effect in restoring the natural soundscape than suggested in the DEIS noise analysis. The implications of aircraft noise versus DBOC noise for the future "restored" soundscape must be fully analyzed and explained if the conclusions of the noise impact assessment of the alternative future actions are to be believable.

H4. The DEIS Noise Analysis Substantially Exaggerates Noise from all DBOC-Related Sources, Invalidating Conclusions Based on This Analysis – The DEIS noise analysis relied on estimates from a library of sound level data to represent DBOC sources of concern. But there is a very small population of equipment involved that could have been easily and specifically quantified to provide more accurate results. As documented below, the sound source estimates used in the DEIS grossly overstated noise levels from DBOC equipment, thereby discrediting the conclusions derived from this flawed analysis.

On November 22, 2011 ENVIRON staff visited the DBOC facility and took direct sound level measurements of the noise sources identified in the DEIS and one that was not. ENVIRON used a B&K 2250 Type 1 sound level meter to both measure the sound levels and to record audio samples of the sources of interest during the measurements. These data were subsequently downloaded to a computer for aural and numeric analysis. The results of these measurements are summarized in Table H-1. Photos of the noise sources and graphic summaries of the measurement data are presented in the Noise Attachment (Attachment B).

Table H-1. DBOC Source Noise Sound Levels Reported in DEIS and Actual (dBA)

Equipment	NPS Reported Sound Level [a]	Measured Source Noise Levels			Overstated Factor [b]
		Duration	Fast Lmax	Leq	
Motorboat #1	71	15 seconds	63.4	60.1	12
Motorboat #2	71	30 seconds	61.7	58.2	19
Frontend Loader [c]	79	4, 30-seconds	67 - 68	64 - 65	25
Pneumatic Drills [d]	85	≈ 1 minute	77.5 / 79.7	70.4 [e]	29
Oyster Tumbler	79	2 minutes	59.4	49.8	825
Air Compressor [f]	Not considered	72 seconds	N/A [g]	58.0	

[a] Levels reported in the DEIS and used in the noise impact assessment. No metrics or time intervals for the source noise levels were reported. But because these levels were used to estimate exposure over time and because it would not make sense to use the Lmax for this purpose (because the fast Lmax is a 1/8-second sound level), ENVIRON interprets these levels as source noise Leqs.

[b] The "overstated factor" is the number of sound sources emitting an Leq as measured that it would take to generate the sound level used to represent this source in the DEIS noise analysis. For example, it would take 12 boats like DBOC boat #1 all operating in the same location and emitting a passby Leq of 60.1 dBA to generate the 71 dBA Leq that was used in the noise assessment reported in the DEIS.

[c] The small frontend loader, which is used to move empty shells into piles, was reported in the DEIS as a "forklift." The levels reported here are for four passby event SLMs.

[d] Due to space constraints, only one of the two pneumatic drills used at the facility was measured, twice. The other drill is identical and used in the same fashion, so the sound levels would be the same.

[e] The measured Leq for a single pneumatic drill was 67.4; assuming two drills were working at the same location simultaneously results in an Leq 3 dBA higher, as reported here.

[f] The air compressor that provides air to power the pneumatic drills was not considered in the DEIS. The compressor is housed inside a building, so except for openings within the building, noise from this source is already partially controlled and could be even more effectively quieted with a more complete enclosure.

[g] The compressor runs only occasionally, and when it does, produces a constant sound level. The Lmax metric is therefore not pertinent to this source.

Source: Sound level measurements by ENVIRON International Corporation, 2011

As shown in Table H-1, all of the estimated equipment noise levels used in the noise impact assessment presented in the DEIS substantially exaggerated noise from DBOC operations. Every single one of the estimated source noise levels was too high by factors ranging from 12 to 825. This fact invalidates the noise impact assessment presented in the DEIS and requires a completely new and accurate analysis.

H5. Inadequate DBOC Noise Impact Assessment – The noise impact assessment presented in the DEIS does not constitute use of "best science available to determine impacts" as required by Director's Order #47 (No. 7 Defining Impacts on Park Soundscapes) ("Soundscape Preservation and Noise Management," Director's Order #47, Washington, DC: National Park Service, December 2000; cited in Volpe, 2011 to define soundscape).

The noise analysis did not consider the duration of noise exposure from the intermittently operated sources related to DBOC operation, but simply assumed that roughly estimated hours of operation of various activities equated to hours of exposure at all possible locations. So there was no consideration of variability of noise from DBOC sources and especially mobile sources (i.e., small motor boats and the frontend loader). This overly simplistic approach may have grossly overstated DBOC-related noise impacts, and given the severity of the resulting conclusions, this simple approach cannot be justified. In addition, the combination of this simplistic methodology with the vastly exaggerated equipment noise levels used in the analysis (see comment H4) provides a completely unfair and inadequate assessment of potential noise impacts from the facility. An adequate analysis will require use of a noise model to simulate DBOC sound source activities at specific locations over the course of a day to develop noise isopleths that can be compared with new estimates of existing sound levels. NPS should provide a comprehensive and accurate noise impact assessment using a noise model that employs standard accepted calculational practices.

H6. No Consideration of Possible Noise Control Measures that could be Employed to Significantly Reduce DBOC-Related Noise if Needed – Possible noise control measures were not even mentioned in the DEIS, must less evaluated for potential effectiveness. This lack of an adequate evaluation of potential means to control any actually problematic noise sources again grossly overstates DBOC noise levels that could be achieved with effective controls. If a complete and accurate analysis indicates noise reductions are in fact needed to avoid impacts, some DBOC sources could be very simply and effectively controlled to reduce the potential for impact.

The NPS approach that did not consider possible control measures to reduce or eliminate identified noise impacts is not consistent with Director's Order #47 (No. 6 Establishing Soundscape Preservation Objectives) (a) which says, "the soundscape management goal [in the event of authorized noise sources] would be to reduce the noise to the level consistent with the best technology available – to mitigate the noise impact, but not adversely affect the authorized activity." The DEIS noise assessment ignored this directive and concluded that the only possible means of controlling noise was the total elimination of the DBOC noise sources. This is an inappropriate approach.

Excluding any consideration of means for reducing DBOC noise is also inconsistent with Director's Order #47 (No. 8 Constructive Engagement) which says that in addressing noise that has been found to be "inappropriate" that "Superintendents must work constructively and cooperatively with those responsible for inappropriate sources of noise in parks..." Such a cooperative effort to identify and, if needed, to reduce facility-related noise, has never been seriously attempted as mandated by this order. Cooperative discussion with DBOC should be included as part of the revamped noise impact assessment.

I Recreation

I1. The DEIS Distorts the Recreational Benefit of the Oyster Farm Itself by Evaluating Visitors to DBOC as a Share of the Total Number of Visitors to the Seashore – The DEIS determines that alternatives B, C, and D, those alternatives where DBOC would remain in operation, would have a "long-term moderate adverse impact on visitor experience and recreation". There is no discussion of the loss of unique recreation and education opportunities that would occur if DBOC were forced to close. DBOC is open from 8:30 am to 4:30 pm every day and receives approximately 50,000 visitors each year. DBOC is the only oyster farm in California permitted to allow visitation and regularly provides tours to school groups at no cost. Visitors are able to go on interpretive tours of the last oyster cannery in California, purchase oysters for consumption, and picnic onsite. Furthermore, undergraduate and graduate students from local universities come to DBOC for coursework and research purposes. The DEIS states that the continued operation of the oyster farm would disrupt the wilderness experience of the Seashore but does not reflect on the visitors to the Seashore that appreciate viewing a working aquaculture farm. Many visitors see the oyster farm as a vital part of their visit to the Seashore as demonstrated in the letter provided by the operators of the local kayak companies.

I2. DBOC Recreation Experience Discredit – On pages 212-214, Chapter 3, Visitor Experience is described. The discussion includes an analysis of why DBOC does not meet the definition of a visitor service. The section also includes an explanation of several different types of visitor experiences at the Seashore but minimizes the visitor experience of the DBOC. This is accomplished by disregarding the importance of the tradition of visiting the DBOC, the importance of acquiring fresh oysters which is an experience not otherwise available in the vicinity, and by suggesting that the experiences of the 50,000 annuals visitors is not statistically significant.

J Culture

J1. Affected Environment Shortcoming – On page x of the Executive Summary, the following statement is made: "Dismissed topics include vegetation, lightscapes, air quality, climate change and greenhouse gas emissions (carbon footprint), geological resources, paleontological resources, cultural resources, and environmental justice." Pursuant to 40 CFR 1502.15, the "Affected Environment" section of an EA or EIS should provide background information on the prehistory and history of the area and describe known historic and cultural resources that may be affected by the project. This should entail the inclusion of a Cultural Resources section describing the prehistoric context, the ethnographic setting, an historical background, known cultural resources present in or near the project area vicinity, Indian Trust Assets, and Native American consultation. The historical background review should include the wide-ranging local, regional, and national effects that the DBOC has had.

Chapter 3 of the DEIS provides sections describing the affected environment but fails to include a section on Cultural Resources. On page 155, the DEIS states "The 'Affected Environment' chapter describes the Drakes Estero environment; relevant physical and biological processes within Drakes Estero; and the existing conditions for those elements of the natural, cultural, and social environment that could be affected by the implementation of the actions considered in this DEIS. The impact topics addressed in this DEIS include wetlands, eelgrass, wildlife and wildlife habitat, special-status species, coastal flood zones, water quality, soundscapes, wilderness, visitor experience and recreation, socioeconomic resources, and NPS operations. Impacts for these impact topics are analyzed in 'Chapter 4: Environmental Consequences.'" Cultural resources were identified by NPS staff and

dismissed from further analysis "because either (a) the resources do not exist in the project area or would not be impacted by the project or (b) impacts would have less than minor impacts" (page x, Executive Summary). Pursuant to 40 CFR 1502.15, cultural resources must be thoroughly addressed during the NEPA process.

J2. Culture Incorrectly Summarized – On page xvi of the Executive Summary, in Table ES-2. *Issues and Impact Topics Considered but Dismissed from Further Analysis: Cultural Resources,* cultural resources are incorrectly summarized. They are first correctly identified citing the NHPA but falsely categorized citing the NPS. The DEIS states that the NPS considers cultural resources to be archaeological resources, cultural landscapes, museum objects, and ethnographic resources. In fact, the 2006 NPS Management Policies, Policy 5, Cultural Resource Management, states that "These resources are categorized as archeological resources, cultural landscapes, ethnographic resources, **historic and prehistoric structures**, and museum collections" (NPS 2006) (emphasis added). Because the buildings constituting the DBOC are of an age older than 50 years, they are considered historic structures and qualify as cultural resources.

J3. Assessment of Cultural Landscape Incorrectly Applied – On page xvi of the Executive Summary, in Table ES-2. *Issues and Impact Topics Considered but Dismissed from Further Analysis: Cultural Resources,* cultural resources are incorrectly summarized. They are first correctly identified citing the NHPA but falsely categorized citing the NPS. The DEIS states that the NPS considers cultural resources to be archaeological resources, cultural landscapes, museum objects, and ethnographic resources. In fact, the 2006 Management Policies, Policy 5, Cultural Resource Management, states that "These resources are categorized as archeological resources, cultural landscapes, ethnographic resources, **historic and prehistoric structures**, and museum collections" (NPS 2006) (emphasis added). Because the buildings constituting the DBOC are of an age older than 50 years, they are considered historic structures and qualify as cultural resources.

J4. Assessment of Historic Structures – On page xvii of the Executive Summary, Table ES-2: *Issues and Impact Topics Considered but Dismissed from Further Analysis: Historic Structures*, the assessment of the historic structures was inadequately applied, similar to cultural landscapes above. The DBOC meets the definition of an historic structure but was not considered eligible for listing in the NRHP based on its lack of integrity, citing that the requirement of integrity is not met based on aspects such as workmanship, materials, and design, noting that the structures are in disrepair and therefore affect the feeling aspect of integrity.

According to the NPS itself: "Integrity is a property's historic identity evidenced by the survival of physical characteristics from the property's historic or pre-historic period. The seven qualities of integrity are location, setting, feeling, association, design, workmanship and materials. When evaluating these qualities, care should be taken to consider change itself. For example, when a second-generation woodland overtakes an open pasture in a battlefield landscape, or a woodland edge encloses a scenic vista. For situations such as these, the reversibility and/or compatibility of those features should be considered, both individually, and in the context of the overall landscape. Together, evaluations of significance and integrity, when combined with historic research, documentation of existing conditions, and analysis findings, influence later treatment and interpretation decisions" (NPS 1994). Therefore, had integrity been more accurately assessed, the DBOC could have been considered an eligible historic structure.

J5. Relevant State Laws and Policies – The DEIS should consider including a section defining CEQA. Under the guidelines of CEQA, the significant impacts and environmental

consequences of project implementation must be evaluated if any of the following could occur:

- A substantial adverse change in the significance of a historical resource that is either listed
    - or eligible for listing on the National Register of Historic Places, the California Register of
    - Historic Resources, or a local register of historic resources;
- A substantial adverse change in the significance of a unique archaeological resource;
- Disturbance or destruction of a unique paleontological resource or site or unique geologic feature; or
- Disturbance of any human remains, including those interred outside or formal cemeteries.

J6. **The DBOC qualifies as a historic site regardless of whether it was found to be ineligible for listing in the NRHP.** Furthermore, NPS Management Policies state that the Park Service's cultural resource management program is responsible for the stewardship "cultural resources. These resources are categorized as archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections" (NPS 2006).

J7. **Visitor Experience Misrepresented** – On page 144, Chapter 2: Alternatives, the topic Visitor Experience and Recreation minimizes the portion of the population that values the DBOC traditions. Furthermore, the DEIS authors state that the experience is available "in the immediate area." In fact, the DBOC experience is unique and constitutes the only oyster farm in the Seashore as well as the last operating oyster company in the state of California.

J8. **Determination of Eligibility** – In the DOE, the DBOC was determined ineligible for listing based on lack of integrity. While clearly meeting National Register Criterion A, the DBOC was dismissed based on three aspects of integrity: workmanship, materials, and design. These were stated to deleteriously affect the aspect of feeling, thereby outweighing the aspects of integrity that it does possess: location, setting, and association. This is an inaccurate assessment of the application of "integrity" when assessing a property's significance.

The Advisory Council on Historic Preservation notes: "Integrity is the ability of a property to convey its significance. To be listed in the National Register of Historic Places, a property must not only be shown to be significant under the National Register criteria, but it also must have integrity. The evaluation of integrity is sometimes a subjective judgment, but it must always be grounded in an understanding of a property's physical features and how they relate to its significance.

K Socioeconomics

K1. **Description of Socioeconomic Impact is Inconsistent, Incomplete, and Appears Biased in Favor of Park Operations over DBOC** On pages 392 and 393 of the DEIS, the impacts of Alternative A are determined to be minor despite the fact that

- 31 full-time jobs and 1 part-time job are anticipated to disappear,
- many of the newly unemployed will simultaneously lose their homes,
- some likely will have to move out of the county to find alternative low-income housing, and
- it is not clear whether they will not be able to find similar work elsewhere

These oversights do not provide an accurate assessment of the socioeconomic impacts. No mention is made of the fact that these workers have been living in the homes for decades doing this work.

The estimated $1 million in DBOC payroll is also dismissed as merely representing 2-3 percent of all agricultural employment in the San Francisco San Mateo Redwood City Metropolitan area, which is a large area to consider. Perhaps the NPS mistakenly meant Marin County, which is still large, but which has an agricultural labor force estimated at between 600 and 1,000 (MCCDA 2011). These estimates were developed by Marin County in a document identifying a strategy for achieving agricultural labor housing, which is apparently in short supply. In this light it seems that the significance of the lost housing is even more important. The Inverness CDP has a population of less than 2000 people, and the agricultural labor force in the area may well be dominated by the DBOC. To accurately tally socioeconomic effects of the no action alternative, the NPS must place the number of jobs to be lost in an appropriate context—namely, the loss to the specific socioeconomic group, and the impact on housing as well as incomes.

In contrast, the NPS employment of 165 employees in the area is described in the most positive terms: representing a payroll of $10 million and including the 'value added' portion of this payroll as generating an additional $13 million. No similar 'value added' portion is reported associated with the DBOC payroll of $1 million. Also, the NPS labor is credited with supporting a 'value of $100 million' to park visitors. But although the DEIS acknowledges that 2-3 percent of the visitors also visit DBOC, this contribution to visitation is described as merely 'detectible.'

K2. Value to Consumers Overlooked If the two economic activities (shellfish production and park operations) are to be compared evenly, the 'value' to consumers of shellfish must also be counted. The value to NPS visitors describes the consumer surplus that accrues to visitors (estimated at $100 million). The consumer surplus is the value of an economic good or service that is over and above what the buyer paid for it. In this case, the value of the PRNS is described, but the value to shellfish consumers is not. Shellfish consumers pay lower prices for DBOC oysters than others that might be imported from Asia, and hence, the consumer surplus is higher. The NPS should either exclude mention of the 'value' of recreational visitation, or include the 'value' of the seafood production.

Neither is there any mention made of the fact that if such a large portion of the oyster market exits production (DBOC produces between 16 and 34% of the statewide oyster market, DEIS at 392), there will be excess demand which can be expected to raise prices. Consumers will have to pay more, and therefore benefit less from oyster purchases. The analysis of Alternative D does point to this, by mentioning that continued DBOC operations would be beneficial to oyster production in the state. Because of the magnitude of contribution to the supply of local, nutritious, natural food, it would in fact be helpful to include the economic impacts anticipated in the seafood market.

K3. Natural Food Status Overlooked In addition to failing to mention the economic losses to consumers, the loss of DBOC production under Alternative A is not recognized for its unique attributes as a natural food that promotes health and is produced for a local population. This is not only a consumer preference that can be seen in markets for natural and healthy foods, but also represents national benefits of improved public health. Further, consumers tend to be Asian and Hispanic (N. Lunny, pers. communication, November 2011), and so, understating the loss of this production disproportionately undervalues losses to specific ethnic groups.

K4. Economic Value of Ecosystem Services Not Considered In evaluating the socioeconomic benefits of Alternative D, or losses of Alternative A, the NPS might have noted the economic value of nutrient sequestration and water filtration. For example, a recent publication from Burke (2009) uses the replacement value method to estimate the value of nitrogen removal resulting from oyster aquaculture. DBOC oyster harvest for 2010 totaled 5,400,000 oysters, estimated to sequester and remove between 972 and 2,808 tons of nitrogen. Using the value estimates from Burke, this suggests that the value of removing nitrogen from the Drakes Estero water is between $2,916 and $84,240 per year.

L Environmental Justice

L1. Environmental Justice Approach Deficient – Adverse social and economic effects have the potential to occur if the action has disproportionately high adverse effects on industries in which low-income or minority workers are clustered, thereby potentially causing job losses or wage cuts that disproportionately affect these groups. To identify whether potential adverse effects will occur within minority populations as a result of the No Action or Action Alternatives, first it is necessary to determine whether DBOC employs a high percentage of minority and low-income workers, and then to determine whether any impacts are anticipated as a result of the No Action or Action Alternatives.

All the 22 workers at DBOC, who would lose their jobs if DBOC operations were to cease, are of Hispanic or Latino ethnicity, and most also fall into the category of low-income. According to Census 2010 data, there are 79 people of Hispanic or Latino ethnicity in Inverness CDP, making up 6.1 percent of the CDP population of 1,304 residents (U.S. Census Bureau 2010). The 22 DBOC workers essentially make up more than a quarter (28 percent) of the Hispanic or Latino population in Inverness CDP. Further, many of these workers and their families reside in on-site housing provided by DBOC as part of their incomes. This type of low-income housing is rare in Marin County. It is likely that these workers, along with their families, comprise a large proportion of the Hispanic and Latino population in the CDP. While the percentage of Hispanic and Latino population in the CDP is lower than that in Marin County (almost 16 percent), the potential that almost all of this minority group would be affected implies an environmental justice concern. In case of No Action, these adverse effects could be, among others, loss of livelihood, loss of housing, potential relocation to other states (such as Oregon and Washington) in order to utilize their specialized skills, potential for lower wages in future employment due to switching to a new profession, and loss of a family profession

In addition, DBOC roughly hires half women and half men as workers at the farm. Inverness CDP is a largely agricultural area, where most farms and ranches typically hire men. Traditionally, DBOC has hired the wives of many of these farm and ranch workers, thus providing means for additional income for these families. The neighboring farms and ranches also have a competitive advantage when hiring workers because of the potential for DBOC hiring the wives. The impact on the closure of DBOC on these neighboring farms and ranches need to be analyzed in the DEIS.

L2. No Attention to Ethnicity – on page 215, Chapter 3 of the DEIS, the authors present race data as a percent of population in Marin County and the State of California. However, the analysis does not identify or present Hispanic population in these areas. Ethnicity data is available from the U.S. Census Bureau, and Hispanics are also considered a minority. Further, this data is key for the environmental justice analysis given that the potential minority group affected by the No Action or Alternatives is Hispanics. Approximately 95 percent of the 30 workers at DBOC are Hispanic, and most also fall into the category of low-income. In Inverness CDP, Hispanics make up over six percent of the population, this

ethnic group is almost 16 percent of the population in Marin County, and makes up about 38 percent of the population of the State of California.

Section 3-3, EO 12898 specifically states that:

> *[E]ach Federal agency, whenever practicable and appropriate, shall collect, maintain and analyze information on the* ***race, national origin, income level, and other readily accessible and appropriate information*** *for areas surrounding facilities or sites expected to have a substantial environmental, human health,* ***or economic effect on the surrounding populations,*** *when such facilities or sites become the subject of a substantial Federal environmental administrative or judicial action. Such information shall be made available to the public, unless prohibited by law.*

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Appendix A

Additional Information for Eelgrass and Benthic Invertebrate Discussion

EELGRASS

1. **PROPELLER SCARRING** – on page 265 of the DEIS, the authors attempt to compare aerial photography of "propeller scars" in eelgrass beds between 2007 (NAS 2009) and 2010 (NPS data). Although they provide the value for the estimate in 2007 (50 acres) they do not provide a corresponding value for 2010, even though the data is based on higher resolution photography, which should provide a more accurate estimate of this impact. Further, there is no indication in the DEIS of how long these impacts potentially persist.

   It is our contention that the DEIS did not provide a comparative value because it is substantially lower than the 2007 estimation, which was "loosely quantified." In fact, calculating the area based on the distance reported for the 2010 data (8.5 miles), and providing a range of possible widths,, the area of impact is a minimum of 91% lower than calculated in 2007 (see Additional Information below). Additionally, the maximum area of impact calculated (4.1 acres) represents 0.2% of the total Drakes Estero waterbody and 0.6% of eelgrass habitat available in the estuary.

   Finally, and most importantly, the impact is in two forms: temporary and longer term. The majority of the impact from boat use is temporary and minor. This involves grazing the tops of eelgrass leaves; similar to mowing a lawn, which stimulates growth. Regrowth of eelgrass from this type of impact would take approximately 2-4 weeks to recover the original biomass (J. Ruesink, pers. comm., 2011). Further to the point, shoot density remains unchanged, and no long term damage occurs in terms of density. The longer term impact is from the removal of the meristem, which may occur occasionally, and regrowth typically occurs at a rate of 1cm/2 weeks (J. Ruesink, pers. comm., 2011). Scars observed from aerial photography represent an accumulation of impact. Therefore, the 8.5 mile estimate is not over a single day, but over a much longer period of use (likely over a period of a year or more). Boating in the Estero typically occurs in water deep enough to avoid interactions with eelgrass that would pull up the entire plant. Where these few occurrences occur, plants would be able to regrow within a year if not continuously disrupted.

   In summary, this impact should be considered short-term and minor based on the intensity of impact, persistence, and how much of the waterbody is affected.

   Additional Information
   Based on the mileage calculated from the 2010 aerial photography for the boat routes through eelgrass (8.5 miles or 45,031 linear feet), a number of possibilities can be calculated for total acreage of impacts from DBOC boats (Table 1). We estimated the width of the propeller scar according to the NPS statement on page 266 of the DEIS, "the width of propeller scars in Drakes Estero is highly variable and can range from one to several feet wide." What each of these calculations shows is that the 2010 aerial photography, based on higher resolution images, estimates a much lower impact than previously calculated, even for scars up to "several feet wide".

Table 1. Acreage calculation of potential propeller scarring in Drakes Estero.

Option	2010 Calculations			2007 Calculation	% Difference
	Length (ft)	Width (ft)	Area (acre)	Area (acre)	in Area
1	45,031	0.5	0.5	50	-99%
2	45,031	1.0	1.0	50	-98%
3	45,031	1.5	1.6	50	-97%
4	45,031	3.0	3.1	50	-94%
5	45,031	4.0	4.1	50	-92%

In addition to the small area of impact, there is no discussion in the DEIS of how long these effects persist. The only discussion regarding prop scarring is related to aerial photography; there was no ground-truthing completed in relation to the analysis. According to the operator (K. Lunny, pers. comm., 2011), no evidence of damage is evident the day after boats travel through the estuary. For the most part, the extent of damage would be taking off the ends of the leaves, but not removing the entire meristem. Regrowth for eelgrass that is only damaged on the surface requires branching of the plant to replace the lost biomass. According to J. Ruesink (pers. comm., 2011), regrowth from loss of the top portion of the plant (i.e., the meristem is still in place) takes approximately 2-4 weeks. There would be no long term damage in terms of density.

The calculation of damage from aerial photography represents an accumulation of shoot removal over a longer period. J. Ruesink (pers. comm., 2011) stated that regrowth of eelgrass that has been removed at the meristem typically occurs at a rate of 1cm/2 weeks. Therefore, if the width of the scar is 3 ft (91.4 cm), then it would take approximately 0.9 years to replace the lost biomass. If a consistent path is desired to reduce potential damage to eelgrass beds, then a comparison should be made between the 8.5 miles of accumulated damage over a year, and potentially denuding a consistent pathway.

Original DEIS Citation

Chapter	Page	Quote
3	172	The effects of propeller scars can easily be observed as linear, dark signatures through seagrass beds on high-resolution aerial photography (Zieman 1976). In their review of shellfish mariculture impacts on eelgrass in Drakes Estero, the NAS (2009) cites an estimated 50 acres of eelgrass habitat that was impacted by propeller damage based on review of 2007 aerial photography, but qualifies the estimate by saying that it was "loosely quantified" due to the resolution of the imagery used. In an effort to provide a more detailed and current assessment of propeller damage to eelgrass, recent (2010) high-resolution aerial photography of Drakes Estero was evaluated using GIS technology. This evaluation showed that 8.5 miles (45,031 linear feet) of propeller scars through eelgrass are readily seen on the aerial images. Due to the large variability among the widths of scars, this analysis method was not suited for calculating a comparable quantity for comparison with the 50-acre quantity reported by NAS (2009).

2. **BOAT USE AND TRANSIT PLAN** – on page xxxvi of the DEIS, the authors state that a transit plan must be created by DBOC and submitted to NPS for approval. Additionally, there is language in the DEIS that attempts to limit boat use by DBOC. These restrictions are not substantiated and would cause undue burden on DBOC operations.

   A vessel transit plan, including GPS boat tracking reports, has already been completed and submitted to NPS. The NPS has disregarded what was submitted in the scoping process and has created an arbitrary lease area in the DEIS (Figures ES-7, ES-9, ES-11). The proposed restriction would make it impossible to access certain oyster beds. A vessel transit plan should definitely be a part of the EIS. However, allowing NPS in the future to "approve" or "not approve" a vessel transit plan gives them the authority to strangle DBOC without a public process. No data or evidence showing harm caused by the existing boat routes has been provided. DBOC would agree to modify its vessel transit plan through use of an adaptive management approach. Adaptive management recommendations would be made by an adaptive management team composed of individuals representing NOAA, CDFG, NPS, CDPH and DBOC. The Marine Mammal Commission (MMC) has recommended this adaptive management team, which should be responsible for all offshore management change decisions.

   The boat use restriction would make it almost impossible for DBOC to conduct its business. DBOC actually has had 3 boats for much of the past 5 years, and is on the water for most of the day in order to complete operations. To limit boat use to a combine 8 hours per day would be devastating to operations. There is no justification for this restriction, and it appears that it is in place to functionally debilitate operations if they are allowed to proceed through the SUP.

   Original DEIS Citation

Chapter	Page	Quote
Executive Summary	xxxvi	A vessel transit plan for DBOC boat use within Drakes Estero would be developed and submitted to NPS for approval.
Executive Summary	xxxvii	Two motorboats and two nonmotorized barges would be operated in Drakes Estero, approximately 12 trips per day, 8 hours a day, combined.

3. **UPROOTING EELGRASS** – on page 265 of the DEIS, the authors claim that eelgrass biomass and abundance is compromised because of boat activity and damage from propellers. However, as discussed above, although this may occur to a minor extent, the majority of interactions with eelgrass do not remove the entire plant, and regrowth occurs within 2-4 weeks. Additionally, the references used appear to be taken out of context and are not comparable to potential impacts from shellfish aquaculture being evaluated.

   The disturbance to seagrass discussed in Preen et al. (1995) was related to two major storms and a cyclone, all in succession. These disturbances are, at minimum, several orders of magnitude greater than the disturbance created by boat traffic associated with tending culture operations in the Drakes Estero. Further, the turbidity that remained in the system following these major storm events was related to 1000 km^2 of eelgrass being uprooted. In the second citation provided in the DEIS to support the conjecture of impact, Fonseca and Bell (1998), the only mention of how storms can influence beds was from the quote "We did not determine

whether acute wind events periodically act to organize seagrass bed formation through extensive reductions in seagrass coverage, although some systems (e.g. Tampa Bay) can experience marked changes in cover after large storm events." Notably, there is no discussion in the paper regarding scarred beds.

In summary, there is no evidence that eelgrass habitat is being moderately impacted relative to boating activities, and the implication that boating can create turbidity that will further affect eelgrass growth is based on events that are infinitely more intense. Based on the information presented, this impact appears to be negligible in Drakes Estero and has no bearing on the overall quality of eelgrass habitat.

Original DEIS Citation

Chapter	Page	Quote
4	265	DBOC activities, particularly boat traffic, adversely impact eelgrass biomass and abundance because plants are uprooted or otherwise physically damaged by boat propellers (NAS 2009).
4	265	Once a propeller scar is created, wave action or fast-moving currents can lead to erosion within the scar, resulting in scouring and deepening of the disturbed area. Heavily scarred beds may also be prone to further damage or destruction by severe storms (Fonseca and Bell 1998). In addition, reduction in water clarity through resuspension of sediments destabilized by seagrass removal can lead to more extensive declines in cover (Preen, Lee Long, and Coles 1995).

4. **BOAT WAKE EROSION** – on page 266 of the DEIS, the authors discuss how propeller wash can erode eelgrass in navigation channels. The authors are using the cited references inappropriately to try to attribute propeller wash in Drakes Estero. The propeller wash noted by Thom et al. (2003) was based on pleasure crafts (yacht) and ferryboats, which displace larger volumes of water than the 20-ft long skiffs used in DBOC operations. Koch (2002) was based on more recreational type boating, but they ultimately concluded that negative effects to seagrass were minimal, and even further reduced when boats moved at high speeds during a high tide. Further, Koch (2002) commented that the strongest impact was from resuspension of a small amount of sediment, but that it was "redeposited within minutes." There is no evidence that propeller wash is occurring in Drakes Estero, and trying to compare navigation channels with the habitat in Drakes Estero, or reporting the results incorrectly, is simply poor science.

Additional Information

When propeller wash is discussed in relation to navigation channels, it is in relation to large vessels, such as ferries, pleasure crafts (yacht) and barges that are associated with commercial ports. The reference that was made in Thom et al. (2003) was from information presented by Thom et al. (1996), which researched vessels longer than 250 feet and traveling at speeds of 12 mph. A direct relationship cannot be drawn to the small boats that DBOC uses in its operations in Drakes Estero. Their boats are 16 to 20 feet long and travel at speeds up to 25 mph, although more often at 5 mph when towing barges. As such, there is no evidence that propeller wash is occurring in Drakes Bay, and certainly not from the small boats used by DBOC.

The work on the east coast by Koch (2002) could be more directly related to conditions in Drakes Estero because it was based on 21-ft V-hulled boats moving at 7.4 and 14.1 mph. However, the authors of the DEIS used his work to say that propeller wash was "known to erode eelgrass." In fact, Koch (2002) concluded that, "the possible negative impacts (increased sediment resuspension, release of sediment nutrients, and reduced light levels) were much smaller than expected, being minimal when compared to natural fluctuations in this habitat (conditions to which the plants have acclimated)."

Original DEIS Citation

Chapter	Page	Quote
4	266	Further, "propeller wash" (i.e., water turbulence behind propellers in boat wakes) and boat-generated waves are known to erode eelgrass along the edges of navigation channels, a phenomenon that has been documented both on the west coast (Thom et al. 2003) and on the east coast (Peterson, Summerson, and Fegley 1987; Koch 2002).

5. **SEDIMENT RESUSPENSION** – on pages 265 and 266 of the DEIS, the authors claim that sediments are destabilized in Drakes Estero due to the removal of eelgrass from DBOC operations. There is no evidence, and no supporting data, to these claims. First, the work by Anima (1991) was done when Johnson Oyster Company was working in Drakes Estero, and the only mention of disturbing the bottom was associated with the boat dock in Schooner Bay. Second, the reference to boat-generated waves in Koch (2001) was from Stewart et al. (1997), a study completed in the Upper Mississippi River in a major navigation channel. Third, as discussed above, Koch (2002) noted minimal impact generated from a 21-ft V-hulled boat to seagrass habitat.

Additional Information

There is no evidence that DBOC boating operations destabilize eelgrass. The comment that boats disturb the bottom substrate by Anima (1991) was related to operations by Johnson Oyster Company, who owned the oyster farm prior to DBOC, and it was related to the boat dock in Schooner Bay. The actual quote from Anima (1991) is "In Schooner Bay the channel is somewhat artificial in that it has been scoured out by the constant boat traffic from the oyster operation. The work by Anima (1991) focused on discharge of pesticides in the water from upland sources and the general geology of the site. Not only is the work associated with a totally different company, but it has no bearing on eelgrass habitat at all.

The only reference to boat-generated waves in Koch (2001) was from Stewart et al. (1997). The Stewart et al. (1997) study was analyzing boat-generated waves in a navigation channel of the Upper Mississippi River. Nothing about that study can be compared to conditions in Drakes Estero. The Mississippi River is a freshwater system with constricted shores (compared to an estuary), is a navigation channel with intense aquatic traffic, and contains vessels that are orders of magnitude greater than the skiffs used by DBOC.

There is no evidence that DBOC boating operations increase turbidity. Koch (2002) found minimal negative impacts to seagrass habitat associated with 21-ft V-hulled boats traveling at speeds of 7.4 and 14.1 mph. In fact, the researcher found that boat generated waves contained less energy than storm or wind-generated waves. Fonseca (1996 *as cited by* Koch 2002) states

that, "seagrasses effectively reduce currents and waves promoting sediment deposition." Any resuspension of sediment caused by boat-generated waves resettled within a matter of minutes and would not, as the authors of the DEIS claim, "result in temporary reductions in photosynthesis."

Original DEIS Citation

Chapter	Page	Quote
4	265	[R]eduction in water clarity through resuspension of sediments destabilized by seagrass removal can lead to more extensive declines in cover (Preen, Lee Long, and Coles 1995).
4	266	DBOC operations adversely impact eelgrass cover and density because boats disturb the bottom substrate (Anima 1991iv), thereby adversely affecting the rooting medium for eelgrass. Eelgrass regrowth into propeller scar areas can be relatively rapid (weeks), or it can take as long as 2 to 5 years, depending on the severity of the impact on the substrate or the root systems (Waddell 1964, as cited in Simenstad and Fresh 1995; Zieman 1976)...Finally, boat traffic can cause a reduction in photosynthesis, and therefore biomass, due to the following: (1) boat traffic causes temporary increases in water column turbidity due to resuspension of sediments, (2) increased turbidity reduces the depth to which sunlight can penetrate the water column, (3) sunlight is a requirement for photosynthesis, and (4) plants must photosynthesize to add biomass; therefore, (5) boat-induced turbidity results in temporary reductions in photosynthesis and can stall or reverse biomass accumulation (Koch 2001, 2002).

6. **INTRODUCTION OF INVASIVE SPECIES** – on page 263 and 266 of the DEIS, the authors attribute the introduction and expansion of *Didemnum* to DBOC operations and mariculture structure. Further, the authors claim that *Didemnum* has the ability to colonize eelgrass. The authors fail to recognize, (1) *Didemnum* was not introduced by mariculture operations, (2) there are many colonial tunicate species in Drakes Estero, (3) because it has the ability to colonize eelgrass, taking out the mariculture structure would only make eelgrass a more attractive substrate for attachment, and (4) current minimization measures that manage for invasive species. In general, colonial tunicates are more problematic for the oyster industry (Jamison 2007) than the local biota in Drakes Estero, and it is in the best interest of DBOC to control the organism. It should also be noted that, even though the NPS claims that they have been monitoring this species, they do not provide any data that it has expanded in abundance in Drakes Estero since initiation of monitoring. In summary, DBOC is not responsible for the introduction of this species, which could just as likely have been introduced by recreational activity, and it provides a service to the NPS through control measures taken during harvest and maintenance activities associated with the farm. If the NPS is serious about managing for invasives, then it should be working with DBOC rather than implicating it in a problem that they did not originate and for which they are improving.

Additional Information

Didemnum was first observed on the West Coast in San Francisco Bay in 1993 (Bullard et al. 2007). It is unknown how the species was introduced, but aquaculture is not implicated in its introduction. That said, shellfish aquaculture has served as a vector for past species introductions, and this has been acknowledged by the industry for many years. Unfortunately,

the DEIS fails to acknowledge regulated industry practices that greatly limit the potential for new introductions that have been in place for many years.

The current measures that minimize the risks of invasive species introductions are principally associated with the use of larval seed from West Coast hatcheries that are prescreened for pathogens and invasive species, and authorized for interstate export only after review by state agencies. All shellfish seed imported into California must be certified disease free and are regulated by the CDFG by an importation permit. All of the seed comes from hatcheries in Washington and Oregon; growers no longer import wild seed from Japan or Europe. The seed is routinely inspected via histological and PCR inspection for disease and pest species and then certified free of disease and pests by a USDA/APHIS certified veterinarian. CDFG carefully monitors hatchery and seed production facilities in Washington and Oregon. It requires these facilities to submit seed inspection reports on a regular basis, and routinely conducts seed inspections and histopathological analysis on imported seed. CDFG only allows importation of seed from established hatcheries with a minimum two-year history of documented absence of disease. The certification process includes inspection of larvae and seed for disease, parasites and invasive/exotic species. It also includes regular communication with Washington and Oregon State biologists and regulators to maintain open communication about relevant issues. In view of these precautions, and shellfish grower's ongoing interest in keeping their waters free of hazardous exotic species, current shellfish farming practices, pose little risk of causing new introductions of invasive or exotic species.

Past practices of importing shellstock from overseas, the primary vector for past species introductions from shellfish aquaculture, are prohibited. Further, boats and gear used in DBOC operations are not moved outside of the Estero, thus preventing spread through hull fouling or gear introduction. In this manner, kayakers and other recreationalists are more likely to introduce "hitch-hiking" species than DBOC. While *Didemnum* has been observed among the oyster racks in the Estero, colonizing hard substrate, what is not recognized is that this species has been established in many locations along the entire West Coast from southern California to British Columbia (Fofonoff et al. 2005, Ruiz et al. 2005). Dr. Andy Cohen (Jamison 2007), director of the Biological Invasions Program at the San Francisco Estuary Institute, told the Point Reyes Light, "*Didemnum* can only grow on hard surfaces. Since the bottom of Drakes Estero is soft sand and mud, he said, the organism is more likely to affect Lunny's oysters than any other marine life in the estuary."

The NPS uses the evidence of *Didemnum* establishment on the racks as evidence that the Estero propogates this species for further distribution outside the Estero. However, while the racks may serve as a source for tunicate settlement, DBOC manages the problem through harvest and maintenance activities. DBOC is doing more for the control of this organism than any eradication program the NPS could devise. If NPS is serious about trying to control colonial tunicates, then they should be working with DBOC to remove the species from the system rather than implicating them in causing a problem that they did not originate.

Finally, tunicates have been known to colonize eelgrass, which typically occurs in the absence of other more suitable structures for colonization (Shumway, pers. comm., 2011). Researchers

from University of Connecticut who have studied colonial tunicates extensively (Sandra Shumway, Stephan Bullard, and Robert Whitlatch) have indicated that in the absence of mariculture structure, the colonial tunicates in Drakes Estero are more likely to colonize eelgrass (Shumway, pers. comm., 2011). Therefore, taking out the mariculture structures would do more to distribute the invasive tunicate in Drakes Estero than leaving it in place.

Original DEIS Citation

Chapter	Page	Quote
4	266	As noted in NAS (2009), commercial shellfish operations have caused the expansion of nonnative invasive species such as the invasive tunicate *Didemnum* into various habitats in Drakes Estero. Although hard structures such as oyster racks and bags represent a point of introduction and/or expansion for this species (Bullard, Lambert, et al. 2007), recent research has shown that this species has the capacity to colonize soft substrates such as eelgrass blades (Carman et al. 2009; Carman and Grunden 2010; NAS 2010). Invasive tunicates have been recently observed colonizing eelgrass blades in Drakes Estero (Grosholz 2011b).
4	263	When eelgrass blades become covered with species such as invasive tunicates or epiphytic algae, this reduces the surface area of the leaves that are exposed to sunlight for photosynthesis. Therefore, because alternative A would reduce the potential for such leaf-blade colonization, the result would be long-term beneficial impacts on eelgrass due to the associated increases in primary productivity.

7. **EPIPHYTIC ALGAE** – on page 263, Chapter 4 of the DEIS, the authors suggest that removing the DBOC would reduce potential harm to eelgrass by removing mariculture structures that stimulate the growth of epiphytic algae. In fact, mariculture is more likely to reduce algae production through consumption of nutrients. Further, the authors use inappropriate scientific references to support the mistaken claim.

   For example, when Hauxwell et al. (2001) and Dumbauld et al. (2009), cited by the DEIS authors, were discussing vegetation that grows on mariculture structures, they were not talking about epiphytes, they were talking about epiphytic *macro*algae. There is a big difference. Epiphytic macroalgae (e.g., *Ulva*, *Fucus*, *Enteromorpha*) are algal species that colonize on structures and can outcompete eelgrass by shading it out, especially newly recruiting shoots (Hauxwell et al. 2001). Epiphytes (e.g., diatoms) that colonize eelgrass blades are a result of natural processes, but can be overproduced due to nutrient loading in a system (Hauxwell et al. 2001, Nielsen et al. 2004). Shellfish aquaculture can actually control the growth of epiphytes by reducing water column nutrients.

   Additional Information
   Macroalgae does not colonize eelgrass blades in the way that epiphytes grow on blades, but can outcompete eelgrass for nutrients (Nielsen et al. 2004). Growth of macroalgae is dependent on nitrogen loading in an estuary (Figure 1, Hauxwell et al. 2001). According to Press (2005), as stated on page 161 of the DEIS, *macro*algae is "not a major source of primary production in Drakes Estero, but may function as important habitat for benthic invertebrates and may also contribute to nutrient cycles in the sediments".

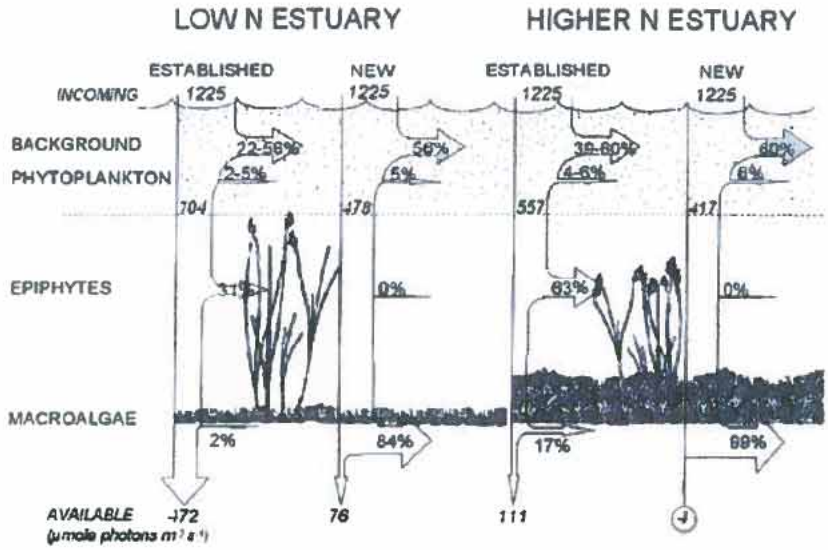


Figure 1. An illustration of mean summer light intensity effects to newly recruiting eelgrass based on the interception of light due to background attenuation and standing stocks of phytoplankton, epiphytes, and macroalgae in two estuaries of Waquoit Bay subject to different nitrogen loading rates (Hauxwell et al. 2001).

In contrast, epiphytes (primarily diatoms) can form thick layers on eelgrass blades. This is a natural processes, and important in the food chain because this layer of epiphytes is grazed by aquatic invertebrates (van Montfrans et al. 1984, Nelson and Waaland 1997). Epiphytic growth can impact photosynthetic processes (Hauxwell et al. 2001, Nielsen et al. 2004), but overproduction of epiphytes is a result of nutrient water column pollution (Williams and Ruckelshaus 1993, Hauxwell et al. 2001, Nielsen et al. 2004). Shellfish aquaculture can provide mitigation of these conditions due to water filtration and control of nutrients that promote the growth of epiphytes. Therefore, the contention that the presence of epiphytes in Drakes Estero would improve with the removal of DBOC is completely inaccurate. If anything, epiphytic growth would increase without the farm.

Original DEIS Citation

Chapter	Page	Quote
4	263	Removal of DBOC activities would also reduce the potential for offshore mariculture structures such as racks and bags to stimulate the growth of algae, which can become established on nearby eelgrass blades (termed "epiphytic" algae) (Hauxwell et al. 2001; Dumbauld, Ruesink, and Rumrill 2009; NAS 2010).

8. **EELGRASS UNDER OYSTER RACKS** – on page 266 of the DEIS, the authors state that bags and racks used for shellfish cultivation have been shown to reduce coverage and density of eelgrass due to shading. To support their claims, they use a number of references from California and the Pacific Northwest that were interpreted incorrectly. Interactions between shellfish cultivation and eelgrass are not as simplistic as presence/absence. Although there may be space competition in a small portion of the estuary associated with the racks and bags (1%), the water filtration and sediment enrichment benefits that shellfish provide positively benefit more than

92% of the Estero and associated benthic communities. (Note: this value is based on the figure presented in NAS (2009) that DBOC has impacted 8% of eelgrass resources, although 7% was based on boating impacts from eelgrass, which more recent data does not support, as discussed above).

For reference, Rumrill and Poulton (2004) found that spacing oyster longlines more than 5 feet apart resulted in no significant reduction in eelgrass density relative to reference areas: the eelgrass spatial coverage among long lines spaced at 5 to 10-ft intervals was within the range of variability found in reference plots. Longlines spaced closer than 5 feet were found to reduce the spatial coverage of eelgrass. Thus, appropriate spacing was found to reduce the space competition found between mariculture gear and eelgrass, and allowed for the coexistence of mariculture operations and suitable eelgrass habitat. The distance of the most densely clustered oyster racks in Drakes Estero are separated by 16 to 20 feet (K. Lunny, pers. comm., 2011). In addition, many authors have reported that bottom culture can increase eelgrass growth rates, even if the plants are less dense (Peterson and Heck 2001, Newell 2006, Tallis et al. 2009). At most, effects from the presence of aquaculture gear in Drakes Estero can be considered neutral if you consider the amount of space that is impacted due to space competition (1%) compared to the amount of benefits it provides through water filtration, sediment enrichment, and predator refugia (92%).

Additional Information

Data from Drakes Estero show reductions, or absence, of eelgrass below oyster rack structures, and this is not disputed. What is not recognized in the DEIS is to what degree the eelgrass in the Estero is benefitted outside of these structures by the filtration and sediment enrichment provided by the shellfish biomass the rack structures support. The filtering activity of the shellfish farmed by DBOC clears excess turbidity from the waters, which improves water clarity and deepens the photosynthetically active radiation zone benefitting eelgrass and macroalgae. The combined filtering activity of the millions of filter-feeding shellfish being grown in the Estero clears as much as 350,000 m^3 each day, removing particles as small as 2 microns (R. Rhealt, pers. comm., 2010). Based on the positioning of the mariculture racks and bags (Figure 2), these benefits are concentrated in more protected areas of the Estero that may not be completely flushed from tidal exchange. This was also acknowledged by Anima (1991) who stated that the greatest abundance of oyster racks is located in areas of the Estero where "tidal flushing is limited." Additionally, in terms of the most localized benefits, shellfish culture is positioned in proximity to nutrient loading from cattle land in the upper watershed, which means that the farm provides mitigation for excess nutrients added to the Estero.

Estuaries with excessive nitrogen inputs and inadequate populations of filter-feeding bivalves often exhibit losses of eelgrass caused by inadequate light penetration from phytoplankton blooms, and dissolved and suspended solids. Filter feeders (e.g., oysters) mitigate for this eutrophication by consuming water-column phytoplankton and particulate organic matter that can interfere with light penetration required for eelgrass photosynthesis (Best et al. 2001, Koch and Beer 1996). Evidence that bivalves in the Estero are providing a benefit to eelgrass can be seen in the doubling of eelgrass habitat from 1991 to 2007 (Bartley et al. 2009, NAS 2009).

The nutrient cycling aspects of shellfish populations may be a significant element in maintenance and growth of eelgrass communities in estuarine ecosystems. Eelgrass growth is likely accelerated in areas where the plants are co-mingled with bottom-growing shellfish (Newell 2006). Mussels (*Modiolus americanus*) enhanced seagrass (*Thallasia testudinum*) productivity in a Florida study (Peterson and Heck 2001) by increasing porewater nutrient concentrations, which correlated with increased nitrogen and phosphorus content in seagrass blades and faster growth. A similar study in southern California examined interactions between eelgrass (*Zostera marina*) and an introduced mussel (*Musculista senhousia*) (Reusch and Williams 1998). Mussels were placed in eelgrass beds and near eelgrass transplants at several densities. At high densities, mussels inhibited rhizome extension of eelgrass, but across a range of densities, eelgrass blade growth rates increased. This finding of enhanced growth was consistent with those of Tallis et al. (2009) in their evaluation of bottom cultured oysters in Willapa Bay, and their documentation that disturbance/displacement of eelgrass varies by oyster culture method.

These and other studies document that while some degree of displacement of eelgrass can occur from cultured shellfish, in the broader embayment where the culture occurs, benefits to eelgrass can be significant if densities of culture operations do not completely outcompete eelgrass for space or exceed the carrying capacity of the local waters. Suspended shellfish systems, in particular, limit space competition and, provided they are not in a density that would exceed the exchange rate for flushing or lead to over enrichment of sediments, they can be maintained sustainably and provide ecological benefits.
To this end, the NAS (2009, p.4) notes, "Mariculture activities had an impact on about 8% of the eelgrass habitat in Drakes Estero in 2007: 1% of eelgrass acreage was displaced by oyster racks and 7% was partially scarred by boat transit through the eelgrass beds. Research elsewhere demonstrates that damaged eelgrass blades have rapid regeneration capacity and that eelgrass productivity can be locally enhanced by the cultured oysters through a reduction in turbidity and fertilization via nutrient regeneration." Thus, in terms of a 'permanent' adverse impact, the assessment observes a maximum of 1% at 2007 coverage levels.

It should be recognized that the SUP permit would authorize only the continuation of operations within the historic footprint of the farm's activities, and not any expansion. Thus, the spatial impact of operations would remain the same. The question must be asked, if 99% of the eelgrass in the Estero is not occluded by oyster racks, and 92% of the eelgrass is benefitted by the filtration and fertilization functions of the oysters, is there a net impact, or benefit?

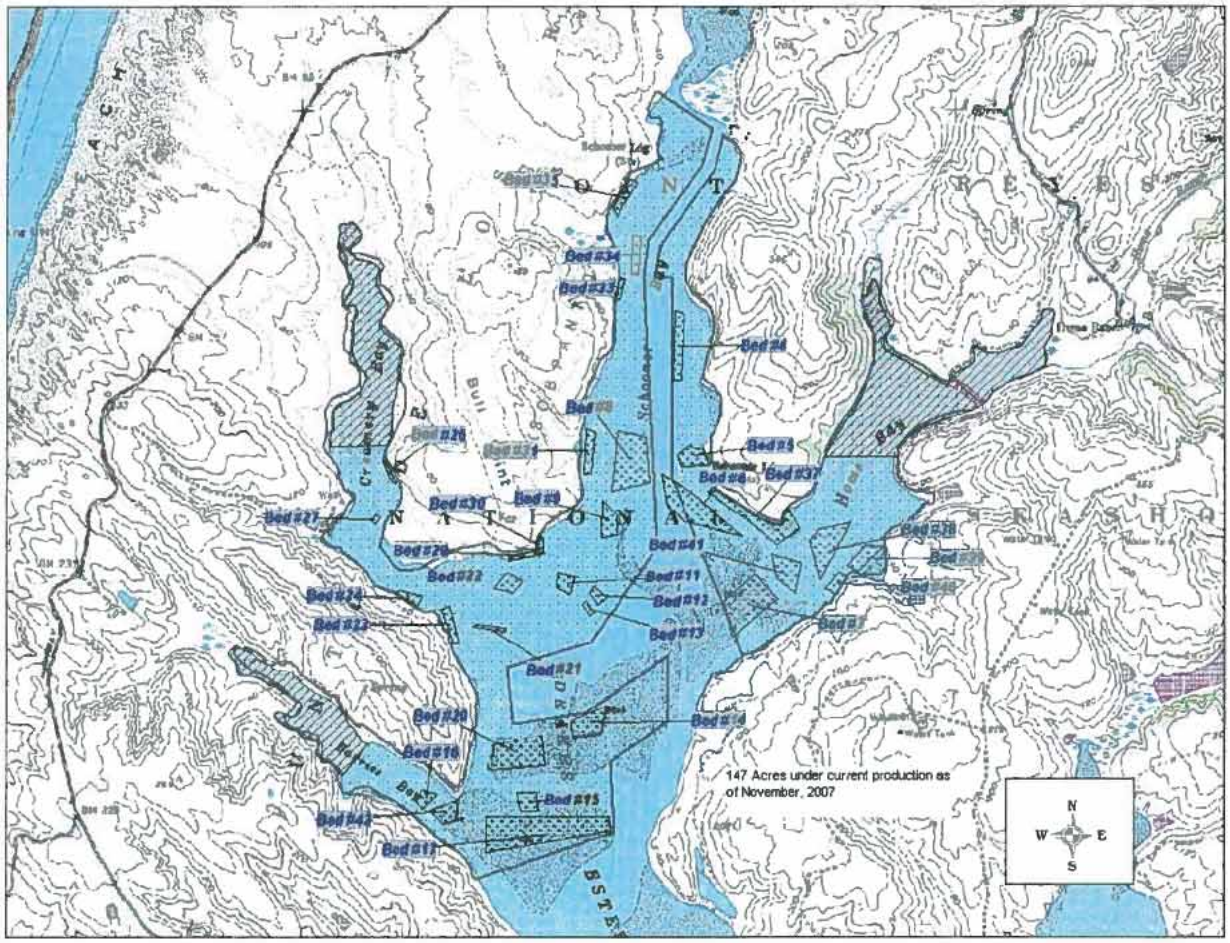


Figure 2. Location of culture beds owned by DBOC in Drakes Estero (total of 142 acres).

Original DEIS Citation

Chapter	Page	Quote
4	266	Based on research conducted in Drakes Estero, bags and racks used for shellfish cultivation have been shown to reduce coverage and density of eelgrass due to shading or preemption of space (e.g., Wechsler 2004v; NAS 2009). Similar results have been found underneath structures used for oyster cultivation in other California estuaries, e.g., Humboldt Bay (Rumrill and Poulton 2004), and throughout the west coast (Pregnall 1993; Simenstad and Fresh 1995; Ruesink et al. 2005; Everett, Ruiz, and Carlton 1995; Tallis et al. 2009). Reduced coverage and density of eelgrass under or adjacent to racks and bags have an associated reduction in primary productivity of eelgrass, because there is less leaf area available to photosynthesize (Everett, Ruiz, and Carlton 1995; Rumrill and Poulton 2004; Tallis et al. 2009; NAS 2010). In addition, lower eelgrass abundance results in a reduction of habitat for wildlife species that use eelgrass for nursery grounds, refuge, and food (Simenstad and Fresh 1995; Dumbauld, Ruesink, and Rumrill 2009; NAS 2009).

9. **EROSION UNDER OYSTER RACKS** – on page 267 of the DEIS, the authors claim that oyster racks promote erosion and/or sedimentation. There is little value in this statement. First of all, it is unclear if the authors feel that sedimentation or erosion is problematic in relation to the oyster farm. Second, both of these processes are typical of tidally-driven systems. According to numerous researchers, tidal action is the dominant driver in sediment distribution in Drake Estero (Anima 1991, Elliott-Fisk et al. 2005). Anima (1991) reports that there is an overall sedimentation trend in Drakes Estero. The rate of sedimentation has varied over the history of the estuary. From 8,000 to 3,000 yrs BP the sedimentation rate was 37.5 cm/100 yrs; from 1,200 to 1,700 yrs BP the rate was 3.8-6.4 cm/100 yrs; and finally a calculated short-term deposition rate of 9-60 cm/100 yrs. In general, Anima (1991) reports that sedimentation has increased in the last 150 yrs, which he attributed to increased land use as a result of population growth. Actions that he attributed to the sedimentation rate included trail and road use, road building, increase in paved areas that increase the amount of surface runoff, and cattle grazing. However, overall, the rate of filling was similar to other West Coast lagoons.

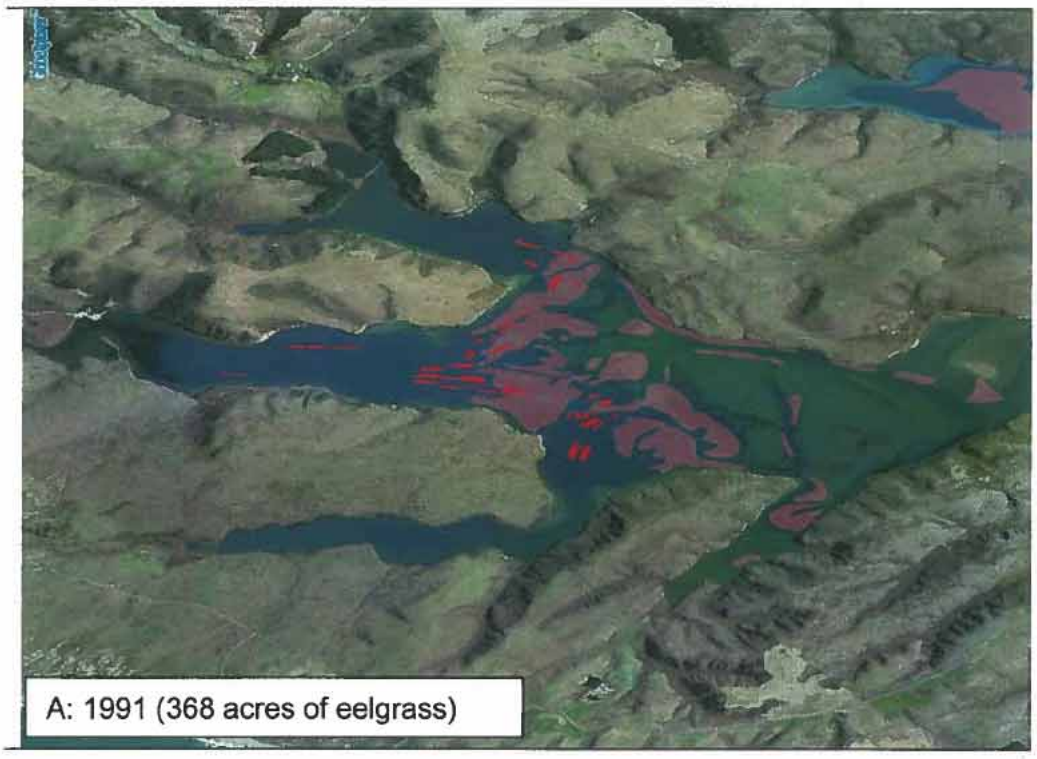
   Anima (1991) also described how the estuary can be dominated by sedimentation processes in some years and erosional processes in others. Drakes Estero is an open-coast system, which have direct influence on the distribution of sediment inside the estuary. When the entrance is to the extreme west (as in 1953 and 1974), oceanic wave and tidal approach is nearly aligned with the main arm of the tidal channel and carries sediment suspension further into the lagoon. When the mouth is in a west side configuration, incoming waves and tides attack the adjacent cliffs, and result in increased erosion.

   Finally, filter feeders play an important role in the deposition of fine grained sediment. Suspended matter removed by oysters is deposited as feces and pseudofeces (biodeposition). The rate of biodeposition has been reported to be seven times faster than the deposition of solids by gravity or settling from suspension (Haven and Morales-Alamo 1966 *as cited in* Anima 1991). The authors also observed that the biodeposition rate of other common invertebrates equals or exceeds that of oysters. Further, according to Harbin 2004 as cited in Elliot-Fisk et al. 2005), the amount of organic matter resulting from pseudofeces produced by suspended oysters is far less than the amount of organic matter resulting from eelgrass decomposition, considering how expansive and dense the beds are within the estuary, making any significant organic inputs from the oysters undetectable (Harbin 2004 *as cited in* Elliott-Fisk et al. 2005). The Elliot-Fisk et al. (2005) report went on to conclude that "We found the oyster racks to have no pronounced impacts on the eelgrass beds, which existed both under and away from the racks as an incredibly rich habitat type." Overall, DBOC oyster racks account for 0.6% (7 acres out of 1,152 acres) of the total intertidal habitat within the Estero. Therefore, the increased sedimentation rate associated with the racks is an insignificant portion of the overall sedimentation in the estuary contributed by tidal action, eelgrass habitat and other invertebrates. More importantly, the presence of oyster racks is not inhibiting eelgrass growth in Drakes Estero.

Original DEIS Citation

Chapter	Page	Quote
4	267	Oyster racks have been shown to cause changes in sediment/substrate quality due to erosion and/or sedimentation processes that are increased by the presence of the structures (NAS 2010). Erosion in particular has been noted in association with oyster racks in Drakes Estero (Harbin-Ireland 2004vi) and in Coos Bay, Oregon (Everett, Ruiz, and Carlton 1995). Erosion reduces substrate quality and availability for colonization by eelgrass, thus contributing to the reduction in eelgrass abundance and cover beneath the racks.

10. **EXPANSION OF EELGRASS HABITAT** – on page 262 of the DEIS, the authors note that eelgrass habitat in Drakes Estero has expanded from 1991 to 2007, but that this expansion cannot be attributed to the shellfish operations (they do not attempt to explain what other cause could be related to this expansion). Shellfish have been shown by multiple researchers to provide benefits to eelgrass habitat (Reusch and Williams 1998, Peterson and Heck 2001, Newell 2006, Tallis et al. 2009). Additionally, areas that see expansion of culture (as long as it is within carrying capacity of the system) have also seen an increase in seagrass habitat (Ward et al. 2003). Even if the benefits that shellfish provide are not recognized, it is obvious that, under the environmental baseline, DBOC operations are not having a negative impact on eelgrass, as eelgrass coverage has doubled in the last 16 years (Figure 3).



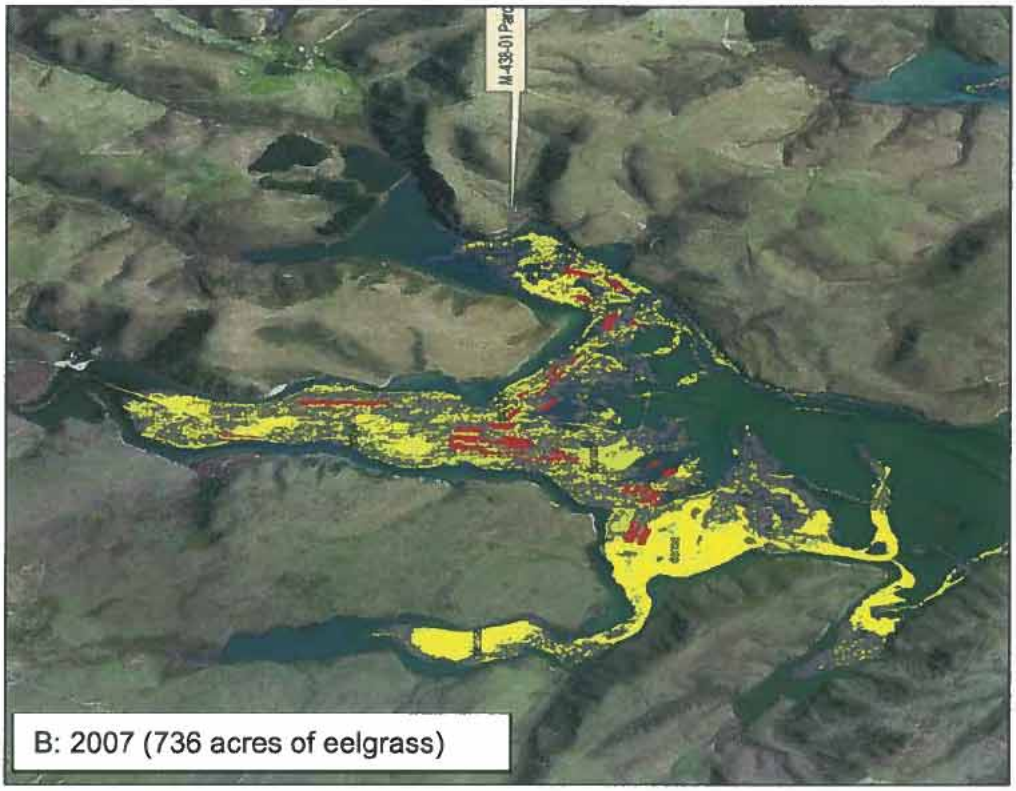


Figure 3. Eelgrass habitat in Drakes Estero from 1991 (A) to 2007 (B). Aerial photography shows a doubling of eelgrass habitat in sixteen years. Red = the location of oyster racks (7 acres).

Additional Information

In a marine habitat mapping study recently completed at Bahía San Quintín, Baja California del Sur, Mexico. Bahía San Quintín is one of the foremost seagrass areas in western North America. Estimates of total extent of eelgrass range from 2,069 ha to 2,390 ha. Satellite (SPOT, and Landsat 5 and 7) imagery was used to track long term changes in eelgrass distribution in a portion of the bay with recently expanded oyster operations (Ward et al. 2003). The authors noted that oyster rack farming was not associated with any detectable loss in eelgrass spatial extent, despite the increase in number of oyster racks from 57 to 484 over the study period. On the contrary, there was an apparent gain in eelgrass coverage in oyster culture areas, and a small loss outside these areas, with the data showing no significant impact on eelgrass distribution from oyster racks.

The results of the Mexico rack and bag study are borne out by Wechsler's work in Drakes Estero (2004). While Wechsler acknowledges that eelgrass growth is restricted directly beneath oyster racks, his ultimate conclusion is, "A qualitative look at the distribution of eelgrass beds in Schooner Bay indicated that its productivity was not affected substantially by oyster mariculture" (Wechsler 2004). Indeed, Wechsler himself notes the positive effect shellfish culture can have on eelgrass growth: Peterson and Heck (1999) similarly suggest that biodeposits from bivalves high in nitrogen and phosphorus can enhance growth of aquatic macrophytes, specifically eelgrass and kelp. This appears to be born out from records reviewed by the NAS on eelgrass coverage in the Estero, which document that coverage of eelgrass in the Estero has doubled

from 1991 to 2007 (NAS 2009). While eelgrass coverage has also increased in some other West coast estuaries over this time period, the results clearly would not support that the oyster operations are adversely affecting the eelgrass resource in the Estero.

Original DEIS Citation

Chapter	Page	Quote
4	262	NAS (2009) discussed an increase in eelgrass between 1991 and 2007. The conclusion from the NAS report was that eelgrass was expanding despite the ongoing commercial shellfish operations but notes this trend was not only observed in Drakes Estero. The NAS report did not evaluate the potential reasons that could be attributed to the expansion.

BENTHIC FAUNA

1. **BIVALVE COMPETITION** – on page 274 and 278 of the DEIS, the authors claim that mariculture in Drakes Estero will result in the escape of non-native bivalves from cultivation, which would become established in Drakes Estero and outcompete native benthic species. This contention does not make sense biologically or in terms of potential carrying capacity in the estuary.

   Elliott-Fisk et al. (2005) reported that the water temperature in Drakes Estero is too low for Pacific oysters to successfully reproduce (per Fred Conte, University of California, Davis), which leads to these species being incubated on shore for several weeks before they are placed on the wooden racks for grow-out. In contrast, the Manila clam has been shown to successfully naturalize in a system in which it was introduced. However, when populations of feral clams dominate a system conditions are typically eutrophic (Pranovi et al. 2006, Humphreys et al. 2007). In other words, Manila clams thrive in poor water quality conditions. This is not the case in Drakes Estero. Although there is nutrient loading from freshwater sources, it is not in a quantity that is causing eutrophication (Anima 1991).

   The second claim that non-native oysters will outcompete native benthic species is also misinformed. Although it is true that aquaculture adds bivalves to a system that will directly compete for space and resources with native bivalves, there is no indication that Drakes Estero is at or near carrying capacity. In a study by Elliott-Fisk et al. (2005), the authors reported that, "the relative abundance of ostracods and bivalves approximately doubles between the racks and 50 meters away." If the system were at carrying capacity, then there would be signs of nutrient limitation and even a stimulation of algal growth rates (Prins et al. 2006). If there is consistent tidal flushing, an increase in benthic invertebrates and bivalves in association with oyster racks, and additional inputs from upland habitat, Drakes Estero is unlikely to be close to carrying capacity. Although there is no data that can be presented to fully support this claim, it cannot be stated that oysters are outcompeting native benthic species.

   Original DEIS Citation

Chapter	Page	Quote
4	274	[T]he termination of DBOC activities in Drakes Estero would remove actions associated with shellfish mariculture…[which] would remove the potential for

		commercially grown nonnative bivalves to escape cultivation, become established in Drakes Estero, and outcompete native benthic species (NAS 2010).
4	278	The Pacific oyster, which is the primary species cultured by DBOC, is not native to the Northern California region (Trimble, Ruesink, and Dumbauld 2009). Similarly, the Manila clam, a recent introduction into DBOC's shellfish cultivation stock and a species that could be produced on a much wider scale under this alternative than under existing conditions, is a nonnative species. Such introductions have the potential to develop naturally breeding populations in Drakes Estero (NAS 2004, 2009). The introduction of commercially grown nonnative bivalve species carries a certain level of risk that the nonnative species would compete with native bivalves for food or habitat, leading to a decrease in local biodiversity of native bivalve species (Ruesink et al. 2005; Trimble, Ruesink, and Dumbauld 2009; Dumbauld, Ruesink, and Rumrill 2009; NAS 2010). The phenomenon of native species displacement has already been observed for the Manila clam (Pranovi et al. 2006), the native Olympia oyster (Trimble, Ruesink, and Dumbauld 2009) and other species introductions on the west coast (Ruesink et al. 2005).

2. **INTRODUCTION OF SHELLFISH DISEASES** – on page 274 of the DEIS, the authors claim that mariculture in Drakes Estero introduces bivalve diseases into the estuary. As noted in above, regulations are in place to control the possibility of disease or species introduction from the transport of oyster seed. The 1998 FONSI for the NPS EA for construction and replacement of facilities at Johnson's Oyster Company (JOC) stated, "to mitigate any impacts related to this issue ["hitch-hiking" alien species], both JOC, and the CDFG have agreed to establish a policy of zero tolerance, develop a risk assessment, and protocols for importing Mexican oysters into Drakes Estero." As detailed above, the current measures that minimize the risks of invasive species introductions are principally associated with the use of larval seed from West Coast hatcheries that are prescreened for pathogens and invasive species, and authorized for interstate export only after review by state agencies. The seed is certified free of disease and pests by a USDA/APHIS certified veterinarian. All shellfish seed imported into California must be certified disease free by a USDA/APHIS certified veterinarian and are regulated by the CDFG by an importation permit. All of the seed comes from hatcheries in Washington and Oregon. Growers no longer import wild seed from out of the country. These hatcheries submit seed inspection reports on a regular basis to the CDFG. CDFG only allows importation of seed from established hatcheries with a minimum two-year history of documented absence of disease. In view of these precautions, and shellfish growers ongoing interest in keeping their growing waters free of hazardous exotic species, current shellfish farming practices at Drakes Estero pose little risk of causing new introductions of invasive or exotic species. The continuation of claims that diseases are introduced by practices employed at the Drakes Estero are simply not supported by existing data, nor do they recognize the best management practices and regulatory regimes in place for many, many years that address and significantly minimize this risk.

Original DEIS Citation

Chapter	Page	Quote
4	274	Removal of shellfish mariculture (including 7 acres of racks and up to 88 acres of bottom bags) from Drakes Estero would also reduce the potential for introduction of bivalve diseases, which can be borne by cultured shellfish (Friedman 1996; Burreson and Ford 2004).

3. **INVASIVE TUNICATE, DIDEMNUM** – on page 274 of the DEIS, the authors discuss the invasive tunicate, *Didemnum*, which is found in Drakes Estero and has the potential to smother habitats and inhibit normal biological functions of benthic fauna. In addition, on page 275, the claim was made that maintenance activities can fragment *Didemnum* and thus increase their dispersal. The concept that *Didemnum* is "smothering" habitat is misleading. The reference associated with this information, Mercer et al. (2009), indicated that *Didemnum vexillum* was able to colonize cobble-pebble substrates and form mats on the seafloor. As a result, there were "subtle shifts" in the benthic community, and the authors state in the conclusions that "the abundance of epifaunal organisms was not significantly affected by presence of the ascidian mats." Because the mariculture structures offer the best attachment points for colonial tunicates in Drakes Estero, the removal of these structures would not eradicate this species (Shumway, pers. comm., 2011).

   The second comment that DBOC operations will fragment and spread *Didemnum* is also misleading. It is true that colonial tunicates will fragment, but it is also true that because *Didemnum* is primarily isolated to mariculture structure in Drakes Estero, DBOC is able to effectively control this species through harvest and maintenance activities. While *Didemnum* has been observed among the oyster racks in the Estero, what is not recognized is that this species has been established in many locations along the entire West coast from southern California to British Columbia. It was first recognized in San Francisco Bay in 1993 (http://woodshole.er.usgs.gov/project-ages/stellwagen /didemnum/htm/page10. html) and culture operations were not the source of its introduction. It is clearly a structure-associated species, but as such creates a nuisance for principally the grower, not the Estero environment, as other hard substrate is extremely limited in the Estero. If NPS is serious about trying to control colonial tunicates, then they should be working with DBOC to remove the species from the system rather than implicating them in causing a problem that they did not originate.

Original DEIS Citation

Chapter	Page	Quote
4	274	After years of shellfish production in Drakes Estero, the invasive tunicate *Didemnum* has become established in Drakes Estero. The removal of offshore commercial shellfish infrastructure would minimize the potential for new colonization of invasive tunicates, which the NAS report associated with DBOC's mariculture structures (NAS 2009) (see discussion under alternative B). Invasive colonial tunicates have the potential to smother habitats and inhibit normal biological functions of benthic fauna (Osman and Whitlatch 2007; Mercer, Whitlatch, and Osman 2009).
4	275	[T]he ability of invasive tunicates (such as *Didemnum*) to regenerate after being fragmented increases their dispersal capabilities (Bullard, Sedlack, et al. 2007), which can be worsened by activities associated with the maintenance of oyster bags and racks (NAS 2009). Therefore, the termination of commercial shellfish activities would reduce the risk of further dispersing the tunicate.
4	279	In California (Foss et al. 2007; Heiman 2006), as elsewhere (Dijkstra, Sherman, and Harris 2007; Dijkstra, Harris, and Westerman 2007), invasive tunicates have been shown to reduce local biodiversity by displacing natural habitats and reducing the availability of resources used by multiple species. Because shellfish mariculture is the

		most likely mode of introduction for invasive tunicates on the west coast (Herborg, O'Hara, and Therriault 2009), these invaders, which have already been identified on native substrates within Drakes Estero, are likely to remain a problematic species in estuaries where shellfish mariculture is practiced.

4. **FOULING ORGANISMS** – on page 274 of the DEIS, the authors indicate that shellfish mariculture can support a variety of fouling organisms. Aquaculture gear is well known for providing artificial reef habitat for a variety of organisms. However, the use of the term "fouling" (a.k.a., sessile organisms) is a misnomer in terms of the local biota in Drakes Estero. The reference used in the DEIS (Light et al. 2005) is related to freshwater organisms (*Cordylophora caspia* (the "sponge", really a hydroid), *Urnatella gracilis* (the goblet worm), and *Balanus improvisus* (the barnacle)) associated with ship fouling. None of these organisms have any relation to Drakes Estero. Although organisms do colonize mariculture gear in Drakes Estero, the only "fouling" and nonnative organisms reported are the colonial tunicates (*Didemnum lahilei*), bryozoans (*Schizoporella unicornis* and *Watersipora subtorquata*), and sponge (*Halichondria bowerbanki*) (Elliott-Fisk et al. 2005). Common organisms that were likely native, but because they were only identified to genus their status was left as unknown, included *Balanus* (barnacle), *Botrylloides* (chain tunicates), *Botryllus* (colonial tunicates), *Obelia* (hydroid), and *Spirorbis* (polychaete worms).

   Organisms that colonize aquaculture gear are typically sessile organisms that require hard substrates for attachment (Dealteris et al. 2004; Pinnix et al. 2005); however, the result is typically a diverse biota of organisms that provide additional food resources for fish and larger invertebrates.

   Original DEIS Citation

Chapter	Page	Quote
4	274	In addition, shellfish mariculture structures can support a variety of other fouling nonnative and native organisms (which attach to underwater structures during their adult phase, inhibiting the normal function of the structure). Examples of other fouling organisms include barnacles, sponges, and goblet worms (Light, Grosholz, and Moyle 2005).

5. **BENTHIC FAUNA ABUNDANCE** – on page 275 and 277 of the DEIS, the authors cite references that indicate that certain benthic species are lower beneath oyster racks relative to other natural habitats. In one sense they are correct. *Certain* organisms are lower in abundance (i.e., those that prefer mudflat habitat over hard structures). However, the overall benthic biota typically increases from mudflat assemblages to more reef-like assemblages with the introduction of mariculture structure. This occurrence was recognized in Elliott-Fisk et al. (2005; of which Harbin was an author), which stated, "the relative abundance of ostracods and bivalves approximately doubles between the racks and 50 meters away." Additionally, many researchers have reported that oyster beds or aquaculture gear are equal (or superior) to adjacent eelgrass habitat in terms of the diversity and abundance of benthic fauna and fish (Meyer and Townsend 2000, DeAlteris et al. 2004, Pinnix et al. 2005, Powers et al. 2007).

   Although these changes are a product of mariculture structure, it is false to state that the benthic biota is lower. Additionally, the influence of mariculture structure to the benthic biota in Drakes Estero does not extend significantly beyond the structures themselves. Aquaculture in the

Estero represents a total of 12% (142 acres out of 1,152 acres) of potential intertidal flat habitat for benthic fauna. (Note: there were many figures presented in the DEIS for intertidal flat habitat, this figure was reported on page 166 from Anima (1991)). Therefore, this effect can be considered at worst minimal, even though it provides a benefit to food resources for fish and larger invertebrates.

Additional Information

The addition of structured habitat, artificial or otherwise, to homogenous marine habitats like sand and mud has long been recognized to increase the types and numbers of colonizing fish, invertebrates, and aquatic plants in a given area (Iversen and Bannerot 1984, Buckley and Hueckel 1985, Hueckel and Buckley 1987, Gregg 1995, Sargent et al. 2006). Such reef structures also provide refuge from predation and the enhancement of the availability of food for other marine organisms of no recreational interest—thereby enhancing local biodiversity (Hueckel and Stayton 1982, Hueckel and Buckley 1987). This "halo effect" underpins, in large measure, the initiative behind marine protected areas to enhance fishery resources throughout the World Ocean today. In brief, the structures create secure substrate, which in turn facilitates the settlement of epibiota (algae, barnacles, etc.) on the surface of the structure, and the consequent development of a more stable biological community that associate with that biota and the food and refuge it provides.

In terms of species abundance and diversity, DeAlteris et al. (2004) found that shellfish aquaculture gear supported more organisms, had higher species richness and higher species diversity than the non-vegetated seabed, and was similar (or superior) to eelgrass or submerged aquatic vegetation habitat. Likewise, Meyer and Townsend (2000) showed that man-made oyster reefs had a higher number of fish, mollusks, and crustaceans than adjacent natural reefs. O'Beirn et al. (2004) reported a wide variety and large numbers of marine organisms associated with the mesh bags of cultured oysters in Virginia. These included worms, mollusks, crustaceans, and fish. Powers et al. (2007) documented that the macroalgal growth on protective netting placed over hard clam (*Mercenaria mercenaria*) aquaculture sites supported elevated densities of mobile invertebrates and juvenile fishes similar to natural seagrass (*Z. marina* and *Halodule wrightii*) habitats. And finally, a three year study by USFWS (Pinnix et al. 2005) documented fish utilization between eelgrass, oyster culture, and mudflat habitats of North Humboldt Bay. Although results varied depending on the type of gear used, both shrimp and fyke net sampling resulted in fish abundance that was significantly higher in oyster culture habitat compared to the other two habitat types. When species diversity was normalized for abundance, it was noted that oyster culture and eelgrass beds supported a similar diversity. Overall, it is evident that fish are attracted to structure, and aquaculture operations can provide a surrogate for structure found in eelgrass beds.

Original DEIS Citation

Chapter	Page	Quote
4	275	Studies in Drakes Estero (Harbin-Ireland 2004vii; NAS 2009) and other systems (Castel et al. 1989; Nugues et al. 1996; Christensen et al. 2003; Lu and Grant 2008) have noted that the abundance of certain benthic species is lower beneath oyster racks relative to other natural habitats, such as nearby eelgrass beds (see discussion

		under alternative B).
4	277	Based on research conducted within Drakes Estero, the relative abundance of certain benthic invertebrates (i.e., the relative numbers of individuals within each species) was found to be lower directly underneath oyster racks than in nearby eelgrass habitat (Harbin-Ireland 2004viii; NAS 2009). Harbin-Ireland (2004ix) suggests that this decreased abundance is due to the fact that benthic habitat underneath oyster racks is more exposed to predators (such as fish) that prey on invertebrates living in the substrate. They further attributed the increased exposure to a lack of sufficient eelgrass cover, a phenomenon also observed by Everett, Ruiz, and Carlton (1995) underneath oyster racks in Coos Bay, Oregon.
4	277	However, some studies in west coast estuaries have shown that benthic invertebrate diversity can be higher near oyster beds than in adjacent unstructured habitat (NAS 2009). In one such study in Willapa Bay, Washington, benthic invertebrate densities were higher in on-bottom oyster beds than in adjacent mudflats, although both oyster and mudflat habitats showed lower diversity and density than eelgrass habitat (Hosack et al. 2006).

6. **NON-CATCH MORTALITY** – on page 275 of the DEIS, the authors quote a term from Kaiser (2001) called "non-catch mortality". Non-catch mortality is a term used in fisheries biology for mortality caused by fish that are not collected, but affected by the fishing process. This makes sense since the Kaiser (2001) reference is in relation to fish aquaculture. It has no meaning in shellfish aquaculture. The fact that benthic organisms that have colonized the bags, which in other locations of the DEIS are called "fouling organisms," are a product of aquaculture structure. Because these organisms would not be present in the densities observed without the presence of the oyster bags, taking them out of the system during harvest does not impact the population. In addition, some of these organisms are returned to the environment before bags are processed, thereby reducing this potential effect even further.

Original DEIS Citation

Chapter	Page	Quote
4	275	[W]hen the bags are harvested, any native benthic organisms that have colonized the bags are also harvested, brought onshore along with the cultured bivalves, and killed during processing—a case of accidental mortality referred to as "non-catch mortality" (Kaiser 2001) (see discussion under alternative B).

7. **DISPLACEMENT OF BENTHIC FAUNA IN SCHOONER BAY** – on page 275 of the DEIS, the authors indicate that there is direct destruction of native benthic fauna by boat propellers and dredging. Although motor boats would not be present in Drakes Estero if DBOC is not operating, there is no indication that disturbance of sediment would cease at the boat dock in Schooner Bay. On page 353 of the DEIS, the authors indicate recreation by kayakers (who would use the boat dock) would continue, and even increase, following removal of DBOC facilities. We presume that this would mean that the park would have the responsibility to dredge the habitat associated with the boat dock in order to maintain this service. In addition, on page 276 of the DEIS, the authors indicate that recreational clamming would continue in the Estero, which would also result in disturbance of the benthic fauna. According to Logan (2005), recreational clamming was shown to have a significant impact on the abundance of the amphipod

Corophium volutator. Because no option would change these recreational activities, this statement should be taken out of the EIS.

Original DEIS Citation

Chapter	Page	Quote
4	275	[T]he potential for substrate disturbance related to DBOC boat traffic in the main channel of Schooner Bay would no longer be present. Therefore, to the extent that such activities cause direct destruction of native benthic fauna by boat propellers or indirect displacement by disruption of benthic sediments. Further, the potential for disruption of benthic fauna and benthic habitat from dredging would no longer exist.
4	353	Use of Drakes Estero by kayakers would continue to take place and may even increase following the removal of DBOC facilities.
4	276	Alternative A, in combination with the MLPA would result in only recreational clamming allowed within the Estero.

8. **MUD SNAIL, *BATILLARIA ATTRAMENTARIA*** – on page 279 of the DEIS, the authors state that the nonnative mud snail, *Batillaria attramentaria*, was introduced by JOC and that it is detrimental to the native snail. The introduction of *Batillaria attramentaria* was from the import of Pacific oysters from Japan in 1932 (Byers 1999). Byers (1999) goes on to report that Drakes Estero contained predominantly *Cerithidea* with a few populations of *Batillaria* in Schooner's Bay. In fact, the author indicates that "The population of Batillaria in Drakes, however, remains very restricted – likely a major reason for its apparent absence from previous surveys." As noted above, the industry is now taking very careful steps before the introduction of seed from outside Drakes Estero, and the importation of oysters from Japan no longer occurs. Given the limited distribution of this species, it does not pose a problem to the biota of Drakes Estero.

Original DEIS Citation

Chapter	Page	Quote
4	279	In addition, Byers (1999) studied the invasion of a nonnative mud snail (*Batillaria attramentaria*), making specific reference to its introduction by JOC, the previous oyster operator in Drakes Estero. This organism was found to be detrimental to native snail populations (NAS 2009).

9. **INVASIVE SPECIES MANAGEMENT** – on page 280 of the DEIS, the authors claim that the presence of the DBOC in Drakes Estero hinders the NPS efforts to manage invasive species and influence the amount of time that a natural benthic faunal community can be re-established. This statement is both misleading and falsely emphasized. The NPS does not provide any indication in the DEIS of what they actually do for invasive species management. DBOC does nothing to prevent them from exercising their right to provide such management. In fact, it would be beneficial for both parties if NPS were willing to work with DBOC to further control invasive tunicates. DBOC is currently managing invasives associated with their farm and structures, as discussed above, which is more efficient than any program that NPS could provide for the Estero, including:

    1. They are able to remove organisms that colonize structure from the Estero during harvesting and processing of shellfish.

2. DBOC has long abandoned past practices of importing shellstock from overseas, the primary vector for past invasive species introductions from shellfish aquaculture.

3. Boats and gear used in DBOC operations are not moved outside of the Estero, thus preventing spread through hull fouling or gear introduction. Incidentally, there is more potential to introduce organisms through recreational boaters or clam harvest due to unwashed gear that was used in other waterbodies.

   In terms of natural benthic faunal community re-establishment in areas of DBOC aquaculture, the farm affects 12% (142 acres out of 1,152 acres) of potential intertidal flat habitat, much of which native species are thriving due to the benefits provided by aquaculture structure and filter-feeding organisms. Additionally, as discussed in above, there is a recorded increase in native benthic fauna associated with mariculture structure (Meyer and Townsend 2000, DeAlteris et al. 2004, Pinnix et al. 2005, Powers et al. 2007). The presence of DBOC in Drakes Estero is at most a minimal impact on benthic fauna, and more likely provides a benefit to foraging resources for fish and larger invertebrates. As previously stated, if NPS is serious about trying to control invasive species, then they should be working with DBOC to remove the species from the system rather than implicating them in causing a problem that they did not originate.

Original DEIS Citation

Chapter	Page	Quote
4	280	Prolonging the presence of these nonnative shellfish under alternative B could hinder NPS efforts at invasive species management in Drakes Estero and could lengthen the period of time before a natural benthic faunal community could be re-established, as compared to alternative A. This risk would result in adverse impacts extending beyond 2022 despite cessation of the shellfish operation.

WATER QUALITY

1. **TIDAL CYCLING AND EELGRASS** – on page 278 of the DEIS, the authors claim that nutrient cycling in West Coast estuaries has more to do with the tides and upwelling, and that the eelgrass population in Drakes Estero controls the cycling of organic materials to the sediments. Although we do not disagree that Drakes Estero has a short residence time for water in most of the estuary, and that eelgrass is a major contributor to the cycling of organic materials, it should be recognized that the shellfish present in the Estero provide a benefit to the environment, even if in more localized areas.

   The combined filtering activity of the millions of filter-feeding shellfish being grown in the Estero clears as much as 350,000 m^3 each day, removing particles as small as 2 microns (R. Rhealt, pers. comm., 2010). This represents 4% of the volume of water in Drakes Estero (total volume of 7,680,000 m^3 by NOAA 2011), which is small, but not an insignificant amount.

   Finally, Dumbauld et al. (2009) is consistently misused throughout the DEIS. Dumbauld et al. (2009) never claim that West Coast estuaries are *controlled* by the tides and upwelling. They state that, "water column and sediment nutrient concentrations are generally relatively high and greatly influenced by the proximity to deeper nearshore ocean waters where upwelling controls production *during summer months*" [emphasis added], in other words, when freshwater inputs

are at their lowest. To make the jump that shellfish filtration has no beneficial influence on water quality (or only localized benefit) is a false statement.

Original DEIS Citation

Chapter	Page	Quote
4	278	[A]lthough introduced bivalves have been shown to have beneficial ecosystem impacts in certain settings through nutrient processing and organic enrichment of sediments (Newell 2004), the nutrient cycle in west coast estuaries (such as Drakes Estero) is controlled by the tides and the important ocean-derived nutrients from upwelling currents—a condition on which filter-feeding bivalves would have limited influence (Dumbauld, Ruesink, and Rumrill 2009). Also, since the dominant eelgrass population in Drakes Estero controls the cycling of organic material to the sediments (NAS 2009), any organic contributions from introduced bivalves would be negligible by comparison.

2. **BIVALVE CONTRIBUTION TO WATER CLARITY** – on page 337 of the DEIS, the authors claim that the bivalves in Drakes Estero do not contribute significantly to water clarity because the estuary is not a highly turbid system and has low residence time in most of the Estero. There are three basic points that contend this statement: (1) the shellfish in Drakes Estero are in the best possible position to control the pathogen levels and nutrient loading from cattle ranching and other terrestrial input sources (e.g., the 2.4 million visitors to the national park every year), (2) if the benefits from shellfish are considered local and minor, then by the same token the impacts should be considered local and minor, and (3) tidal flushing is not the same for the entire estuary, and protected pockets at the upper arms of the Estero stand to benefit the most from the presence of DBOC shellfish.

Original DEIS Citation

Chapter	Page	Quote
4	337	However, it should be noted that most of the studies showing the beneficial effects of bivalve cultivation (such as water clarity and sediment nutrient enrichment) were conducted in estuaries with relatively turbid waters full of particulates, with low to moderate tidal flushing. By contrast, Drakes Estero is not a highly turbid coastal embayment (NAS 2009), so bivalve contributions to water clarity would likely be relatively minor.
4	339	In the context of Drakes Estero, nutrient inputs are primarily a function of Drakes Estero's physiographic structure allowing tidal flushing from upwelling with short residence periods (NAS 2009; Dumbauld, Ruesink, and Rumrill 2009). Water quality monitoring conducted by the CDPH indicates that the inputs from upstream sources such as the cattle ranches affect the pathogen levels in the upper arms of the Estero resulting in the establishment of the "Water Quality Prohibited Areas" where shellfish harvest is prohibited (Zubkousky 2010).

3. **WATER QUALITY MONITORING** – on page 339 of the DEIS, the authors claim that removal of shellfish mariculture will not modify the water quality appreciably. However, even though it is admitted on page 342 of the DEIS, in this section the authors are failing to recognize that shellfish are currently providing mitigation for nutrient loading in the system from cattle ranching upstream. As indicated above, pathogen and nutrient loading has been documented by CDPH in association with cattle ranching in the upper portion of the basin. Further, the location of

shellfish in the Estero is positioned to control these influences to water quality through filtration, biosequestration, and denitrification. If the shellfish are removed, then how does NPS intend to counteract this issue?

Tidal flushing of the upper arms of Drakes Estero is not as significant as the main part of the estuary. Although there are native species of bivalves in the system, they are not as efficient at treating nutrient loading as the species and densities provided by DBOC. Further, eelgrass habitat has doubled in the last 16 years in Drakes Estero, which has been attributed to the presence of DBOC shellfish (Bartley et al. 2009, NAS 2009)--a finding that the DEIS does not recognize, and does not provide any other reason for its occurrence. In summary, the evidence supports that DBOC operations improve and mitigate water quality impacts to the Drakes Estero, not impact it as contended in the DEIS.

Original DEIS Citation

Chapter	Page	Quote
4	339	Water quality monitoring data collected from Drakes Estero reveal that the water quality standards are far below the thresholds required for contact recreational use (including swimming and boating). The removal of the shellfish mariculture facilities and operations would not be expected to modify the water quality appreciably, or to a level that would prohibit the continued use of Drakes Estero for recreation.
4	342	As filter feeders, shellfish provide beneficial water quality functions with their ability to remove suspended solids, nutrients, and phytoplankton from the water column. Pollutants that enter Drakes Estero from cattle operations and other non-point sources have the potential to be captured and processed by the cultivated shellfish. Under this alternative, cultivated shellfish would remain in Drakes Estero providing localized benefits to water quality by removing those pollutants entering the water.

4. **MARICULTURE DEBRIS** – on page 339 of the DEIS, the authors indicate that mariculture debris has been found on mudflats and shorelines of Drakes Estero. Mariculture debris mentioned in the DEIS is an issue that DBOC inherited from the previous owners (Johnson Oyster Company (JOC)), for which they have made dramatic strides to clean-up. JOC began using plastics in the early 1960s in its rack and stake culture. Both culture methods used the black plastic spacers, and the stake culture also used plastic coffee can lids. The spacers and coffee can lids were lost during storm events. Due to the extensive loss of plastic into the environment, CDFG required JOC to stop stake culture in Drakes Estero. By the mid-1990s all stake culture had ceased and had been replaced by bag culture.

   In 2005, DBOC took over the shellfish farm in Drakes Estero. Fully aware of the legacy plastic debris problems, DBOC made several changes in farm practices to further reduce the chances of losing culture gear into the environment, including:

   6. Immediately implementing a policy that no wires would be cut when harvesting strings from the racks until above the high tide line (above the stringing shed). DBOC removes the oysters from the wires without cutting the wire. Using this technique, the black plastic spacers are not subject to loss into the environment.

   7. Beginning in 2006, DBOC began to replace the Japanese Hanging Cultch wire string culture method with "French tubes". These French tubes reduce consumables (i.e., the wire strings which can only be used for one growing season), and do not require

the black spacers. It should be noted that DBOC, EAC, or NPCA have never found a fugitive French tube anywhere in Drakes Estero. Over the past five years, approximately 100,000 strings have been replaced with the French tube method, and this technique now represents the majority of the rack culture. DBOC will, however, continue to cultivate a portion of its oysters with the traditional wire string and spacer method. The description of this historic culture method during DBOC's interpretive on-farm tours is of great interest to the visiting public.

8. DBOC checks the oyster racks regularly to remove any loose materials so they are not lost into the environment.

9. DBOC anchors all oyster bags in areas where tidal energy could displace bags.

10. DBOC initiated a program whereby all floating culture is anchored in a least two places and all floating bags are attached to at least two anchored lines (our "redundancy program").

Additionally, DBOC made a commitment to pay staff to clean-up the beaches to address JOC's legacy debris problem. DBOC's staff patrols the beaches of Drakes Estero on a regular basis to pick up any marine debris. It is notable that most of the trash retrieved is unrelated to mariculture (i.e., it is a product of recreational activity in the park). DBOC also pays for refuse disposal fees. The majority of the plastic mariculture debris that is currently being picked up and disposed of by DBOC is the plastic coffee can lids that have not been used in Drakes Estero for almost 20 years. It is evident that these efforts are paying off because DBOC is finding less and less of this legacy mariculture debris each year.

Original DEIS Citation

Chapter	Page	Quote
4	339	[E]quipment from the racks and bags have often become dislodged and found floating in Drakes Estero or washed up on mudflats and shorelines. The primary debris associated with commercial shellfish production that has been observed in and along the shores of Drakes Estero includes the plastic spacers used in hanging culture (to separate clumps of oysters) and Styrofoam floats (used for floating bags).

5. **WASTEWATER**– on page 340 of the DEIS, the authors try to indicate that potential risk from wastewater entering Drakes Estero is only associated with DBOC operations. However, as indicated on page 344 of the DEIS, the authors state that, "the risk of discharges from a lack of capacity appears unlikely." Further, by their own admission (page 340), NPS will not remove any of these structures if DBOC operations do not exist in the area. Given the fact that: (1) there have been no releases of wastewater into the Estero, (2) no violations of water quality criteria as a result of the on-site septic system in the last 77 years of shellfish operations, and (3) none of the alternatives discussed will eliminate this risk, this impact is negligible and cannot be attributed solely to DBOC operations.

Original DEIS Citation

Chapter	Page	Quote
4	340	DBOC operations include several wastewater tanks and pumps at the onshore facilities. Wastewater is pumped into two underground drain fields located upslope from the operations facility. While the wastewater system would remain, the level of

		use would be substantially reduced or eliminated, and the risk of wastewater entering Drakes Estero from a treatment facility failure or pumping leaks would cease.
4	340	The vault toilet near surface waters and wetlands would also remain. These facilities pose a slight risk of fecal coliform being introduced to Drakes Estero from pumping spills or undetected leaks. Such contaminants could temporarily affect water quality for aquatic species until flushed by tidal action or absorbed by biological processes. No spills have occurred in the past, and it is unlikely that the vault toilet would cause adverse impacts on water quality.
4	344	The capacity of the wastewater tanks, pumps, and drain fields appears to be sufficient to handle the effluent originating from the operations center. Thus, the risk of discharges from a lack of capacity appears unlikely. Impacts on water quality could occur from wastewater entering Drakes Estero if the treatment facility were to fail.

6. **IMPERVIOUS SURFACES** – on page 340 of the DEIS, the authors try to indicate that there is potential risk of run-off from impervious surfaces associated with DBOC operations. However, by their own admission, NPS will not remove any of these structures, or abandon any of the road network that contributes to impervious surfaces in the basin, if DBOC operations do not exist in the area, which means that this impact, considered minimal anyway, is the same for all alternatives. Further, the mitigating role of the cultured oyster biomass to any runoff from impervious surfaces will be effectively eliminated with the removal of DBOC operations.

Original DEIS Citation

Chapter	Page	Quote
4	340	NPS facilities would remain under this alternative. Non-point sources of pollutants reaching Drakes Estero would continue from the access road and canoe/kayak parking lot, although there would be less stormwater runoff compared to the runoff resulting from the action alternatives. These sources would be very small due to the limited use the parking lot receives, and would have a minor adverse effect on the Drakes Estero ecosystem as a whole.
4	344	Vehicular traffic to and from the operations facility associated with the commercial shellfish operations is predicated on employee travel, distribution/delivery trucks, and visitors to the DBOC interpretations center. Vehicular use would continue under current conditions, resulting in oils and other pollutants entering Drakes Estero through nonpoint-source stormwater runoff originating from vehicles.

7. **CCA LEACHING** – on page 343 of the DEIS, the authors attempt to indicate that maintenance and repairs to racks and the dock would introduce chromate copper arsenate (CCA)-treated wood to Drakes Estero. This comment is completely false and lacking any understanding of current procedures related to DBOC operations. By their own admission (page 343 of the DEIS), NPS understands that wood treated in the past is no longer leaching CCA into the environment. Any new wood used to repair existing racks in need of maintenance would be subject to approval by NOAA Fisheries (WWPI 2011). DBOC is currently trying to find new construction materials that would be more benign in terms of environmental effects for use in their oyster racks. They have looked into biodegradable materials, plastics that wouldn't leach into the water, and are open to new ideas that improve their stewardship of the environment (Lunny, pers. comm., 2011).

It should also be noted that on page xxxvi of the DEIS, the NPS states that "Ongoing maintenance of racks, assuming 5 percent replacement or repair annually, may include repairs or replacement." However, according to the operator, racks require major repairs approximately every 10 years. If all racks were currently in good repair, roughly 10% of the racks would require maintenance each year. Currently, roughly 50% of the racks are in need of immediate repairs. Given that the life of the investment is roughly 10 years, and the proposed SUP is 10 years, the proper business decision would be to make the repairs to all of the racks as soon as possible. It is critical that NPS not limit the percentage of the racks repaired in any given year.

Original DEIS Citation

Chapter	Page	Quote
4	343	The most commonly used chemical treatment for marine use is chromate copper arsenate (CCA). Most of the CCA remains affixed to the wood fibers; however, some may leach into the aquatic environment once exposed to rain or submersed in water (Brooks 1996; Weis and Weis 1996). As described by Sanger and Holland (2002), the vast majority of any leachates from the wood preservatives entering the water and sediment occur within the first 90 days of installation. The DBOC structures are far older than 90 days, and the active leaching of wood preservatives into Drakes Estero has ended, for the most part. Over the 10-year permit period under this alternative, however, maintenance and repairs to racks and the dock are expected. This action would introduce new treated lumber into the aquatic environment resulting in CCA leaching into the water column.

8. **PESTICIDES AND HERBICIDES** – on page 343 of the DEIS, the authors claim that offshore activities would potentially release DDE (no other compound was found above the detection limit) into Drakes Estero. This contention is both misleading and the reference is used inappropriately. Although DDE can be found in Drakes Estero in small quantities, it was noted by Anima (1991) that the levels of traceable DDE in the sediment are "below the limits set by the National Academy of Sciences and the U.S. Environmental Protection Agency for organisms." The limits set include 1,000 µg/kg ΣDDT (the sum of ODD, DDE, and DOT) wet weight for the protection of fish-eating wildlife (NAS 1973) and 150 µg/kg ΣDDT wet weight in fish (EPA 1980). The maximum of amount of DDE sampled from Drakes Estero represents approximately 1% of the USEPA limit established for this compound. Even if DDE is disturbed, which is unlikely given that it was sampled from "deeper tidal channels in which the research vessel could transit" (Anima 1991), it does not represent a risk to aquatic organisms in the Estero.

Original DEIS Citation

Chapter	Page	Quote
4	343	Sediment disturbances to the Drakes Estero bottom from all offshore activities have the potential to release pesticides and herbicides that may have accumulated in the sediment over time into the water column. An analysis of sediment cores sampled by Anima (1990) in Drakes Estero found the level of herbicides and pesticides to be "low or below the analytical cutoff points for the compounds tested, except for DDE (Dichlorodiphenyldichloroethylene), which in Schooner Bay, Estero de Limantour, Abbotts Lagoon, Barries Bay, and Creamery Bay did show concentrations between 0.1 to 2.1 µg/kg." The detection limit for DDE was 0.1 µg/kg.

9. **RUNOFF WATER** – on page 344 of the DEIS, the authors indicate that water from spray-wash at the conveyor station and outdoor setting tanks is returned to the Estero, which results in a minor adverse effect. Within the same section, the authors concede that the replacement of the existing conveyor washing station with a new system, as proposed by DBOC, would filter the water before it re-enters Drakes Estero. This system would decrease the sediment load and local turbidity entering the Estero. Further, the discharge from the spray-wash was tested by California Department of Health Services and found to be non-hazardous (Baltan 2006, DEIS p. 200).

   In addition to direct testing of water discharge from DBOC operations, California Department of Health Services looked at potential sources of contamination in Drakes Estero. As reported on DEIS p. 198, "Baltan (2006) and Zubkousky (2010) list five source types of bacterial pollution potentially affecting the water quality of Drakes Estero. These sources include cattle operations, septic systems, industrial waste, wildlife, and watercraft. The primary source of pollution is from cattle waste originating from the six cattle ranches within the watershed." It is notable that the shellfish industry was not listed as a contributing factor to water quality concerns in Drake Estero. In summary, these impacts, which were reported to be minor based on existing conditions, would be further reduced with proposed improvements by DBOC.

   Finally, it should be noted that on DEIS p. xxxi, the NPS states that, "Alternative D considers expansion of operations and development replacement of new existing infrastructure as requested by DBOC as part of the EIS process." In fact, the replacement is not an expansion of operations; it is the replacement of the conveyor station agreed upon in the 1998 NEPA EA and FONSI (NPS 1998, PRNS 1998). This should be considered as part of Alternative B, which assumes that operations will not change from current conditions.

Original DEIS Citation

Chapter	Page	Quote
4	344	Water used to spray-wash harvested shellfish at the conveyor station is allowed to flow across the ground surface and reenters Drakes Estero. Drakes Estero water used for the indoor single-oyster cultch tanks is heated to a temperature of 23 to 25 degrees Celsius (73 to 77 degrees Fahrenheit) and enriched with nutrients (DBOC has not provided specifics as to which nutrients are added) to promote the growth of shellfish larvae. Water for the outdoor setting tanks is also heated and allowed to cool before re-entering Drakes Estero. Oysters in the setting tanks are fed by routing/circulating Drakes Estero water through the tanks on a continuous basis for several days. Because the original source of the water is Drakes Estero and the wastewater returning to Drakes Estero is relatively unchanged (with the exception of the small volume of nutrient-enriched water), these activities would be expected to have minor adverse effects on the water quality of Drakes Estero.
4	344	DBOC is proposing to remove the existing conveyor washing station and replace this facility with a new conveyor system that would capture the wastewater from the washing station and filter the water before the water is allowed to reenter Drakes Estero. This system would be expected to decrease the sediment loads entering Drakes Estero and local turbidity compared to the existing spraying system. This point source discharge is not expected to significantly impact water quality (Baltan 2006).

Appendix B

Noise Sources and Graphic Summaries

Noise Attachment

DBOC Source Noise Measurement Documentation and Summary Charts

This document provides supplementary information regarding the DBOC source sound level measurements conducted by ENVIRON International Corporation on November 22, 2011.

ENVIRON took these measurements using a B&K 2250 Type 1 sound level meter. The meter and the calibrator used during equipment setup were both factory certified as accurate within the previous 12 months.

The photographs on pages 2-5 depict the equipment that was considered in the measurements.

The charts on pages 6-11 summarize the measurement data.

Photo 1. Pneumatic Drill Use Stations

Photo 2. Pneumatic Drill Used to Break Apart Oyster Shell Clusters

Photo 3. Oyster Tumbler

Photo 4. Oyster Tumbler Motor (and primary noise source)

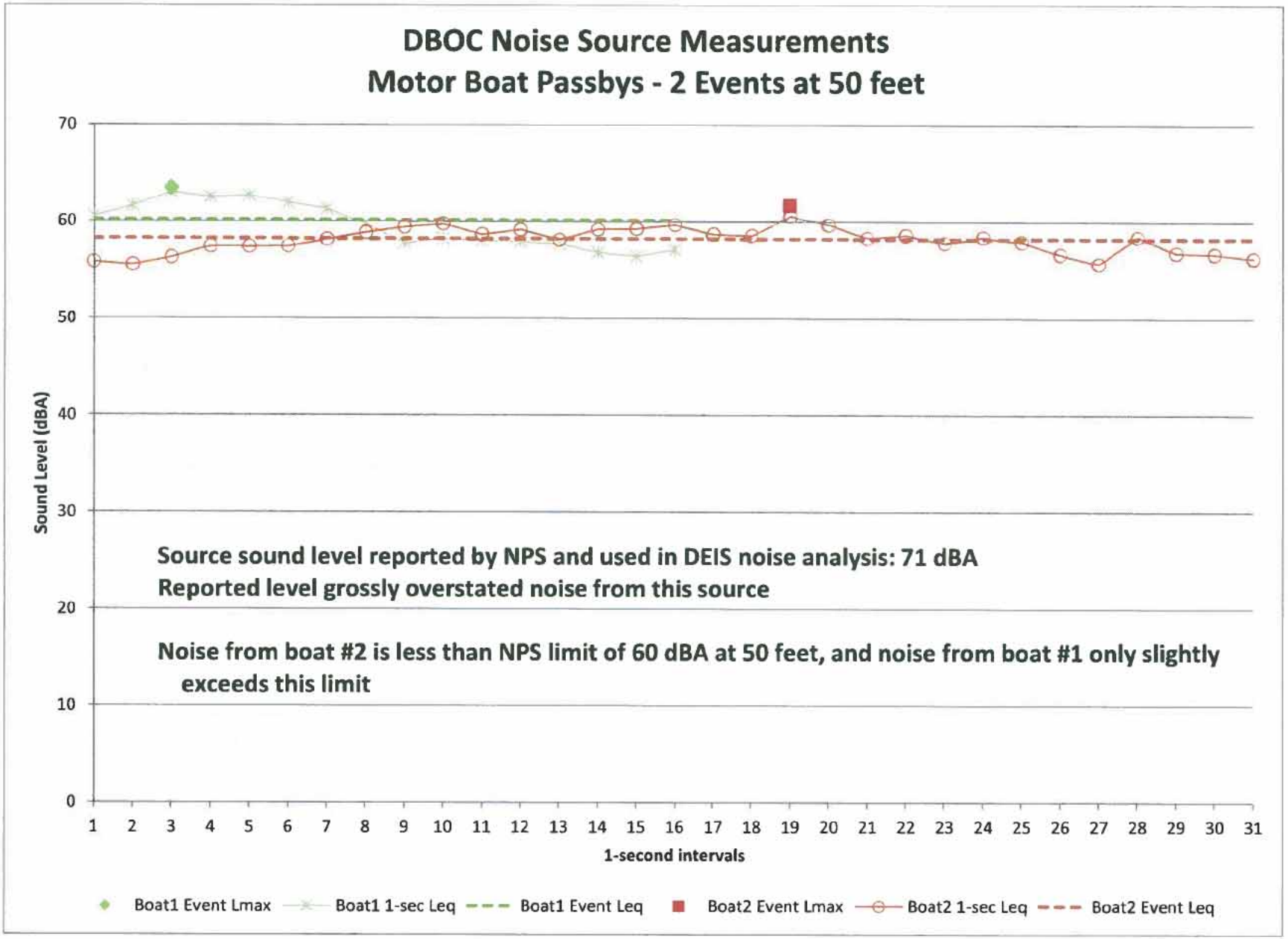
Photo 5. Boat Passby

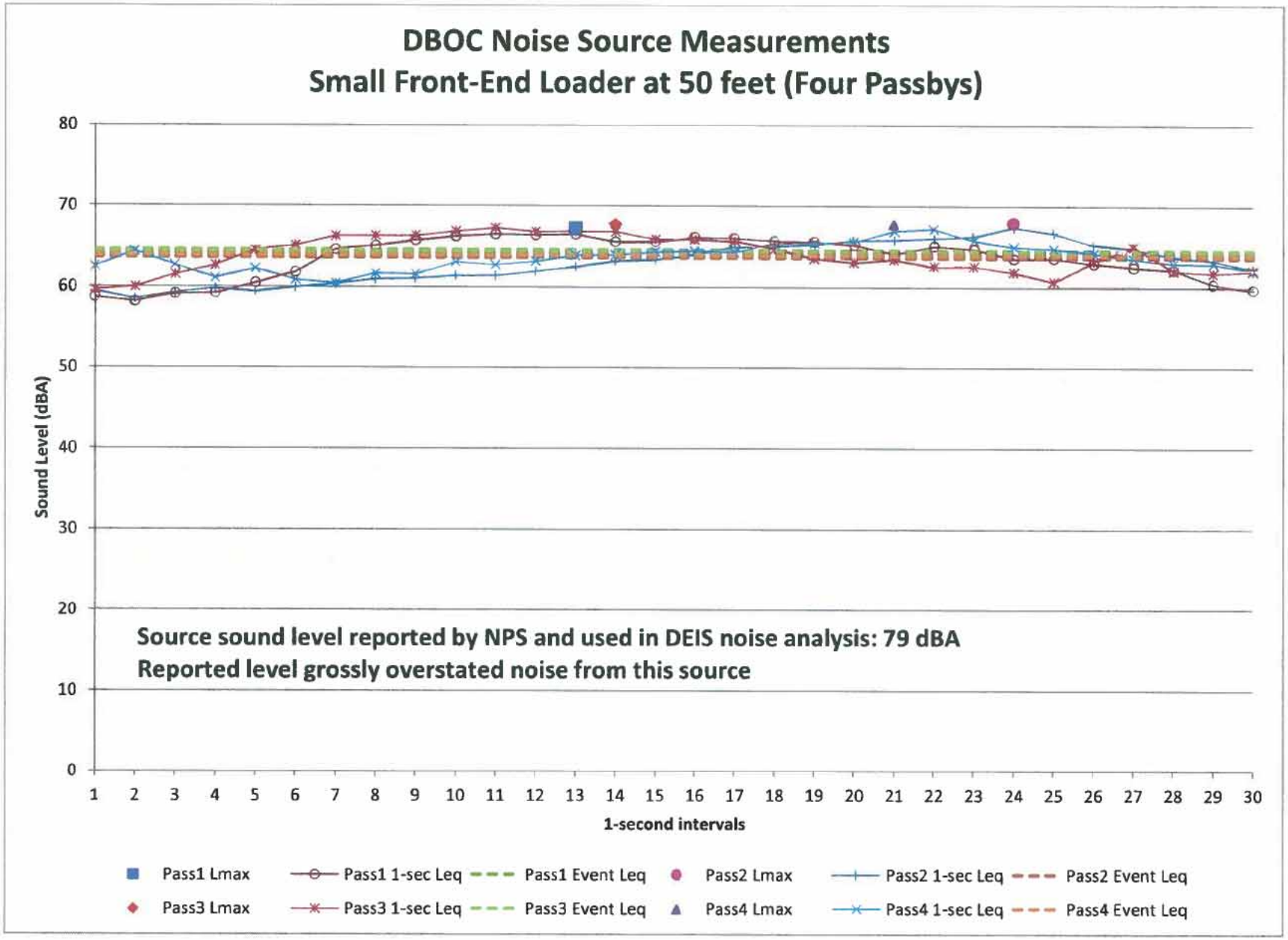
Photo 6. Building (with openings) Housing Air Compressor

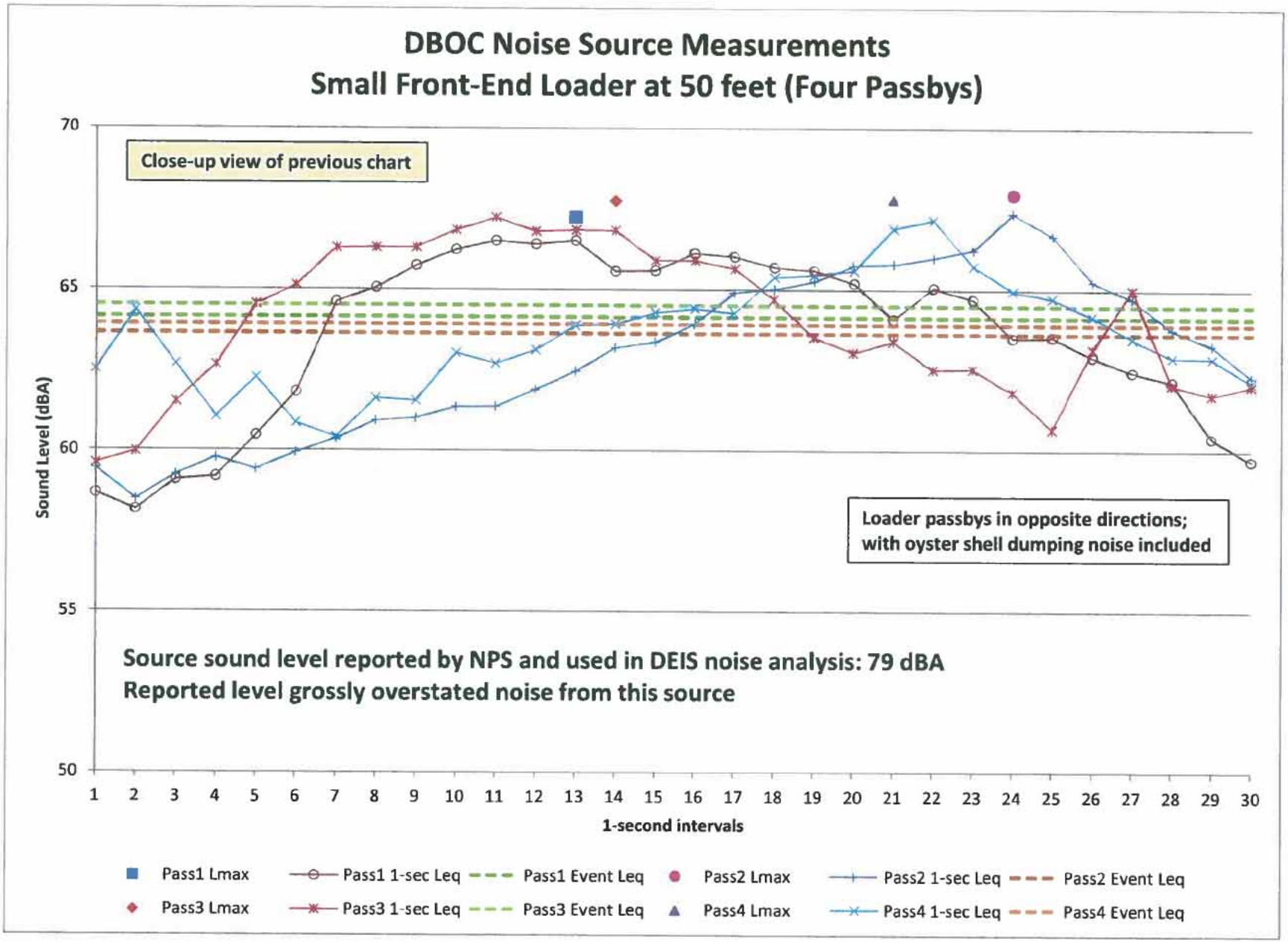
Photo 7. Frontend Loader Path

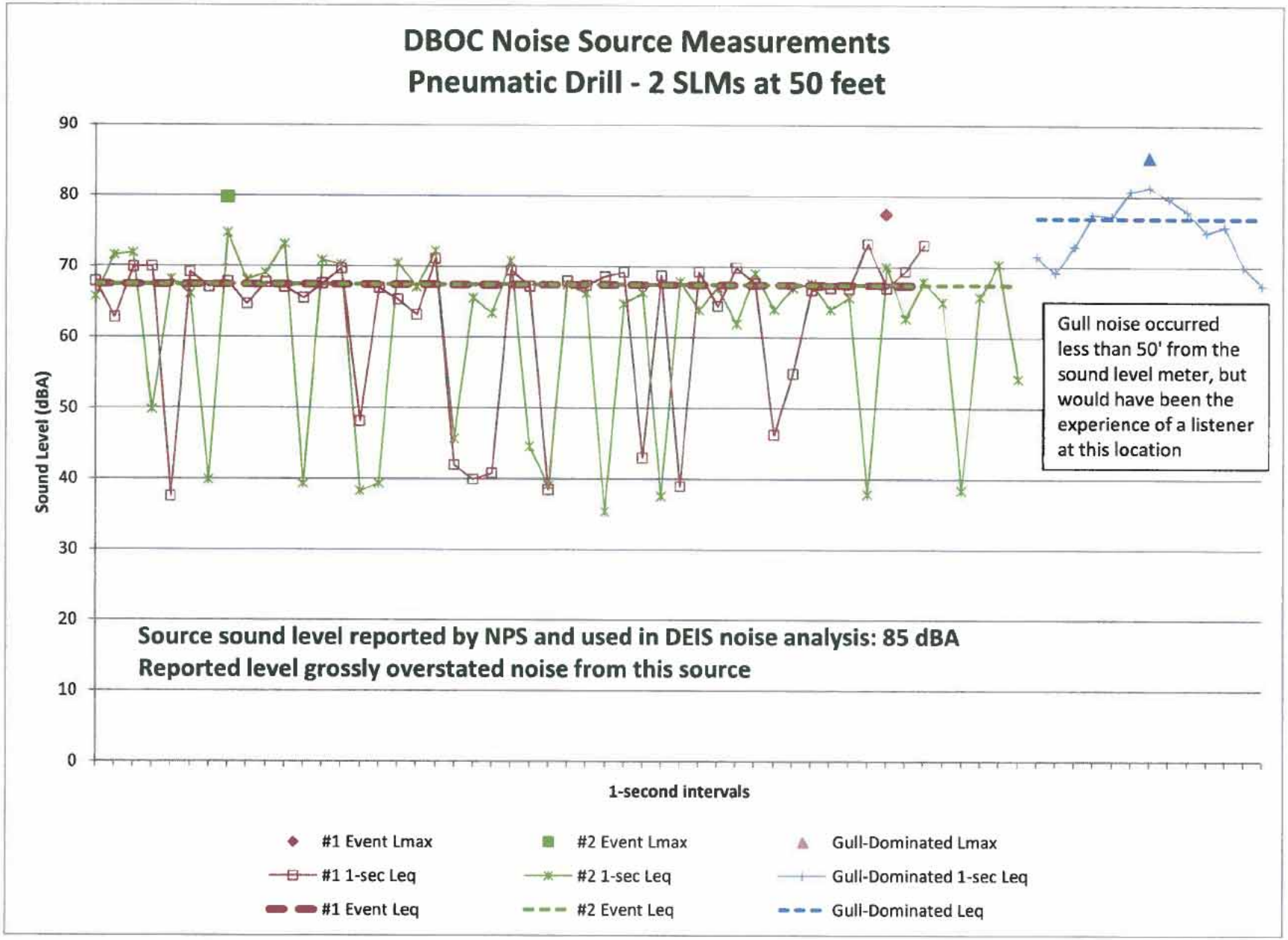
Photo 8. Frontend Loader Hauling Shells to Piles

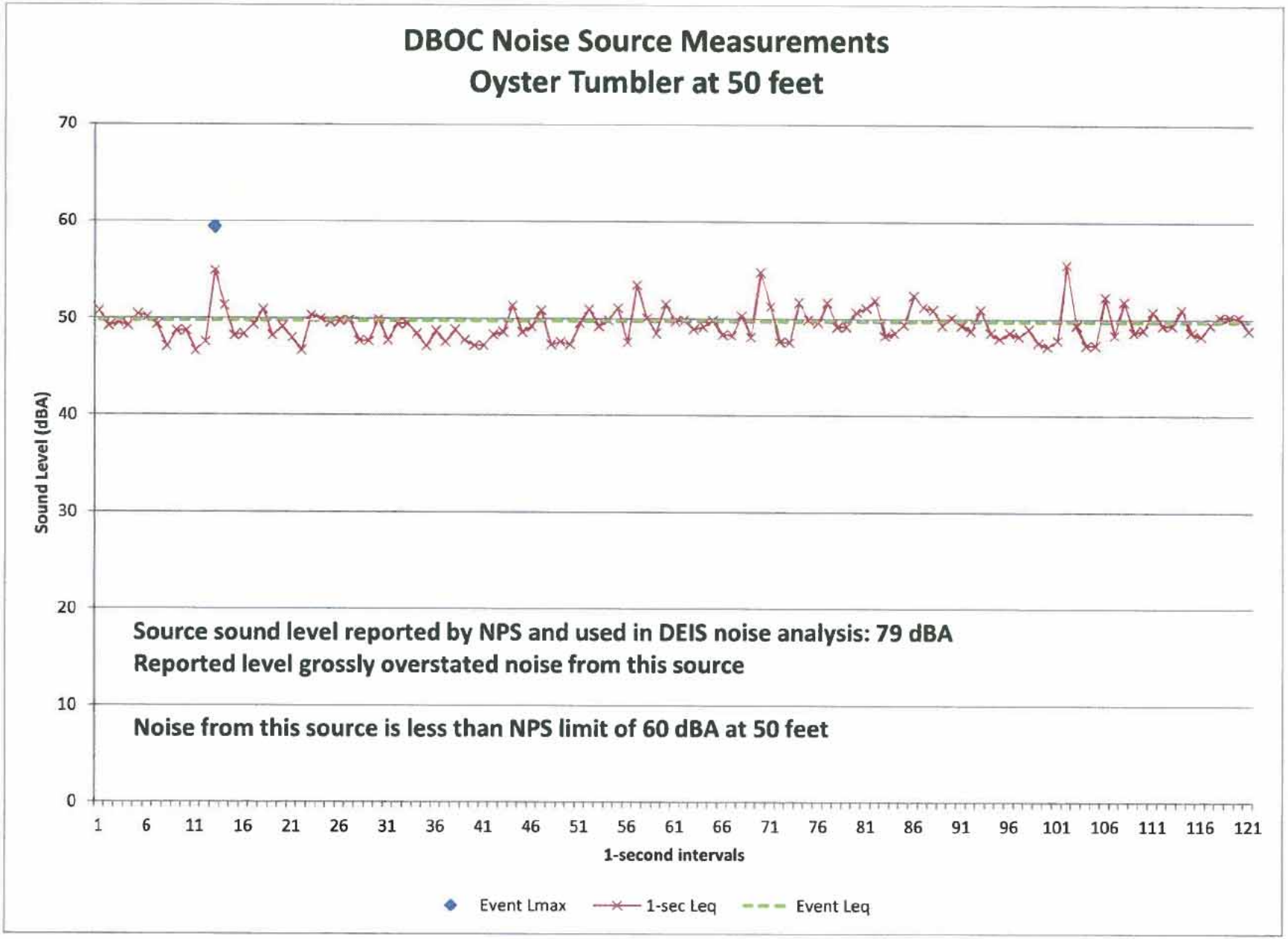
Sound level measurements taken by ENVIRON on 11/22/2011 using B&K 2250 Type I meter



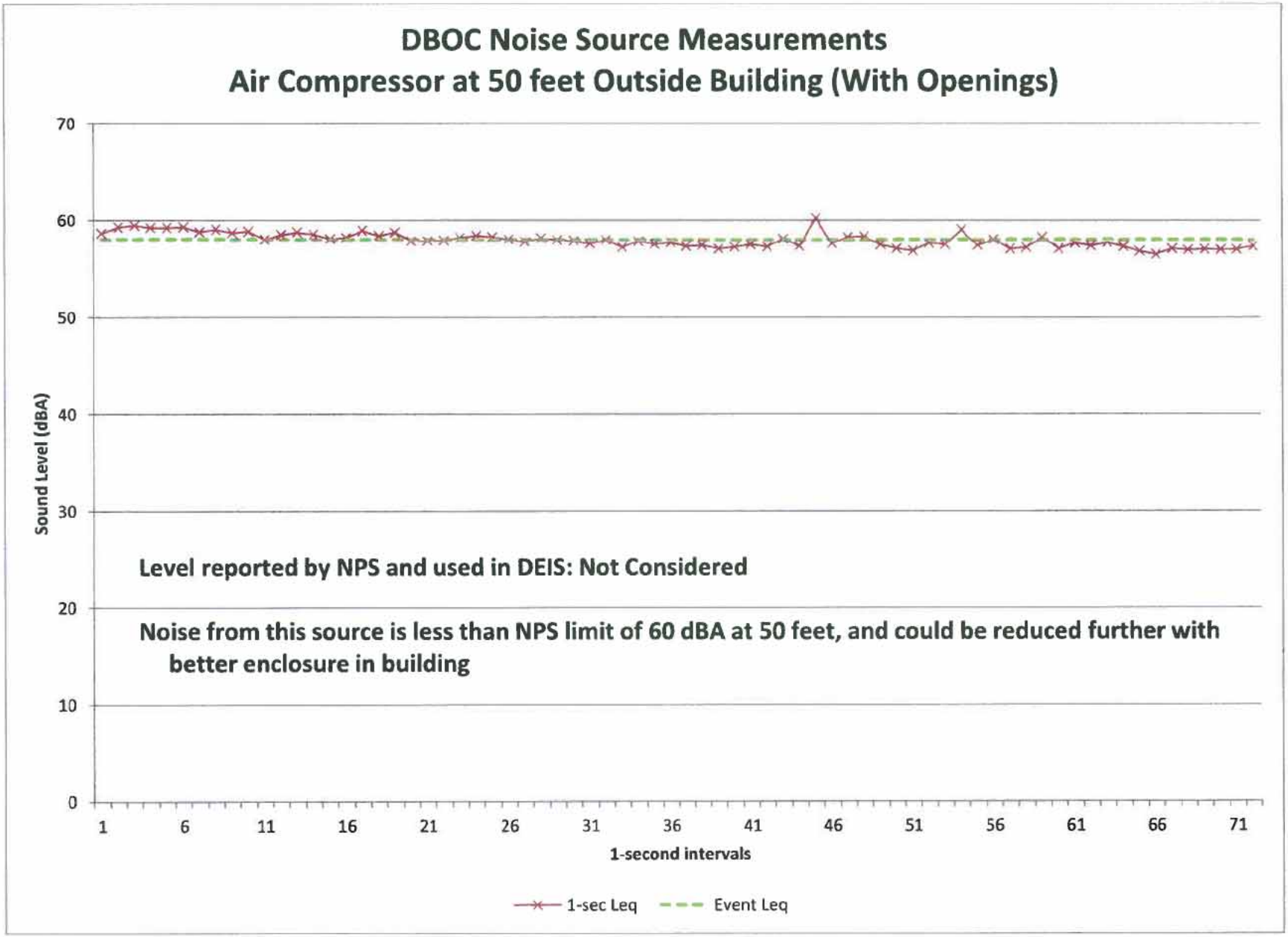

DBOC Noise Source Measurements
Small Front-End Loader at 50 feet (Four Passbys)
Sound Level (dBA)
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
1-second intervals
Source sound level reported by NPS and used in DEIS noise analysis: 79 dBA
Reported level grossly overstated noise from this source
Pass1 Lmax
Pass1 1-sec Leq
Pass1 Event Leq
Pass2 Lmax
Pass2 1-sec Leq
Pass2 Event Leq
Pass3 Lmax
Pass3 1-sec Leq
Pass3 Event Leq
Pass4 Lmax
Pass4 1-sec Leq
Pass4 Event Leq


DBOC Noise Source Measurements
Small Front-End Loader at 50 feet (Four Passbys)
Close-up view of previous chart
Loader passbys in opposite directions;
with oyster shell dumping noise included
Source sound level reported by NPS and used in DEIS noise analysis: 79 dBA
Reported level grossly overstated noise from this source
Sound Level (dBA)
70
65
60
55
50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
1-second intervals
Pass1 Lmax
Pass1 1-sec Leq
Pass1 Event Leq
Pass2 Lmax
Pass2 1-sec Leq
Pass2 Event Leq
Pass3 Lmax
Pass3 1-sec Leq
Pass3 Event Leq
Pass4 Lmax
Pass4 1-sec Leq
Pass4 Event Leq


DBOC Noise Source Measurements
Pneumatic Drill - 2 SLMs at 50 feet
Sound Level (dBA)
90
80
70
60
50
40
30
20
10
0
1-second intervals
Gull noise occurred less than 50' from the sound level meter, but would have been the experience of a listener at this location
Source sound level reported by NPS and used in DEIS noise analysis: 85 dBA
Reported level grossly overstated noise from this source
#1 Event Lmax
#2 Event Lmax
Gull-Dominated Lmax
#1 1-sec Leq
#2 1-sec Leq
Gull-Dominated 1-sec Leq
#1 Event Leq
#2 Event Leq
Gull-Dominated Leq


DBOC Noise Source Measurements
Oyster Tumbler at 50 feet
Sound Level (dBA)
70
60
50
40
30
20
10
0
1
6
11
16
21
26
31
36
41
46
51
56
61
66
71
76
81
86
91
96
101
106
111
116
121
1-second intervals
Source sound level reported by NPS and used in DEIS noise analysis: 79 dBA
Reported level grossly overstated noise from this source
Noise from this source is less than NPS limit of 60 dBA at 50 feet
Event Lmax
1-sec Leq
Event Leq

Sound level measurements taken by ENVIRON on 11/22/2011 using B&K 2250 Type I meter



Analysis of Becker et al. 2011: conclusions part 1

1. **Analysis reveals no "*evidence for long-term spatial displacement*"**
2. **No "*evidence*" that oyster farm displaced seals out of Estero**
3. **Mother Nature leads to movements of seals into & out of Estero; major factors: seals at Double Point (DP) & total regional seals**
4. **Rogue elephant seal at DP in 2003 displaced seals into Drakes Estero; Becker 2011 best models are driven by transient spike in 2003 & 2004**
5. **Top models using NPS data are far superior to Becker's best model; best P-values are 1000 times more significant than in Becker 2011**

Analysis of Becker et al. 2011: conclusions part 2

1. **Annual oyster harvest is not surrogate for UEN/OB pupping season**
2. **Seal haul-out map is misleading: seals and oysters do not overlap**
3. **Claims and maps of oyster bags in pupping areas are incorrect**
4. **Claims of zero oyster bags at OB/UEN from 2000-2004 are incorrect; CDPH records show JOC continued to harvest from UEN & OB**
5. **Inferences that drove OYST Hi/Low categorical model are incorrect; NPS did not provide conclusive data to support major model in paper**

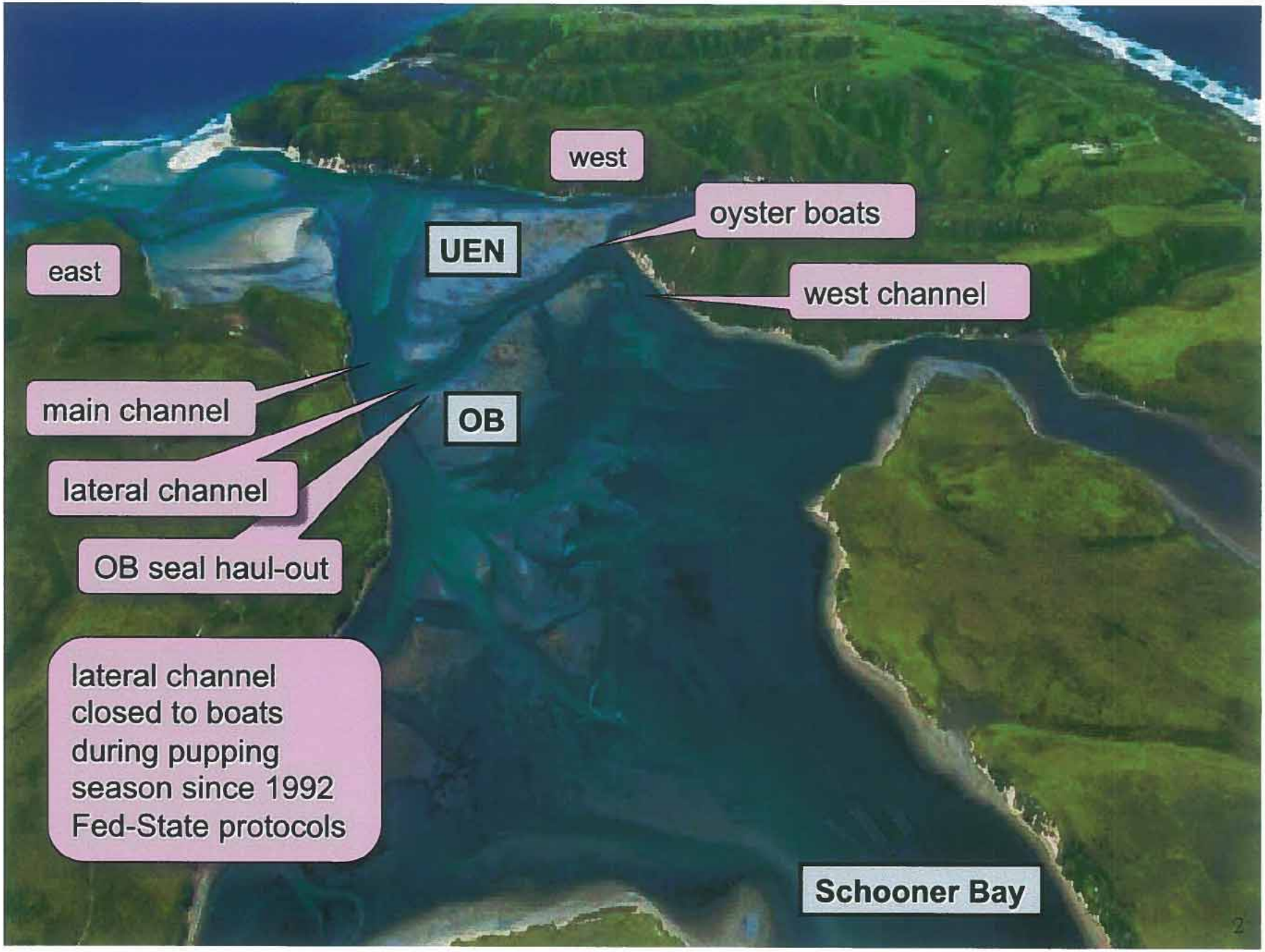
Analysis of Becker et al. 2011: concluding comments

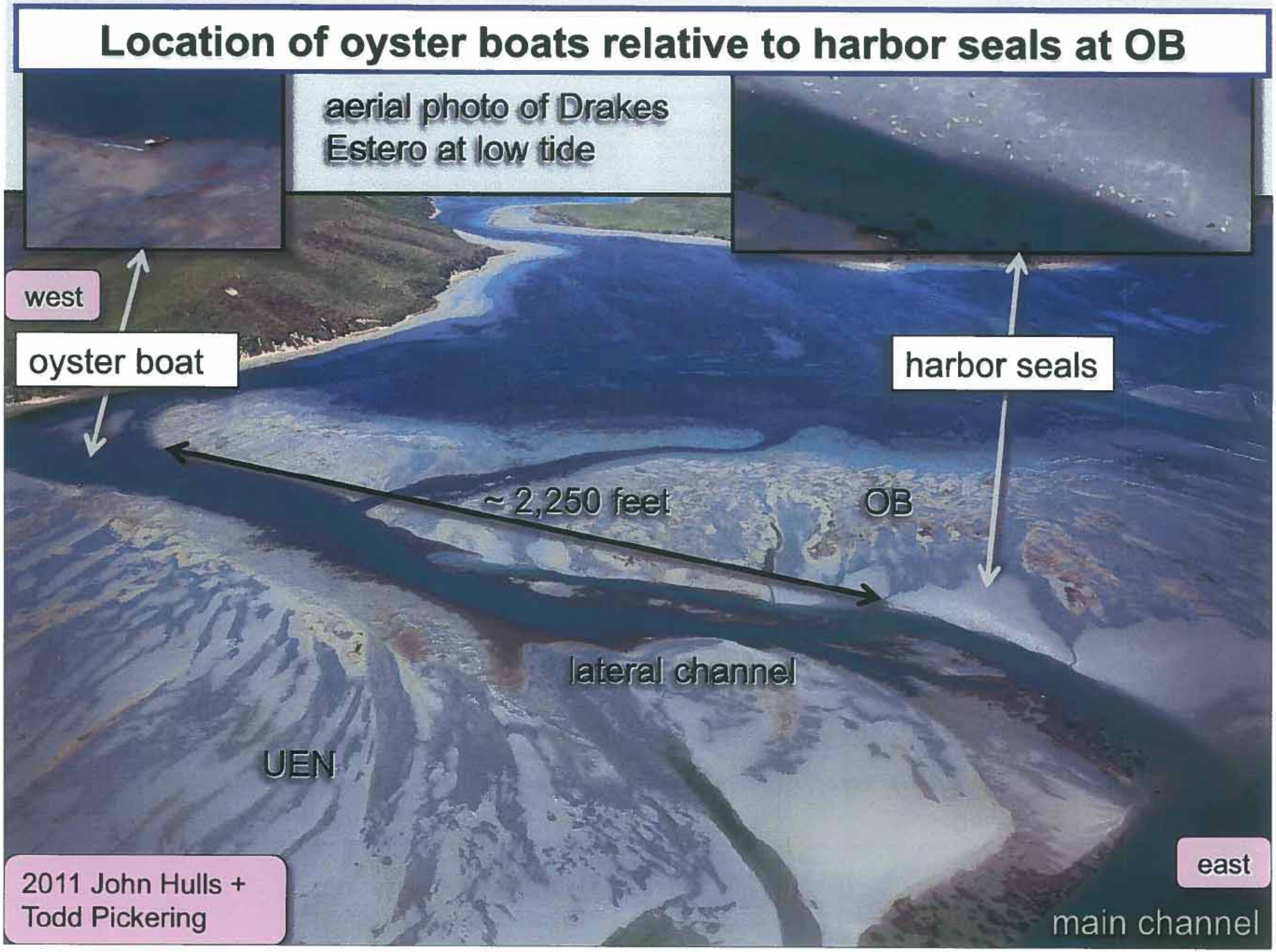
The MMC-directed review leads to a single, overriding conclusion: upon review, every aspect of NPS Becker 2011 collapses -- scientifically and statistically. The paper's title misrepresents the data: the statistical analysis reveals there is no evidence the oyster farm has caused a long-term spatial displacement of harbor seals out of Drakes Estero.

1. **Title says "*long-term spatial displacement*" but analysis shows transient; authors failed to note their statistics were driven by 2003 & 2004**
2. **Title says "*evidence*" oyster farm displaced seals but models fail; NPS data generates models 1000 times more significant than oyster activity**
3. **Title says "*three decades*" of data but 14 year gap; authors cherry picked 1982 & 1983 data; NPS previously denied these data existed**
4. **Analysis shows regional harbor seal population, events at Double Point, and elephant seals drive movements of harbor seals into Estero**
5. **Authors used incorrect seal haul-out maps, incorrect oyster bag maps, and misinterpreted aerial photos; NPS scientists never asked for DBOC data**
6. **Authors missed opportunity to determine if adaptive management succeeded with 1992 (oyster boats) & 1996 (kayak) management changes**
7. **Authors missed opportunity to use data to study biology of harbor seals and population dynamics; NPS scientists were too focused on the oyster farm**

Analysis of Becker, Press, and Allen 2011
Part 1: Statistics and Models

Corey S. Goodman, PhD


west
oyster boats
UEN
east
west channel
main channel
OB
lateral channel
OB seal haul-out
lateral channel
closed to boats
during pupping
season since 1992
Fed-State protocols
Schooner Bay


Location of oyster boats relative to harbor seals at OB
aerial photo of Drakes Estero at low tide
west
oyster boat
harbor seals
~ 2,250 feet
OB
lateral channel
UEN
2011 John Hulls + Todd Pickering
east
main channel

Becker et al. 2011

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN

US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

1. Shellfish mariculture is increasing worldwide and often occurs adjacent to marine mammal breeding and feeding habitat. To better understand breeding pinniped vulnerability to potential shellfish mariculture disturbance and displacement effects in a US National Park, potential mechanisms were explored that may affect the proportion of harbour seals (*Phoca vitulina*) selecting high quality haul-out sites near shellfish aquaculture within a large colony, and overall seal utilization of that colony in relation to other regional colonies.

2. Seal haul-out sites isolated from the mainland (no predator access) had higher pup:adult ratios, indicating they are generally more important for pupping. Short-term human disturbance did not have significant effect on spatial use, but rather spatial use was pre-determined by general sandbar isolation. Using multiple competing hypothesis and an information-theoretic approach, it was found that within the estuary, after removing effects of El Niño, the proportion of seals (total seals and pups only) hauled out near mariculture sites was 8 ± 2% lower during years of higher oyster harvest. Annual oyster harvest was used as a measure of aquaculture activity that could result in direct disturbance or indirect displacement of harbour seals.

3. At the regional scale, oyster harvest, seal counts at a nearby colony, and loss of a major haul-out site within the estuary, best explained pup and total seal use compared with the region. Regional population size, short-term human disturbance rate, and other factors were not important. Concurrent with higher oyster harvest, the proportion of regional seals using the estuary declined by 7 ± 2% for seal pups (−65 ± 18 total pups), and 5 ± 2% for total counts (−192 ± 58 total seals). These findings (both within the estuary and at the regional scale) were essentially identical whether modelling oyster harvest as either a continuous or categorical (low/high) variable and when using either frequentist or Bayesian statistical analyses.

4. Marine reserves set aside for wildlife may be less effective when the highest quality breeding and pupping sites are adjacent to regular aquaculture activities. These effects may not be detectable until additional natural variation lowers the quality of nearby habitats.

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Received 14 October 2010; Revised 15 February 2011; Accepted 28 February 2011

KEY WORDS: *Phoca vitulina*; aquaculture; disturbance; harbour seal; generalized estimating equations; Bayesian analysis; marine protected area

INTRODUCTION

A variety of factors may influence habitat availability for breeding, moulting, and resting pinnipeds, including coastal development (Stewart and Yochem, 2005), human encroachment and disturbance (Yochem *et al.*, 1987; Gerodette and Gilmartin, 1990; Suryan and Harvey, 1999; Thompson *et al.*, 2001), predation (Nordstrom, 2002), climate change (Fritas *et al.*, 2008), and natural variation in habitat suitability. Moreover, since longer lived, slowly reproducing K-selected species maximize their long-term survival, they tend to respond to human disturbances by increasing heart rate and energetic costs (Bason *et al.*, 2009). Thus, seals are expected to move away from, or remain vigilant to, disturbance sources rather than habituate as some smaller, quickly reproducing species do (Bason *et al.*, 2009). This might be particularly evident for females with pups, which should be more risk averse than adult males. Furthermore, Frid and Dill (2002) found that chronic, long-term disturbance stimuli resulted in habitat shifts and subsequently reduced access to resources in all of the 14

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†This article is a US Government work and is in the public domain in the USA.

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This analysis relied entirely on NPS data provided by Becker

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year	adult.de	adultnot.de	pup.de	pupnot.de	tot.de	totnot.de	oyst	a.max	prop.a.de	prop.a.pr	a.avail	bags.6	bags.5	tot.dp	pup.dp	prop.dp	dp.change	dist.rate	mam.dist.rat	weight	enso	92 protocol
1982	556	1674	170	492	726	2166	360004	275	0.379	0.095	1	1	1	851	263	0.294	0	0.33	1.2	1	5	0
1983	534	1678	122	444	656	2122	440139	379	0.578	0.136	1	1	1	832	262	0.299	-0.02	0.62	1.79	1	0	0
1997	854	1431	257	726	1111	2157	476791	252	0.227	0.077	1	1	1	854	357	0.261	0	0.96	1	0.3	4	1
1998	591	1362	162	366	753	1728	292188	247	0.328	0.1	1	1	1	708	187	0.285	-0.17	0.93	0.85	1	0	1
1999	637	1620	285	783	922	2403	125749	241	0.261	0.072	1	0	1	890	335	0.268	0.26	0.77	0.61	1	1	1
2000	755	1778	376	962	1131	2740	34094	325	0.287	0.084	1	0	0	1076	412	0.278	0.21	0.49	0.55	1	2	1
2001	687	1827	327	902	1014	2729	65676	309	0.305	0.083	1	0	0	913	350	0.244	-0.15	0.49	0.39	1	3	1
2002	904	2231	377	813	1281	3044	78064	297	0.232	0.069	1	0	0	1162	380	0.269	0.27	0.87	0.52	1	4	1
2003	1066	1916	486	746	1552	2662	118643	315	0.203	0.075	1	0	0	459	105	0.109	-0.6	0.74	0.75	1	5	1
2004	1183	2322	461	803	1644	3125	96754	313	0.19	0.066	1	0	0	929	264	0.195	1.02	0.42	0.33	1	6	1
2005	754	1951	332	771	1086	2722	138958	220	0.203	0.058	1	1	1	928	289	0.244	0	0.65	0.46	1	7	1
2006	784	1962	287	660	1071	2622	291538	130	0.121	0.035	0	1	1	783	245	0.212	-0.16	0.63	0.1	1	8	1
2007	752	1786	273	624	1032	2410	468000	21	0.02	0.006	0	1	1	684	215	0.199	-0.13	0.94	0.93	1	9	1
2008											0	1	1	824	328	0.236	0.2	0.76	0.75	1	10	1
2009											0	1	1	724	298	0.229	-0.12	0.36	0.43	1	11	1

ADULT

Year	Bolinas Lagoon	Double Point	Drakes Estero	Duxbury Reef	PR Headlands	Tomales Bay	Tomales Point
1982	109	588	556	109	213	227	428
1983	119	570	534	166	176	230	394
1997	181	497	854		117	389	267
1998	98	521	591		126	256	383
1999	133	555	637	88	130	435	279
2000	155	664	755	92	118	470	269
2001	224	583	687	71	65	518	388
2002	288	782	904	107	110	529	415
2003	312	354	1066	138	145	594	375
2004	239	665	1183	131	161	497	629
2005	318	639	754	93	84	504	313
2006	381	538	784	72	126	503	362
2007	282	469	759	81	119	481	374
2008	272	498	627	32	142	382	384
2009	281	429	561	59	131	438	255

PUP

Year	Bolinas Lagoon	Double Point	Drakes Estero	Duxbury Reef	PR Headlands	Tomales Bay	Tomales Point
1982	17	283	170		19	58	135
1983	17	262	122		1	45	120
1997	51	357	257		24	141	153
1998	47	187	162		24	34	74
1999	59	335	285	10	38	190	151
2000	108	412	376	20	45	188	189
2001	123	350	327	5	51	179	194
2002	123	389	377	3	31	144	132
2003	150	105	486	4	48	178	283
2004	123	264	461	15	57	202	142
2005	143	289	332	6	44	188	101
2006	149	245	287	17	41	106	100
2007	126	215	273	7	46	72	158
2008	153	328	341	3	64	118	154
2009	143	298	272	3	68	89	129

This analysis relied entirely on NPS data shown here provided by Becker. Just as in Becker 2011, columns were added together, or one divided by another to get proportions, or certain years excluded or adjusted. Regression analysis was done using NPS data as defined in this report.

Becker's best models derived from these columns

proportion pups DE = pup.de / total regional pups

total regional pups

OYST Hi/Low

year	pup.de	pupnot.de	bags.5
1982	170	492	1
1983	122	444	1
1997	257	726	1
1998	162	366	1
1999	285	783	1
2000	376	962	0
2001	327	902	0
2002	377	813	0
2003	486	746	0
2004	461	803	0
2005	332	771	1
2006	287	660	1
2007	273	624	1
2008	341	820	1
2009	272	739	1

Becker's best models all included bags.5 = OYST Hi/Low categorical designation as surrogate for oyster activity at OB/UEN during pupping season (Mar–May)

Models 1000 times more significant from these columns

Becker listed prop.dp (proportion seals DP) but not prop. pups DP = pup.dp/total reg. pups

total regional seals

seals Double Point

pups Double Point

tot.dp/total reg. seals

As shown on page 44, prop.seals.dp is better than Becker's best multi-model.

year	tot.de	totnot.de	tot.dp	pup.dp	prop.dp	92 protocol
1982	726	2166	851	263	0.294	0
1983	656	2122	832	262	0.299	0
1997	1111	2157	854	357	0.261	1
1998	753	1728	708	187	0.285	1
1999	922	2403	890	335	0.268	1
2000	1131	2740	1076	412	0.278	1
2001	1014	2729	913	350	0.244	1
2002	1281	3044	1162	380	0.269	1
2003	1552	2662	459	105	0.109	1
2004	1644	3125	929	264	0.195	1
2005	1086	2722	928	289	0.244	1
2006	1071	2622	783	245	0.212	1
2007	1032	2410	684	215	0.199	1
2008	968	2528	824	328	0.236	1
2009	833	2332	724	298	0.229	1

And some important insights from these columns

year	OYST Hi/Low (bags.5)	ann. oyster harvest (oyst)	disturbance rate (dist.rate)
1982	1	360004	0.33
1983	1	440139	0.62
1997	1	476791	0.96
1998	1	292188	0.93
1999	1	125749	0.77
2000	0	34094	0.49
2001	0	65676	0.49
2002	0	78064	0.87
2003	0	118643	0.74
2004	0	96754	0.42
2005	1	138958	0.65
2006	1	291538	0.63
2007	1	468000	0.94
2008	1	438000	0.76
2009	1	450000	0.36

Becker 2011 claimed the categorical designation OYST Hi/Low gave the same results as annual oyster harvest. Analysis later in this report shows this is not correct. Becker 2011 also did not show analysis using disturbance rate on its own. There is no relationship to seals (either considering proportion in Drakes Estero or proportion at certain subsites in the Estero) as shown in slides below. This refutes the Becker 2009 paper.

Analysis of Becker et al. 2011: conclusions part 1

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

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2. No "*evidence*" that oyster farm displaced seals out of Estero

3. Mother Nature leads to movements of seals into & out of Estero
   Major factors: seals at Double Point (DP) & total regional seals

4. Rogue elephant seal at DP in 2003 displaced seals into Estero
   Becker 2011 best models are driven by transient spike in 2003 & 2004

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   Best P-values are 1000 times more significant than in Becker 2011

Becker et al. 2011

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3. At the regional scale, oyster harvest, seal counts at a nearby colony, and loss of a major haul-out site within the estuary, best explained pup and total seal use compared with the region. Regional population size, short-term human disturbance rate, and other factors were not important. Concurrent with higher oyster harvest, the proportion of regional seals using the estuary declined by $7 \pm 2\%$ for seal pups (-65 ± 18 total pups), and $5 \pm 2\%$ for total counts (-192 ± 58 total seals). These findings (both within the estuary and at the regional scale) were essentially identical whether modelling oyster harvest as either a continuous or categorical (low/high) variable and when using either frequentist or Bayesian statistical analyses.

Gerodette and Gilmartin, 1990; Sayan and Harvey, 1999; Thompson *et al.*, 2001), predation (Nordstrom, 2002), climate change (Freitas *et al.*, 2008), and natural variation in habitat suitability. Moreover, since longer lived, slowly reproducing K-

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Key conclusion in Becker 2011:
7 +/- 2% spatial displacement of pups out of Estero due to "*higher oyster harvest*"

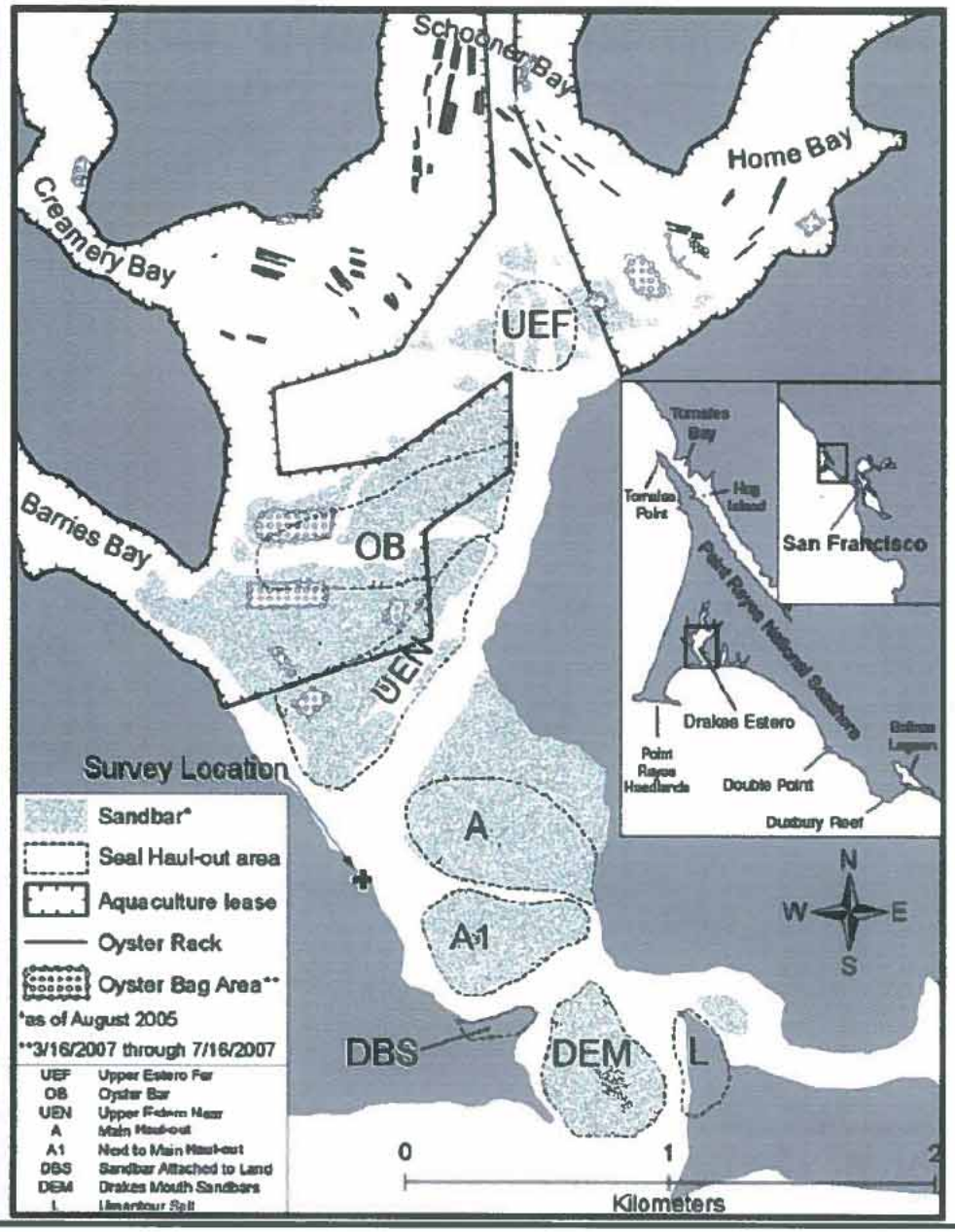
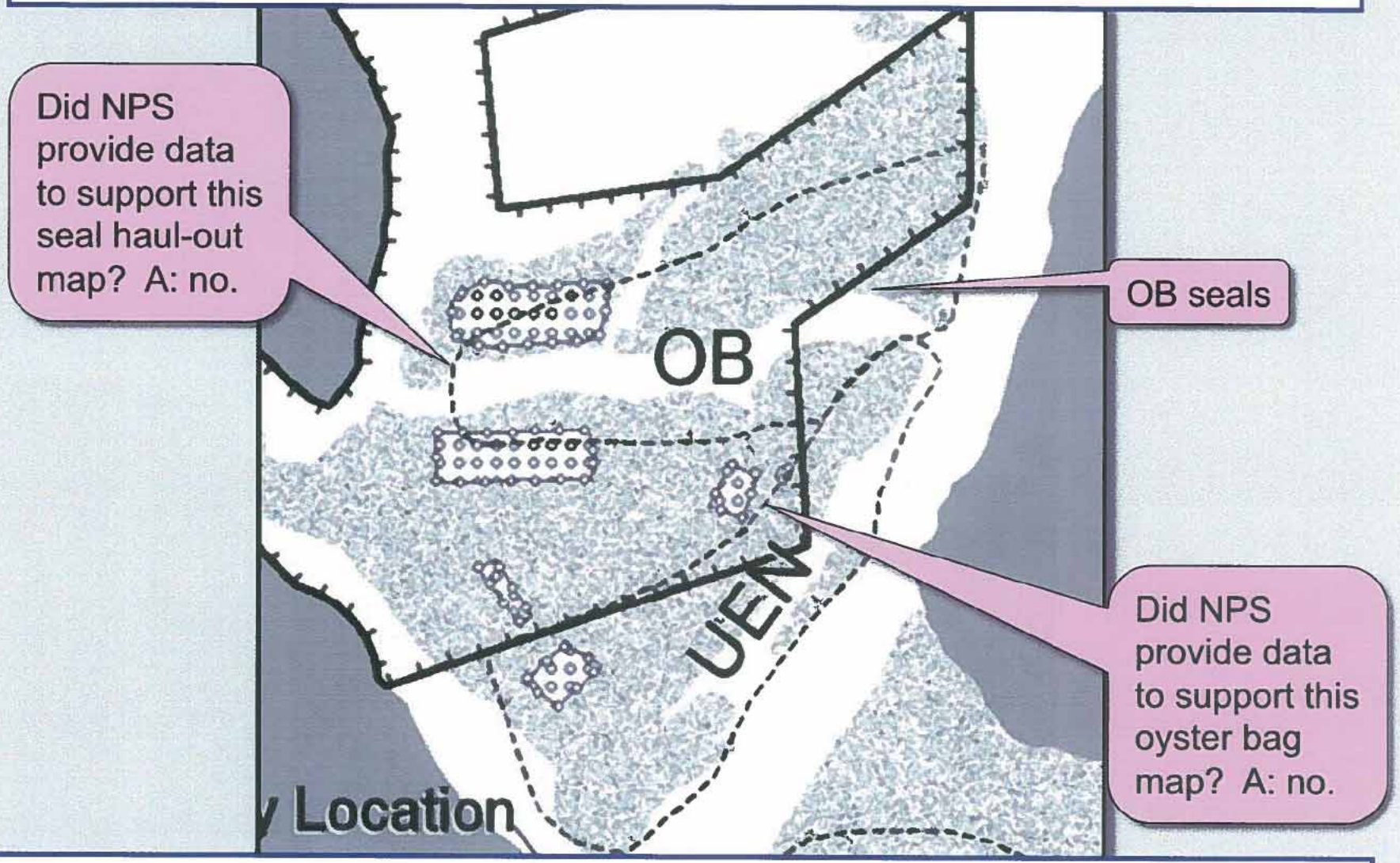
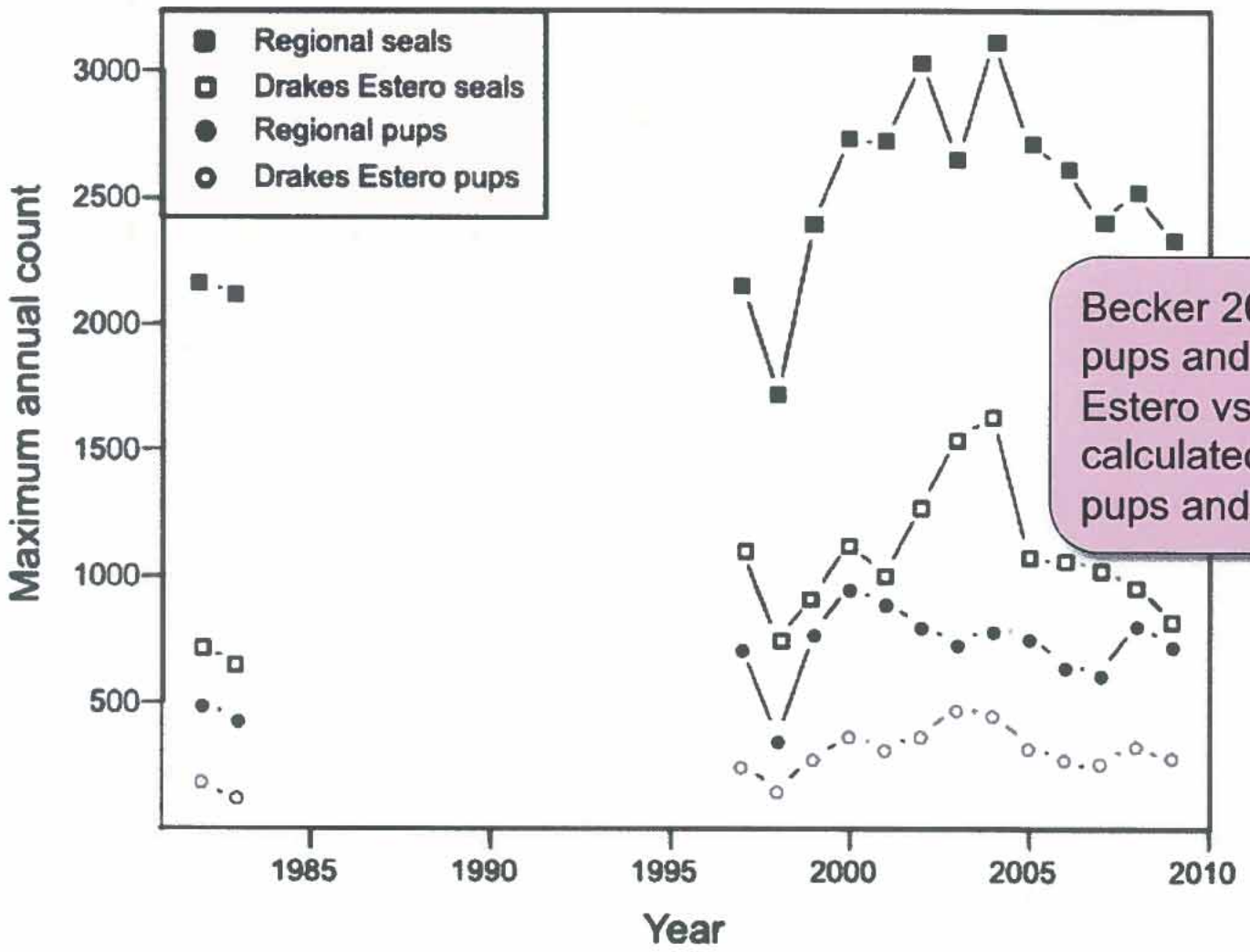


Figure 1. Drakes Estero and the eight labelled seal haul-out subsites.

Figure 1 in Becker 2011 gives false impression that oyster bags are within seal haul-outs – map is inaccurate

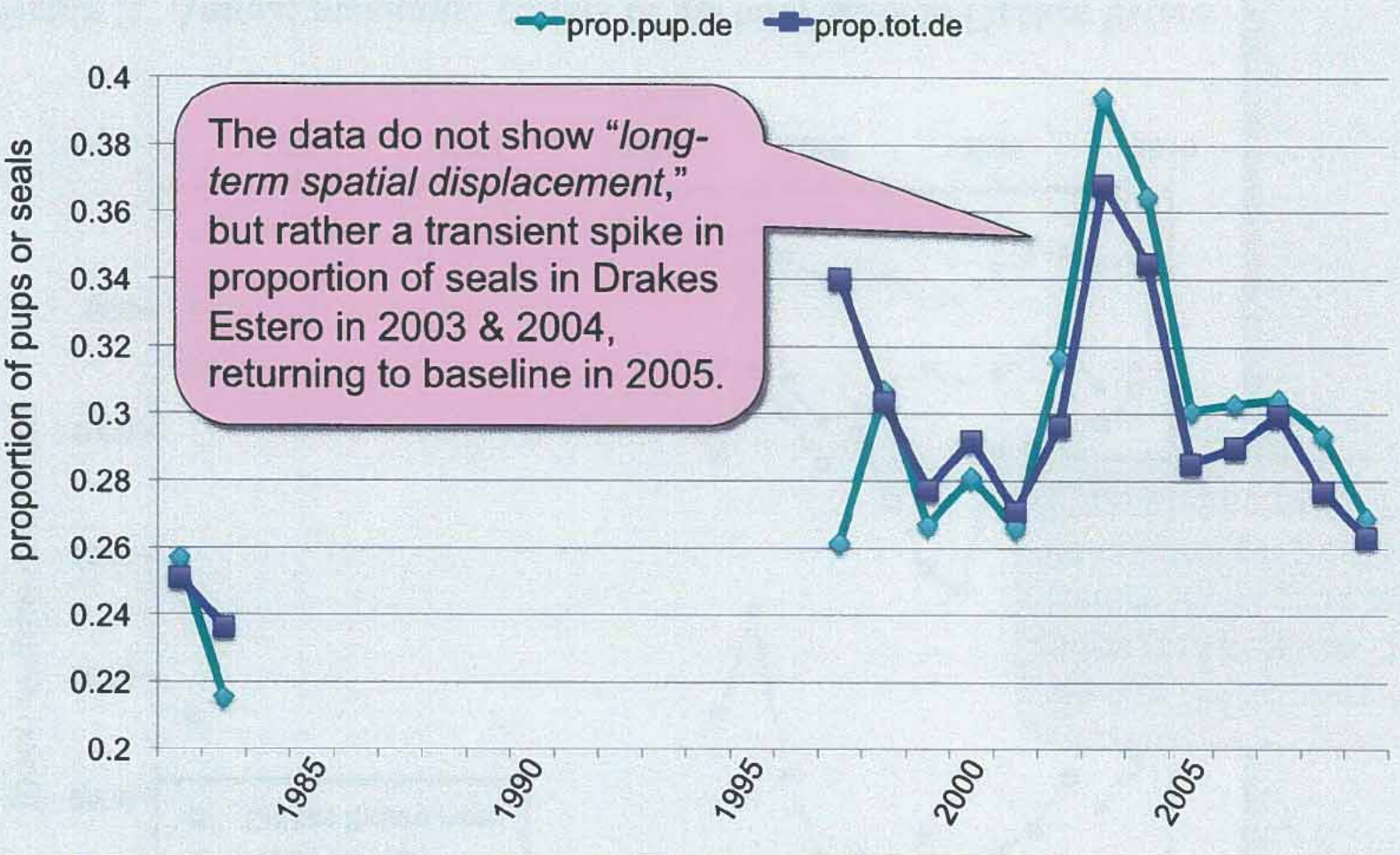


maps, haul-outs, & oyster bags discussed in part 2

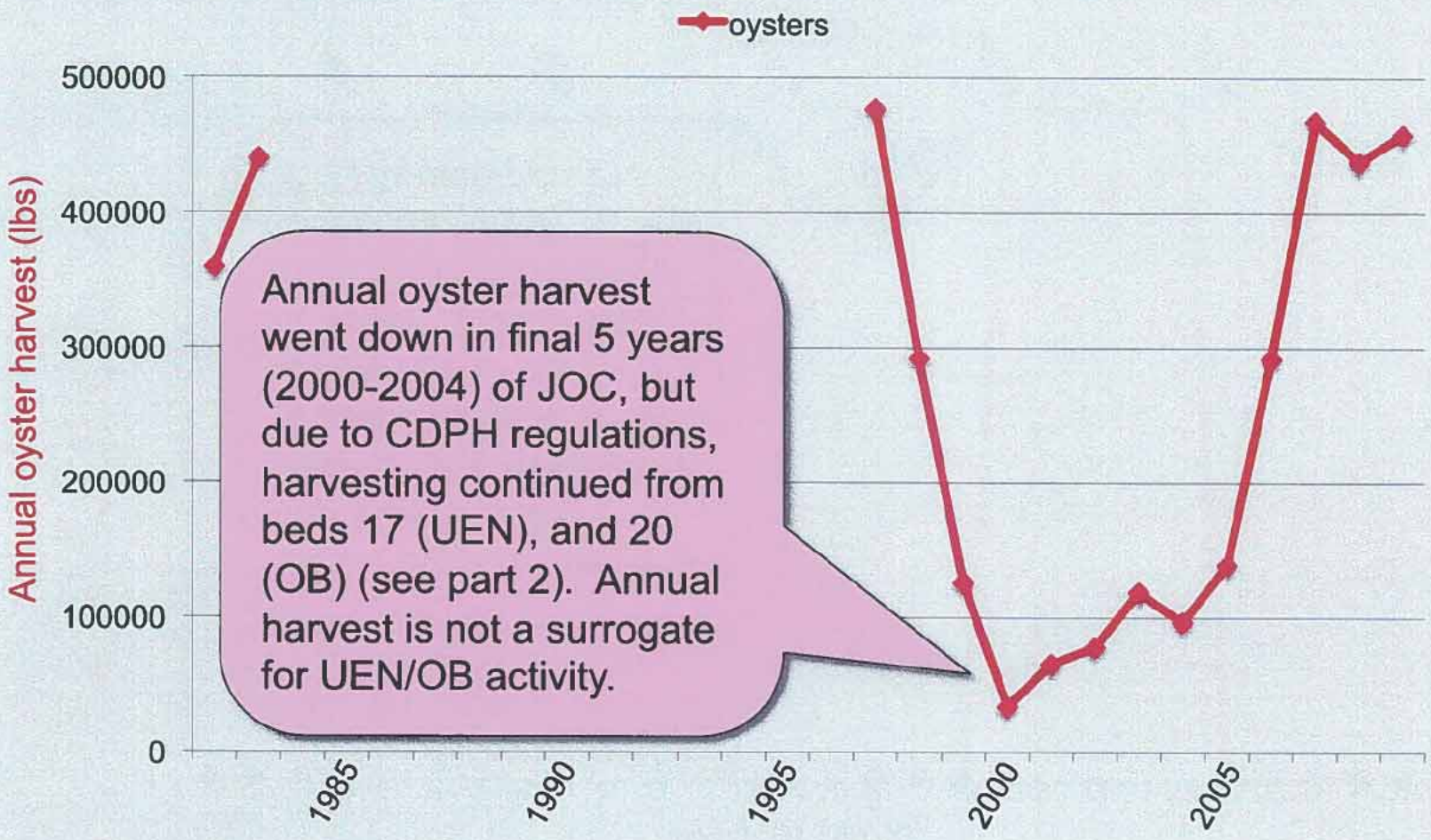


Becker 2011: compared pups and seals in Drakes Estero vs. region, and calculated proportion of pups and seals in Estero

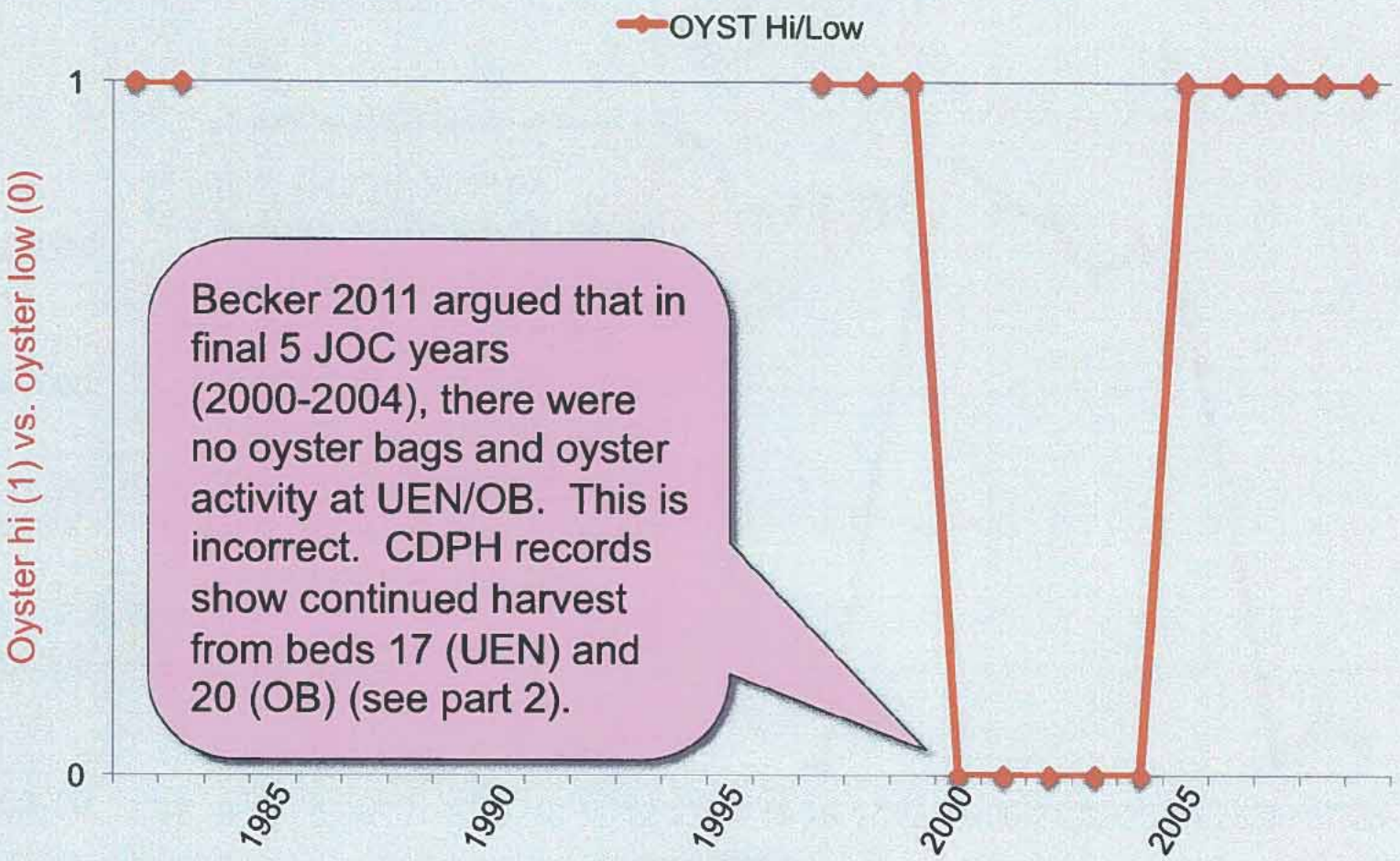
Figure 2. Annual maximum counts of harbour seals in Drakes Estero and the Point Reyes region (less Drakes Estero) during the peak pupping period (15 April–15 May) from 1982–2009. Regional surveys were not conducted between 1984 and 1996.



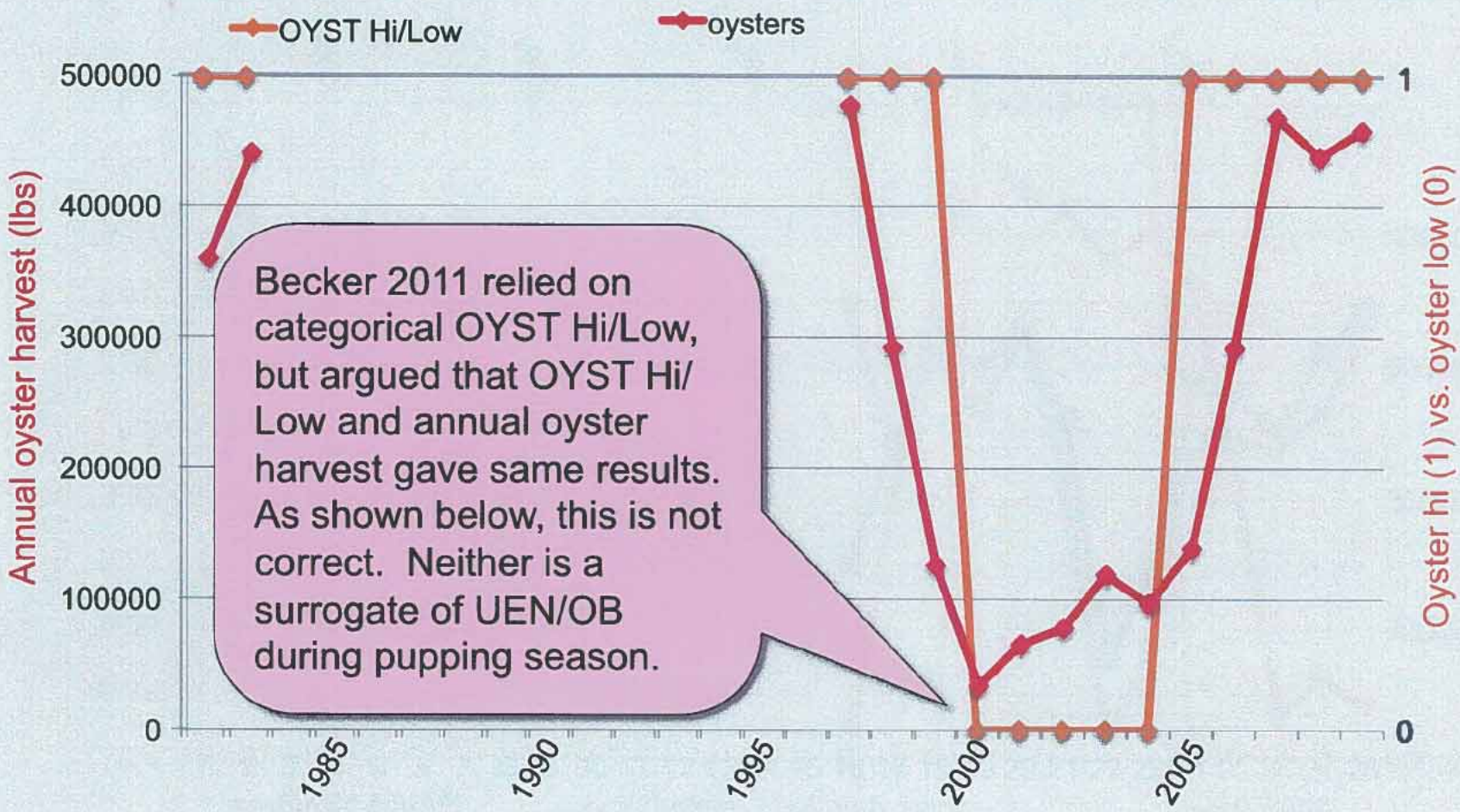
proportion of pups and seals in Drakes Estero



annual oyster harvest

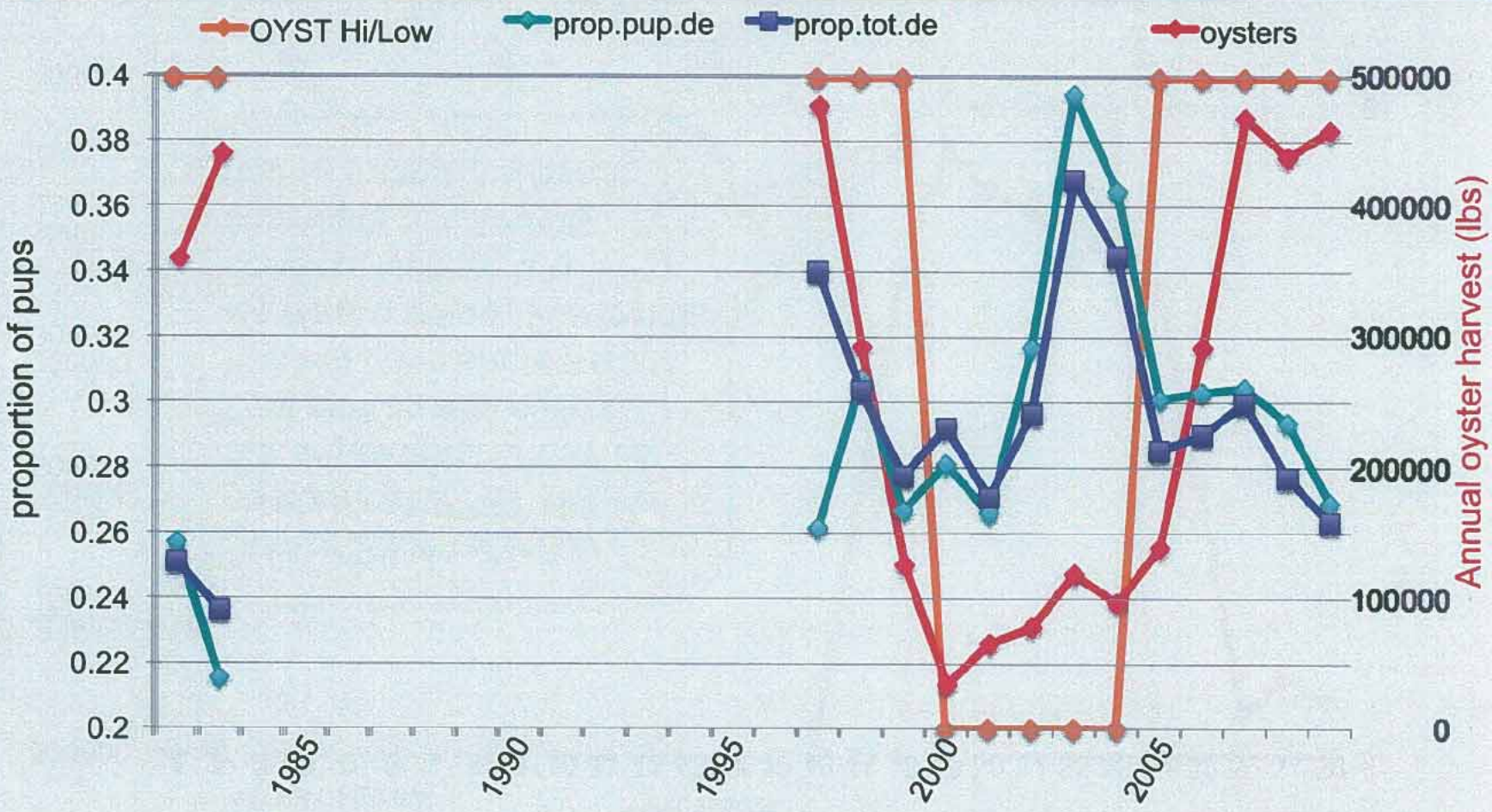


OYST Hi/Low categorical oyster activity



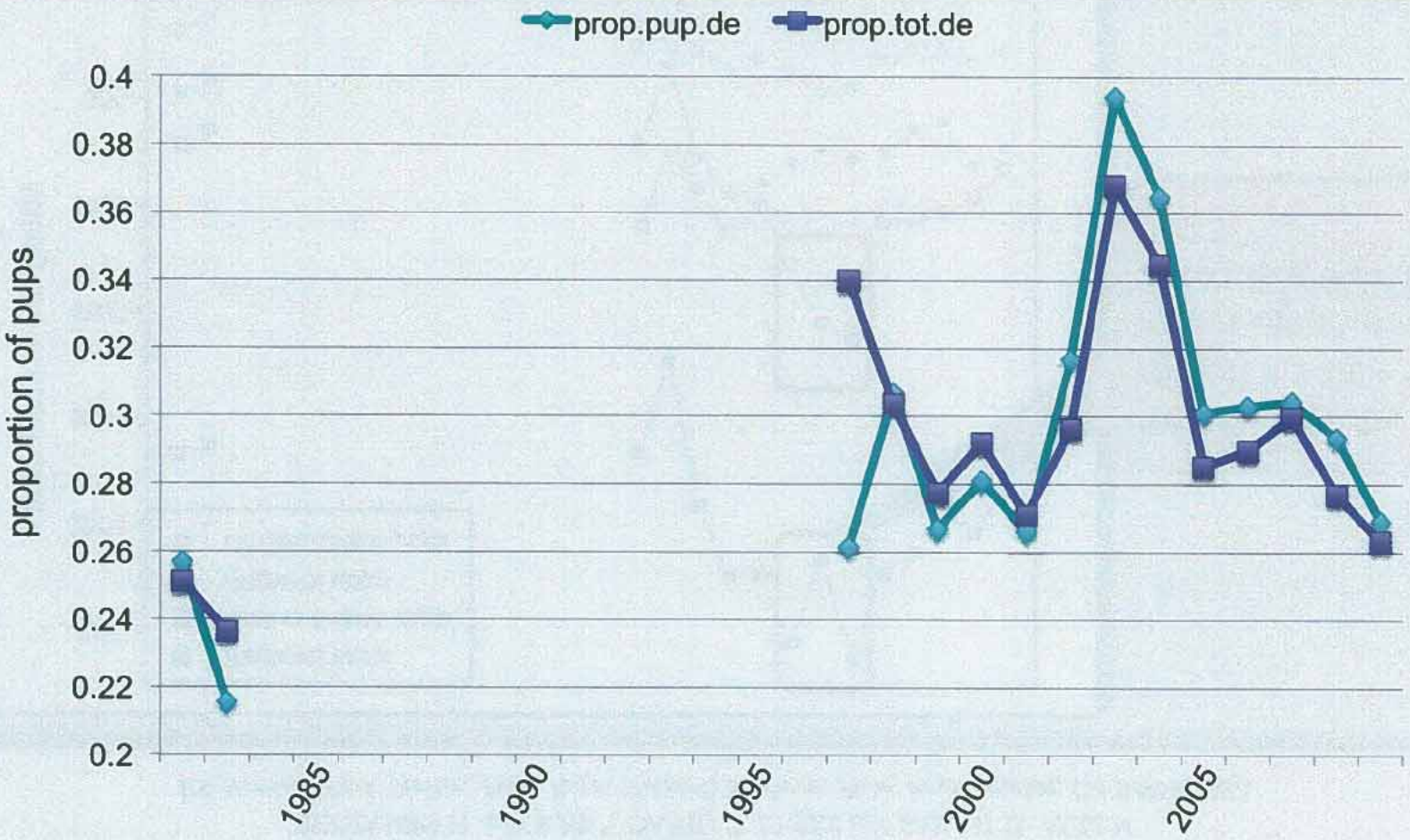
annual oyster harvest vs. OYST Hi/Low

Becker 2011 examined what variable (or variables) correlated with changes in proportion of pups or seals in Drakes Estero



Maybe the oyster farm is a good explanation …

Becker 2011 examined what variable (or variables) correlated with changes in proportion of pups or seals in Drakes Estero



… but could there be a better explanation? Answer: yes.

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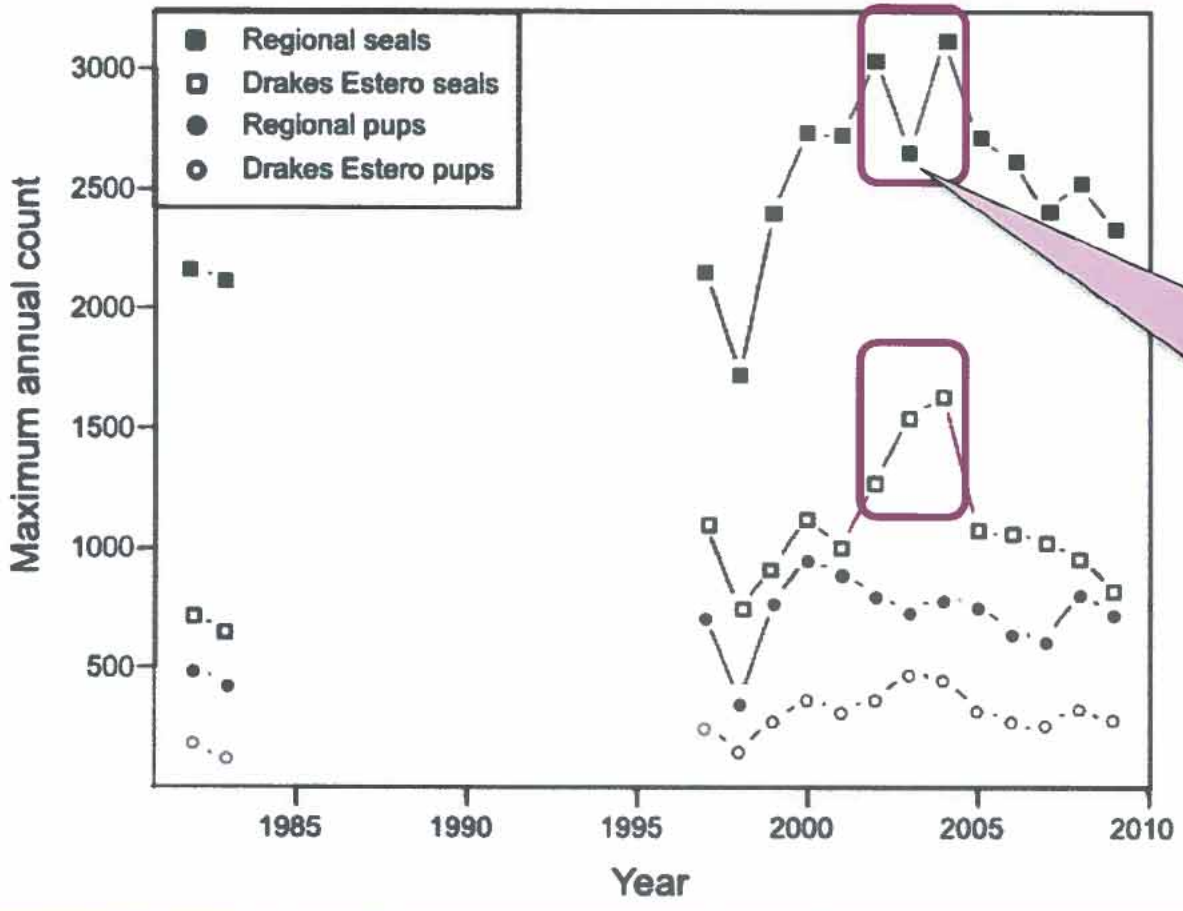
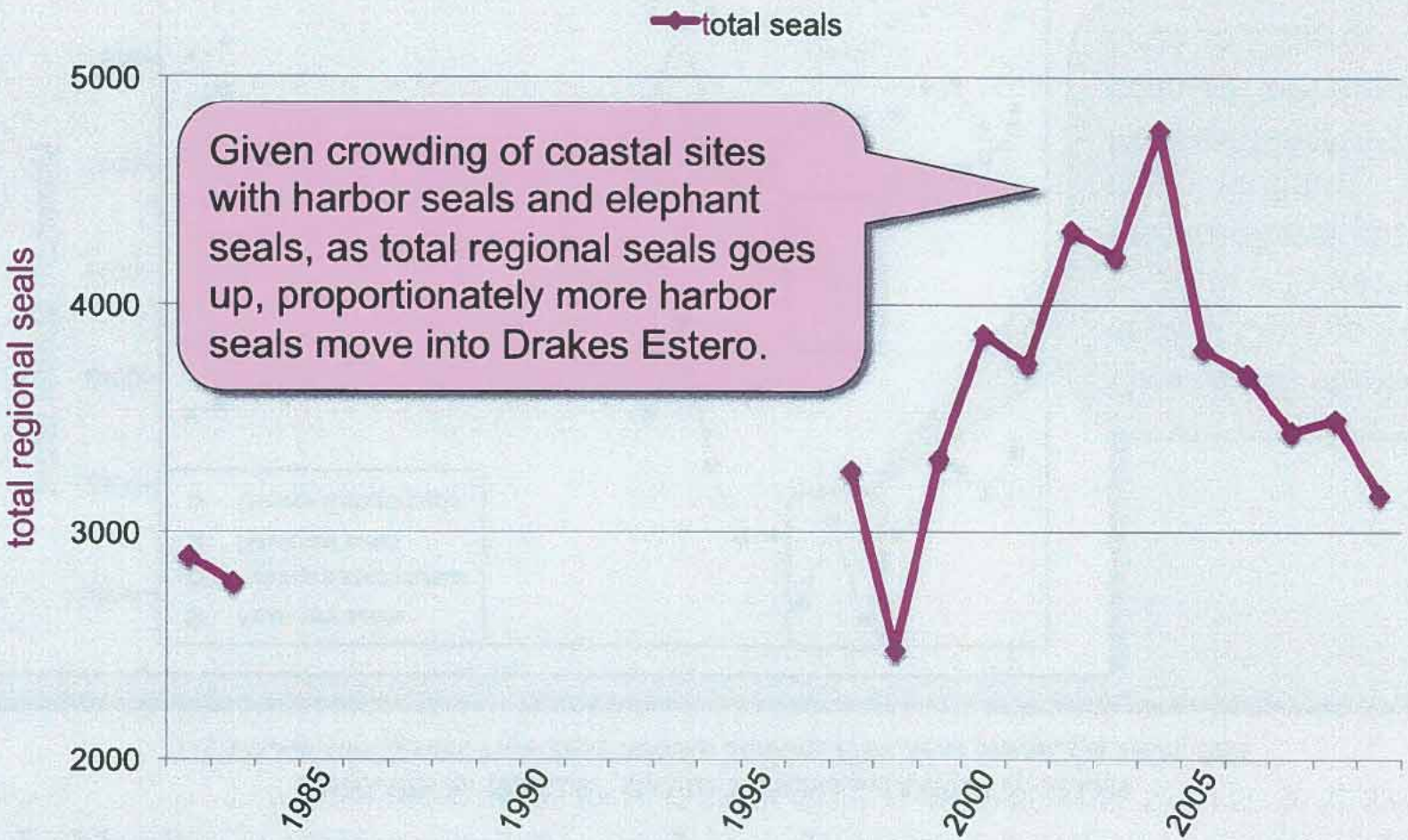


Increased total regional seals + one rogue elephant seal at Double Point in 2003.



total regional seals (DE and non DE)

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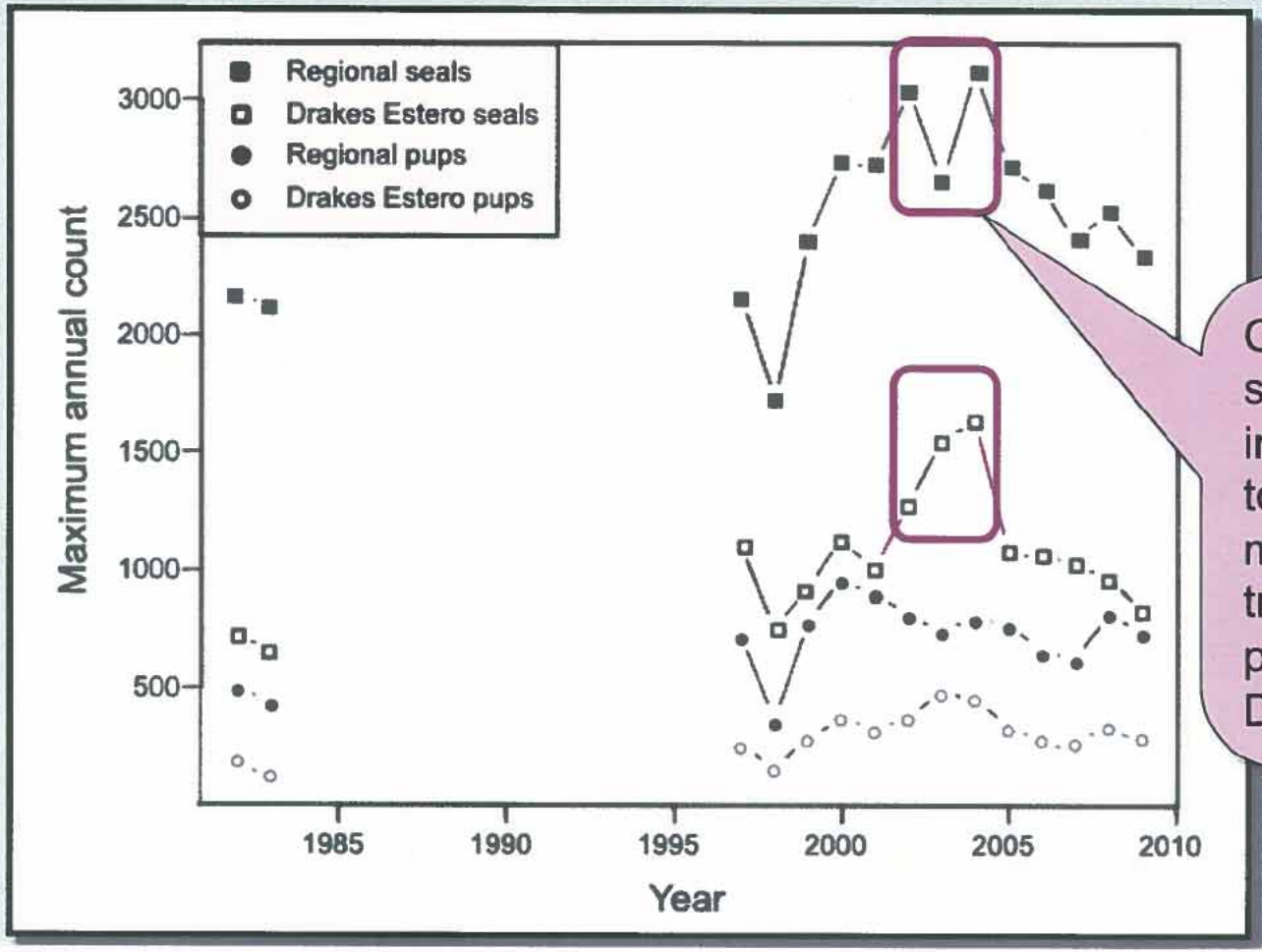

One rogue elephant seal at Double Point in 2003 + increased total regional seals might explain transient increase in proportional seals in Drakes Estero.

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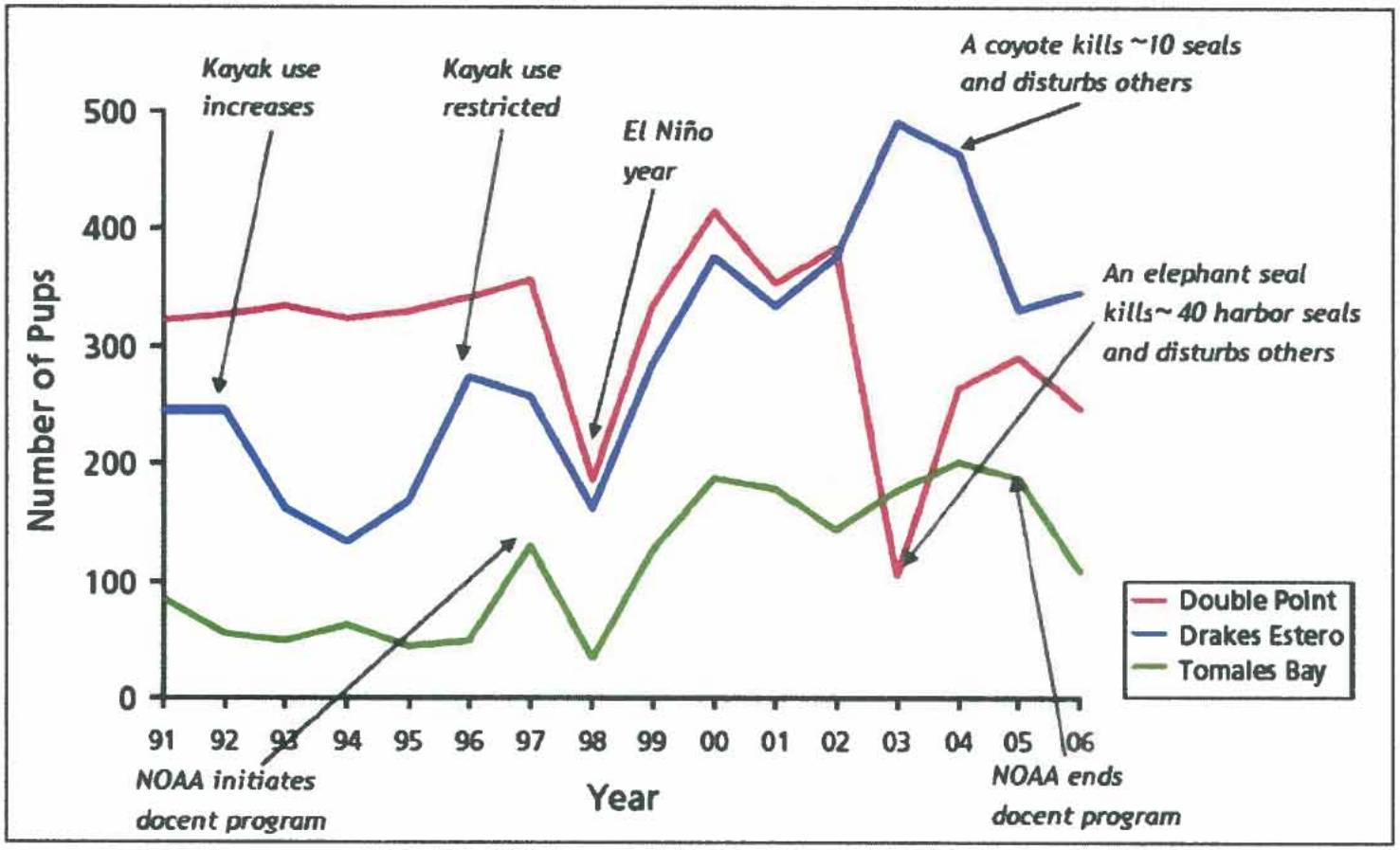
Maximum annual count of seals at nearest colony (*Double Point*). Seals are thought to transit between Double Point and Drakes Estero (Allen Miller, 1988; Grigg *et al.*, 2009), and in 2003 an aggressive elephant seal probably displaced numerous harbour seals from Double Point to Drakes Estero.

We can calculate how many harbor seals went into Drakes Estero. The analysis on slide 26 tells us that around 50% of the pups displaced from Double Point (DP) went into Drakes Estero. The analyses of the long-term relationships predict the same. The mean proportion of pups at Double Point (prop.pup.dp) is 0.296. In 2003, a rogue elephant seal killed 40 seals and chased away ~ 600 seals from Double Point, leaving prop.pup.dp at 0.085. Thus, the rogue elephant seal led to a decrease in prop.pup.dp of 0.211 that equals 260 pups. If ~ 50% of the pups from DP went into Drakes Estero, this would equal around 130 pups displaced into DE. This can be seen visually on the next slide (#24) from an NPS May 2007 document.

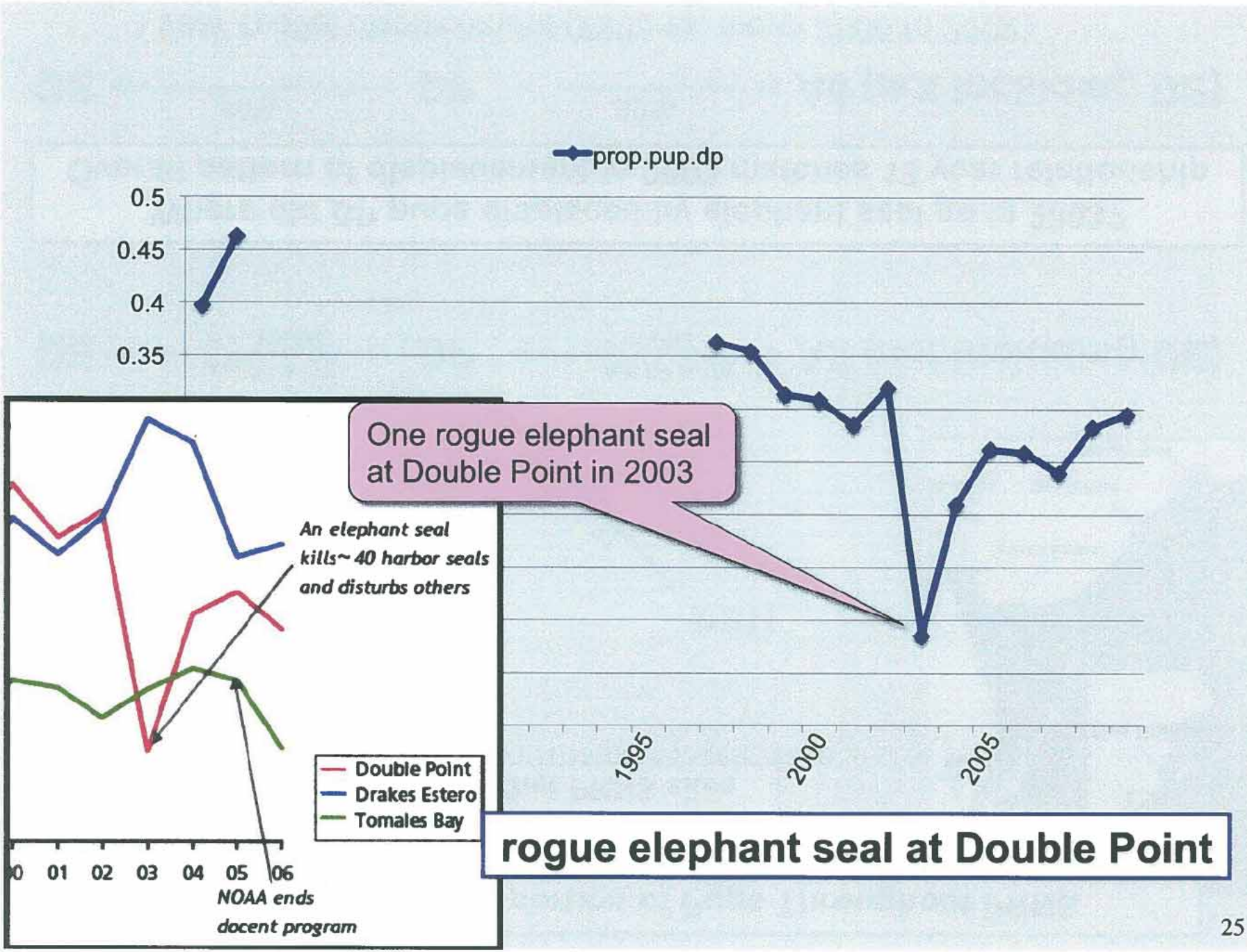
National Park Service
U.S. Department of the Interior
Pacific Coast Science and Learning Center
Research Project Summary May 2007

Harbor Seal Monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area

By Marcus Koenen and Sarah Allen

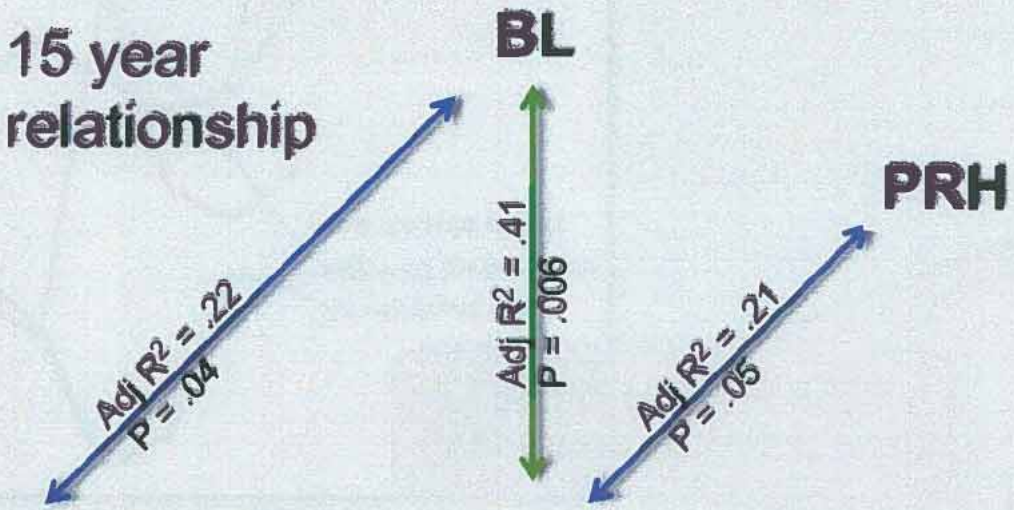


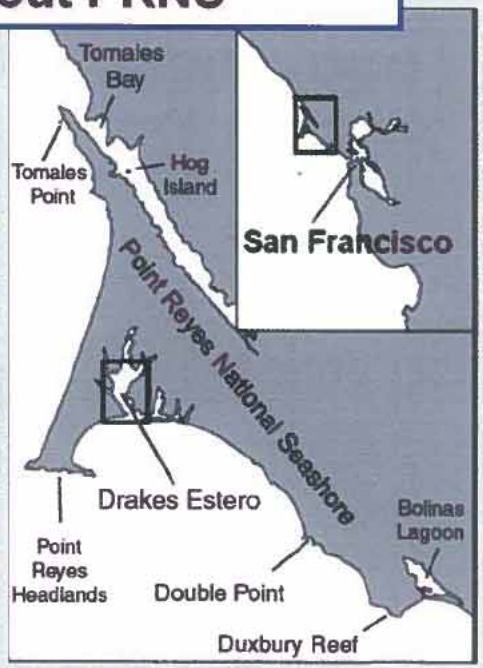
The harbor seal pup population is sensitive to human disturbance, climate variability and interactions with other species. Different management approaches also affect the seal population.


prop.pup.dp
0.5
0.45
0.4
0.35
1995
2000
2005
One rogue elephant seal at Double Point in 2003
An elephant seal kills~ 40 harbor seals and disturbs others
Double Point
Drakes Estero
Tomales Bay
00
01
02
03
04
05
06
NOAA ends docent program
rogue elephant seal at Double Point

Relationships of Proportion of Pups Throughout PRNS

Regression analysis of Drakes Estero and Double Point against other PRNS sites



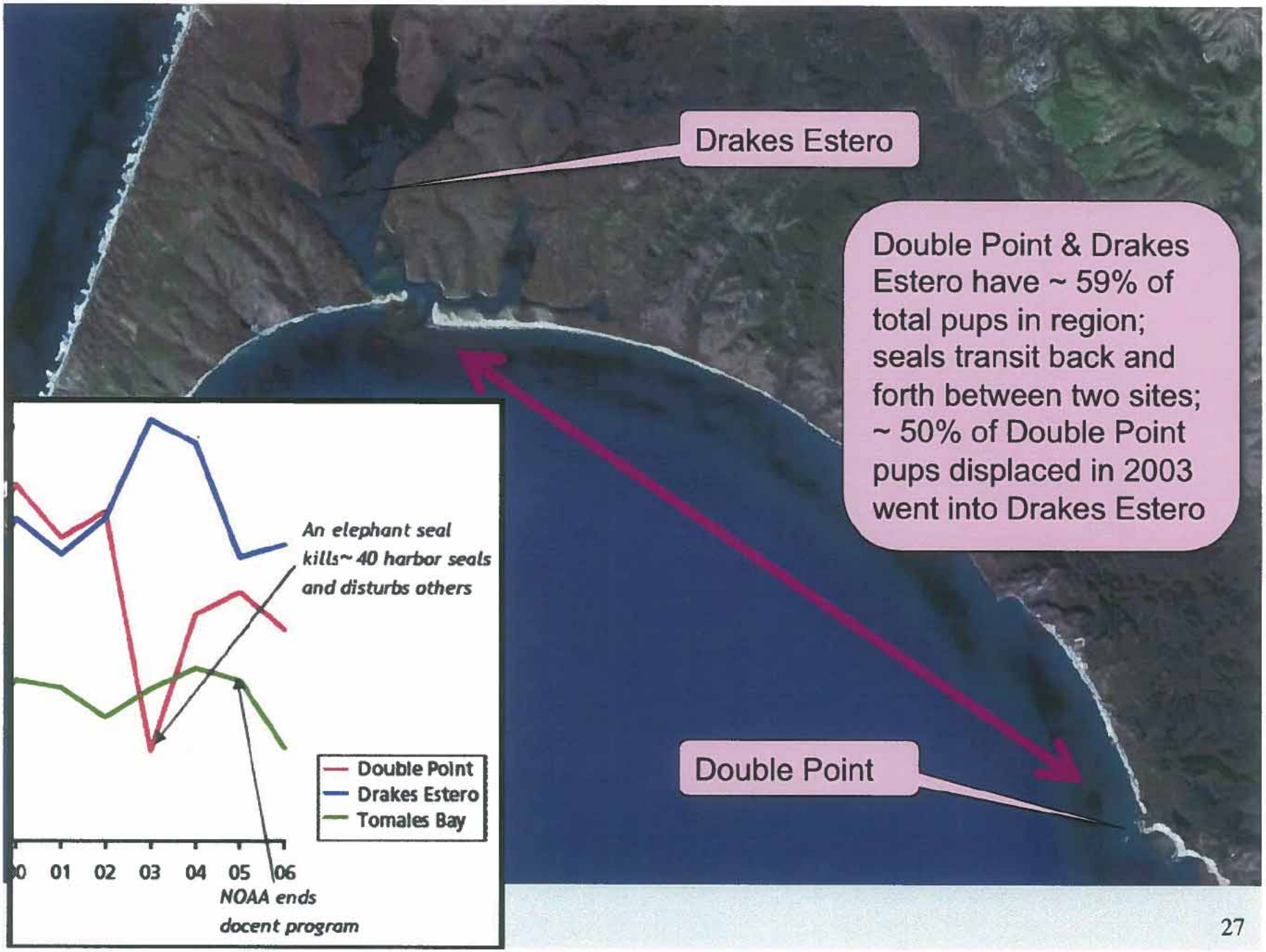


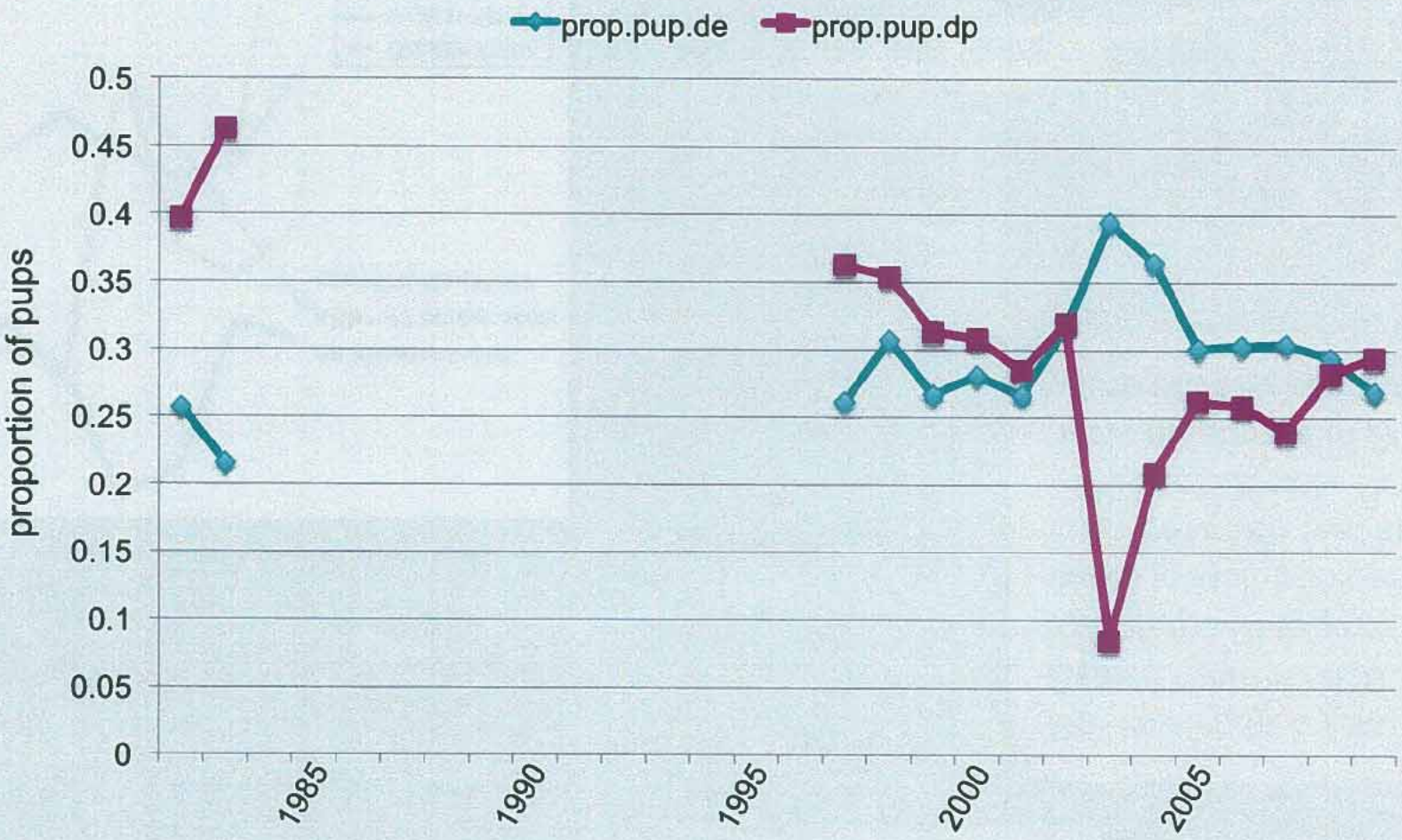
DE ← Adj R^2 = .75, P = .00002 → DP ← Adj R^2 = .76, P = .002 → All (not including DE)

Where did DP pups displaced by elephant seal go in 2003?
Overall pattern of displacement in 2003 matches 15 year relationship

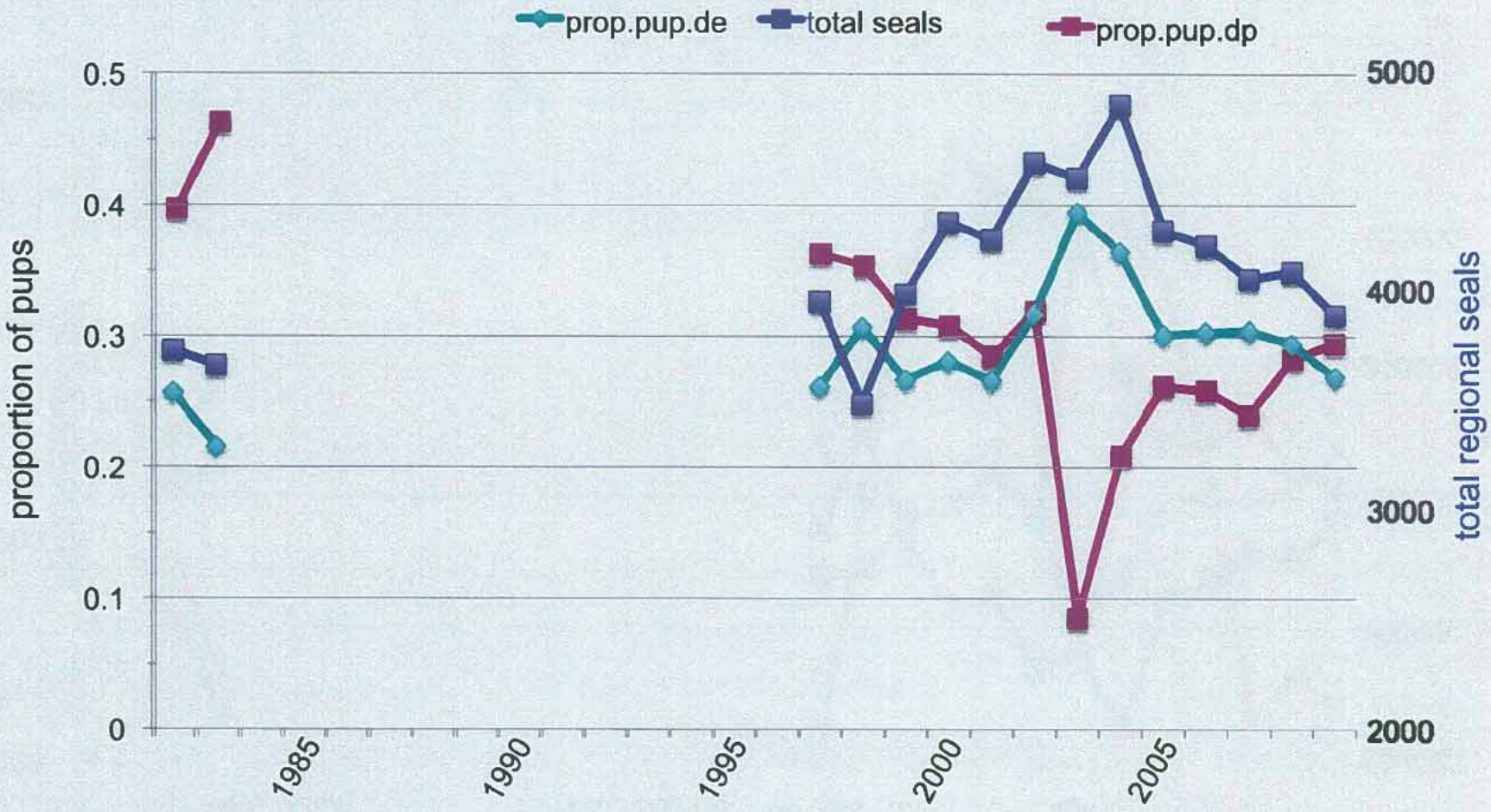
DE ← 48% — DP — 52% → All (not including DE)

1 year spatial displacement (2003 vs. mean 2000 to 2002)

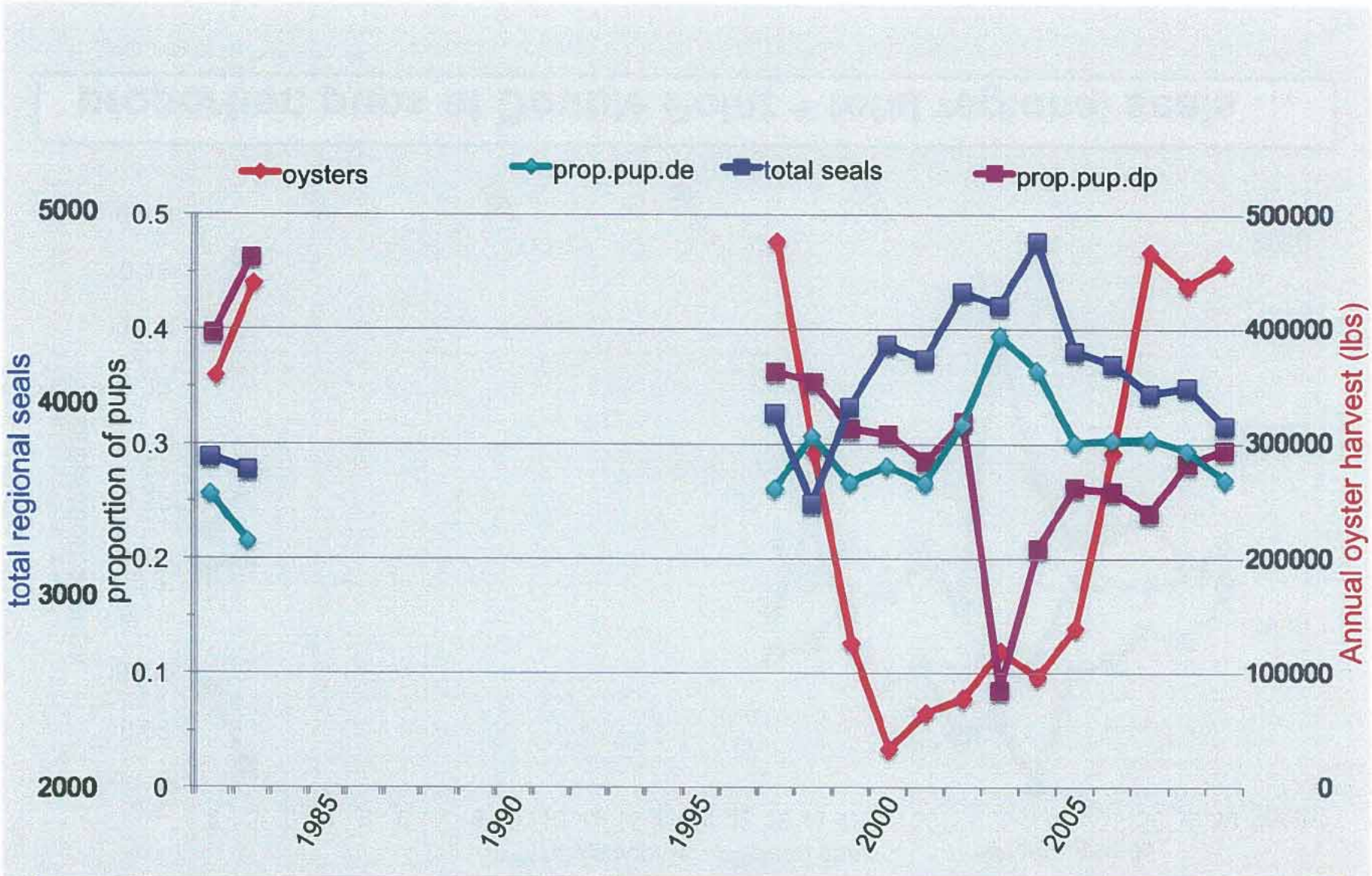

Drakes Estero
Double Point & Drakes Estero have ~ 59% of total pups in region; seals transit back and forth between two sites; ~ 50% of Double Point pups displaced in 2003 went into Drakes Estero
Double Point
An elephant seal kills ~ 40 harbor seals and disturbs others
Double Point
Drakes Estero
Tomales Bay
00
01
02
03
04
05
06
NOAA ends docent program



proportion of pups at DP looks to better correlate …

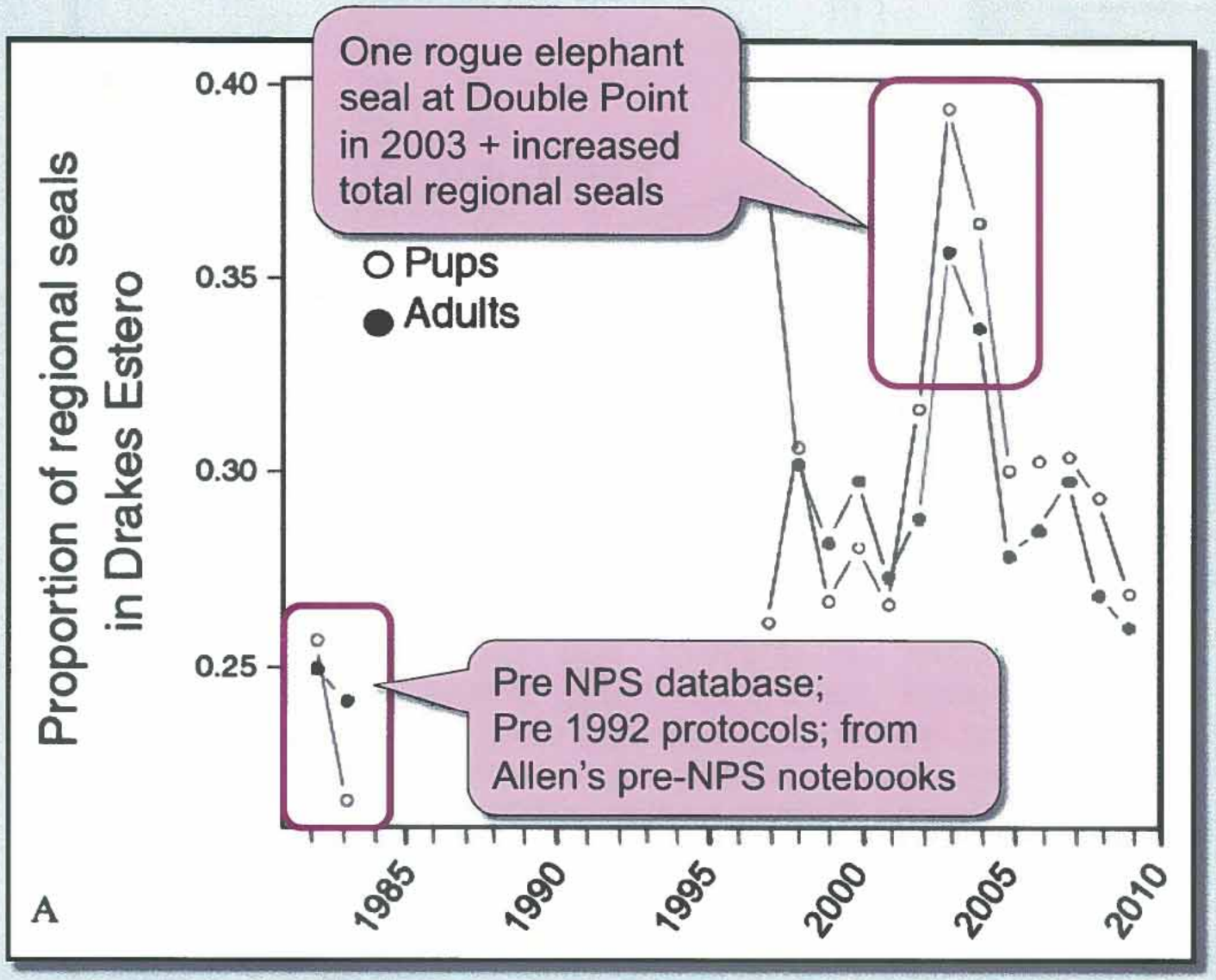


proportion pups at Double Point + total regional seals …



… to the eye look better than annual oyster harvest.

What does statistical regression analysis teach us?



Becker 2011 Figure 3A

Ranking of Models in Becker 2011: Proportion Pups in Drakes Estero

Table 3. A priori models ranked by delta QAICc for the proportion of Point Reyes seal pups and total seals using Drakes Estero. Δi indicates QAICc distance from the best model and wi indicates model weight. Modeling oyster harvest as a continuous variable or low oyster during 1999–2004 gives similar results. Models ranking within the lowest 4 QAICc units (in bold) were used for multimodel inference in table 5. Oyst: low oyster harvest from 2000–2004; DP: Double Point Counts; A: proportion of Drakes Estero seals using subsite A; Dist: anthropogenic disturbance rate. Rankings are similar if using continuous oyster harvest rather than *categorical*

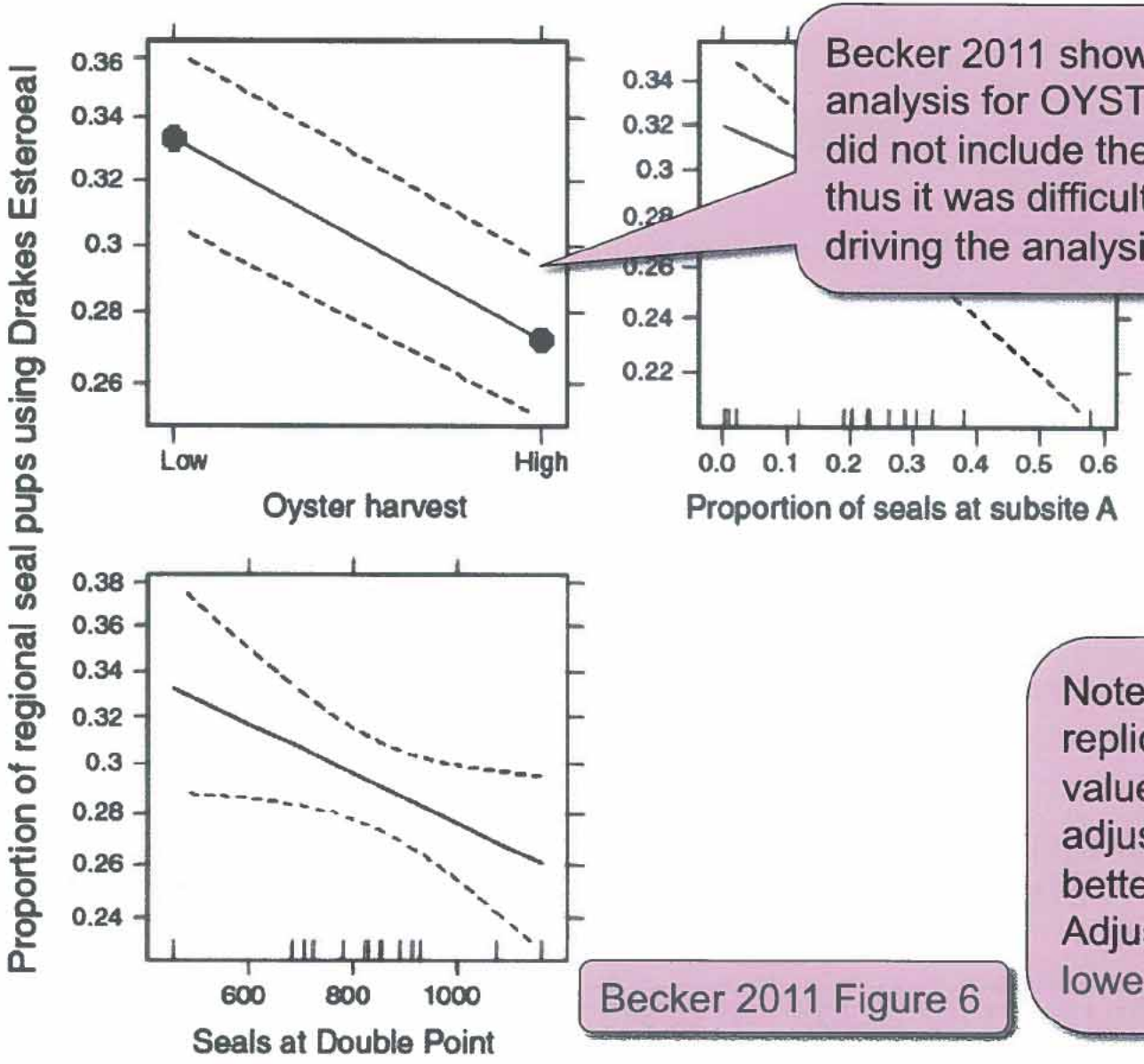
Age class	Model	Δi	wi	r^2
Pup	**Oyst+Double Point (DP)**	**0.0**	**0.35**	**0.51**
	Oyst+DP+A	**1.3**	**0.18**	**0.63**
	Oyst+A	**1.4**	**0.18**	**0.46**
	Oyst+ENSO	**2.6**	**0.09**	**0.42**
	Oyst	**3.3**	**0.06**	**0.26**
	Year	5.0	0.03	0.20
	Oyst+Dist	5.6	0.02	0.32
	Oyst+DP+Dist+A			
	DP+Year	6.4		
	DP	7.3		
	Null	7.7		
	Regional pup count	10.3		

Prop.pup.de

OYST Hi/Low

Becker's top models included OYST Hi/Low categorical variable.

Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis

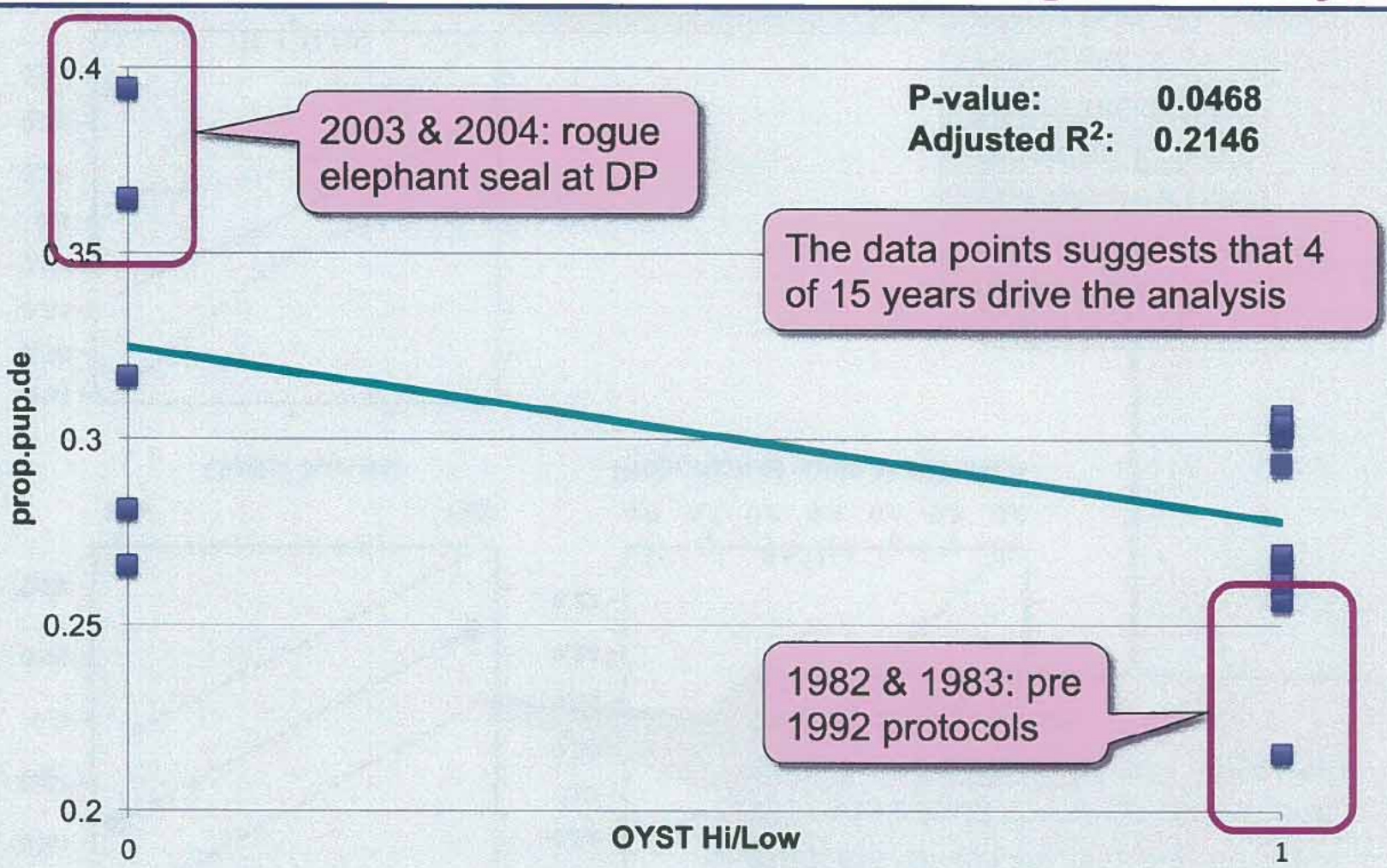


Becker 2011 showed a regression analysis for OYST Hi/Low, but he did not include the data points and thus it was difficult to see what was driving the analysis.

Becker 2011 Figure 6

Note: we can replicate Becker's R^2 values. We used adjusted R^2 as a better measure. Adjusted R^2 is often lower than R^2 value.

Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis



Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis

Modeling the effects of El Niño, density-dependence, and disturbance on harbor seal (*Phoca vitulina*) counts in Drakes Estero, California: 1997–2007

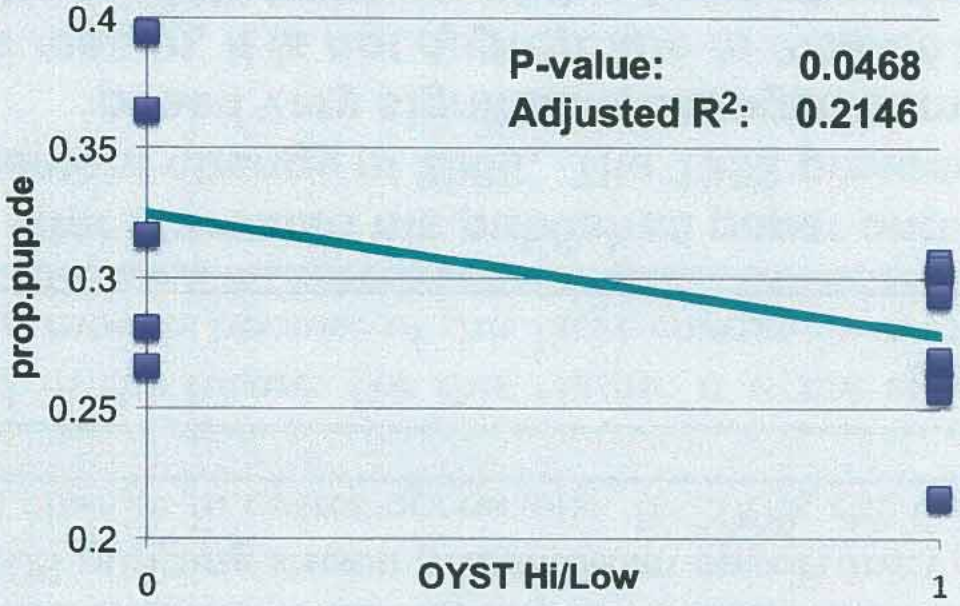
MARINE MAMMAL SCIENCE, 25(1): 1–18 (January 2009)

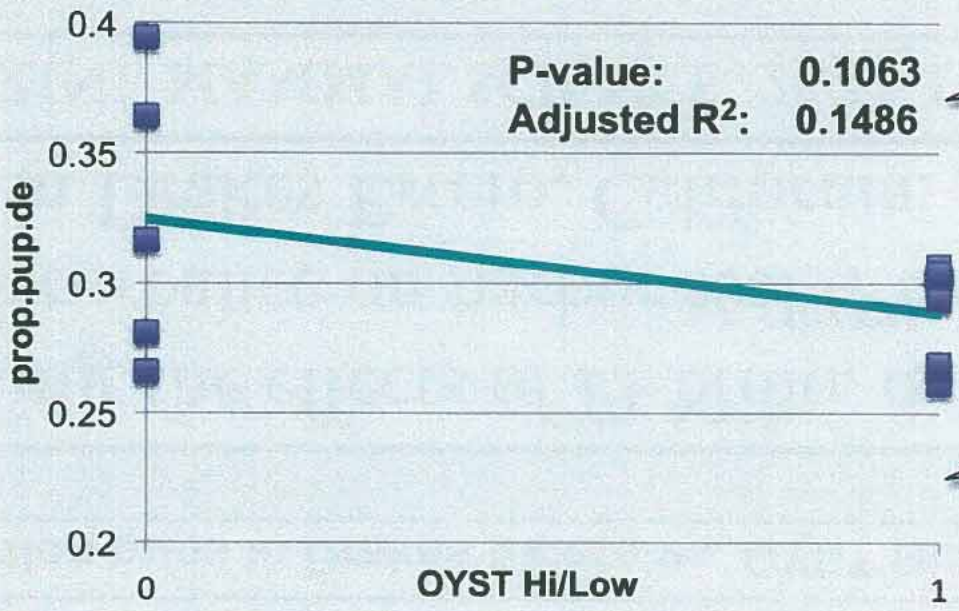
The 2008 pupping season presented an opportunity to investigate the immediate effect of a change in oyster operations. In 2008, the California Coastal Commission

less useful in the future. For this reason, it is not appropriate to include the 2008 data in the models because of this large change in management.

Becker later corrected his published paper and noted that there was no management change in 2008. The 1992 protocols and 1996 kayak ban posed very significant changes in management.
"*For this reason, it is not appropriate to include the*" 1982 & 1983 "*data in the models because of this large change in management.*"

Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis

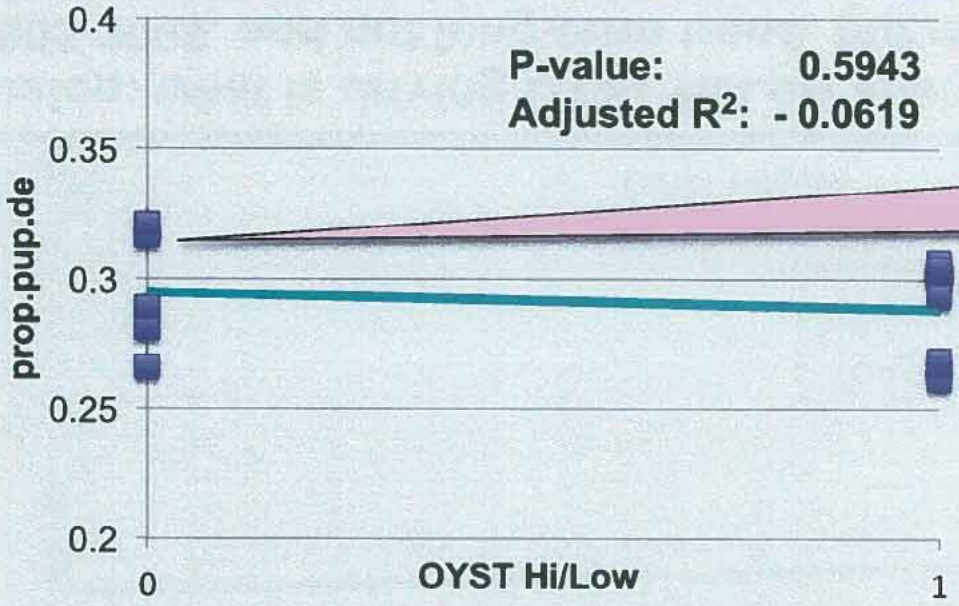




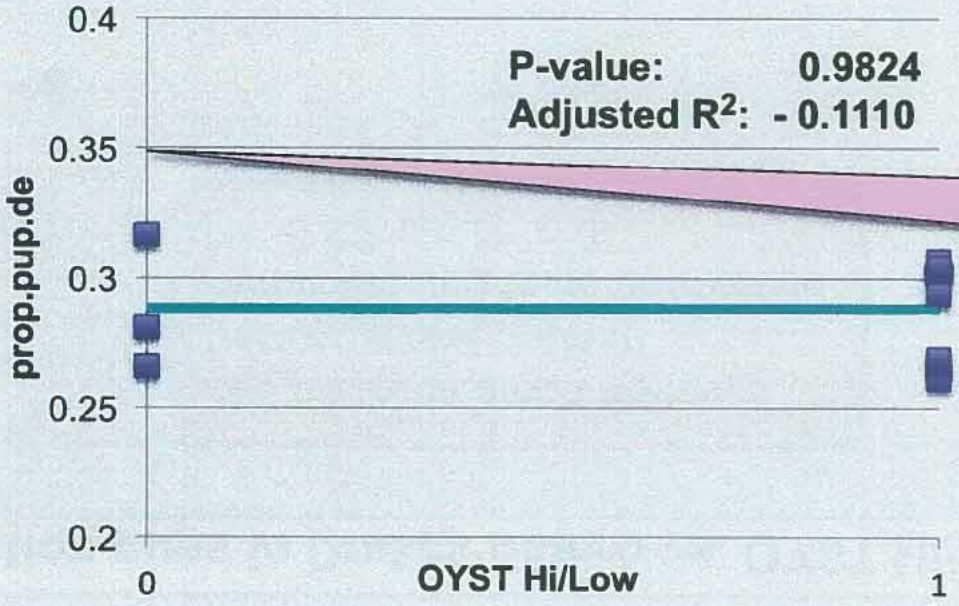
P-value no longer significant (> 0.05)

Removed 1982 & 1983 from analysis

Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis



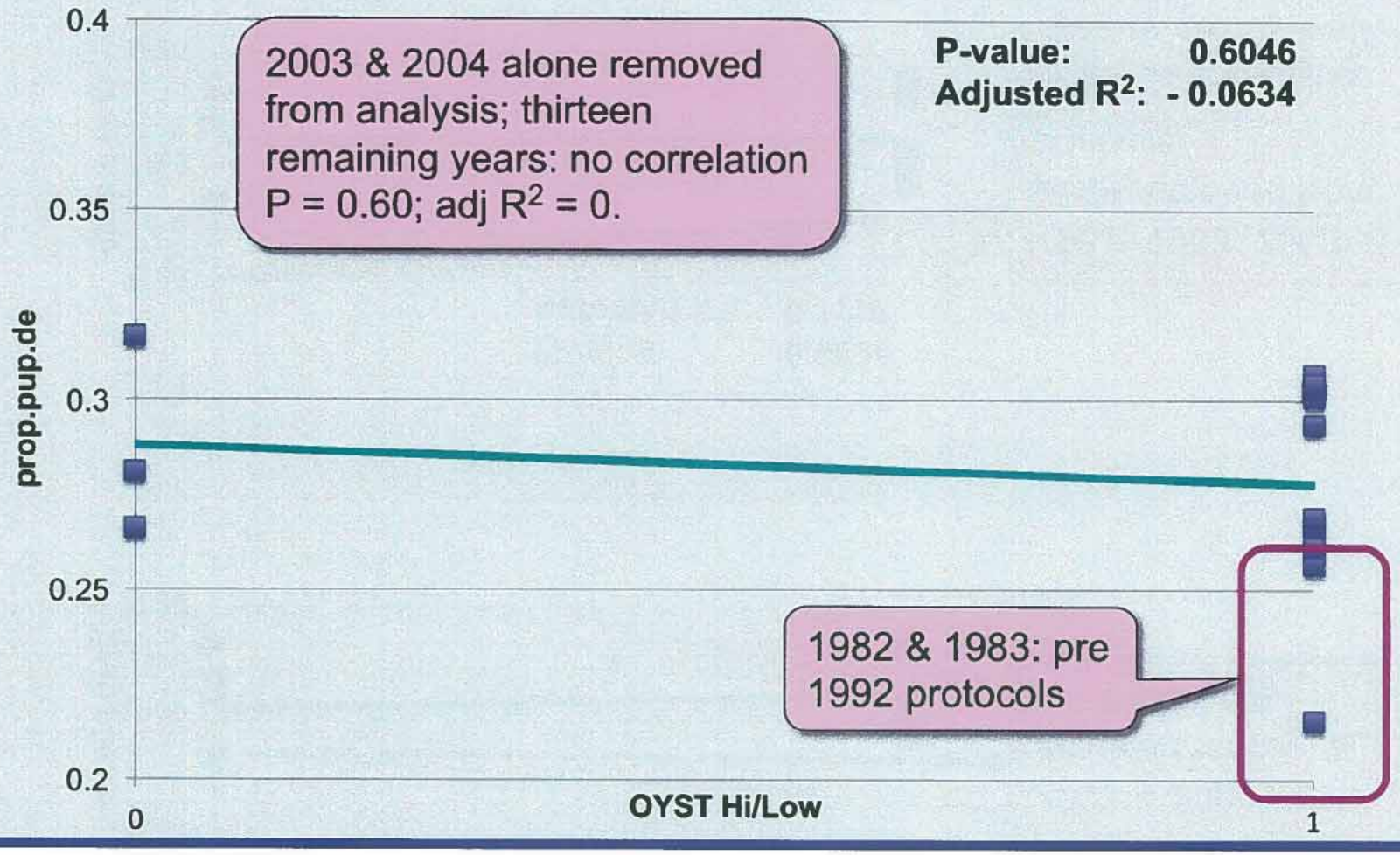
2003 & 2004 adjusted for rogue elephant seal



1982, 1983, 2003, & 2004 removed from analysis

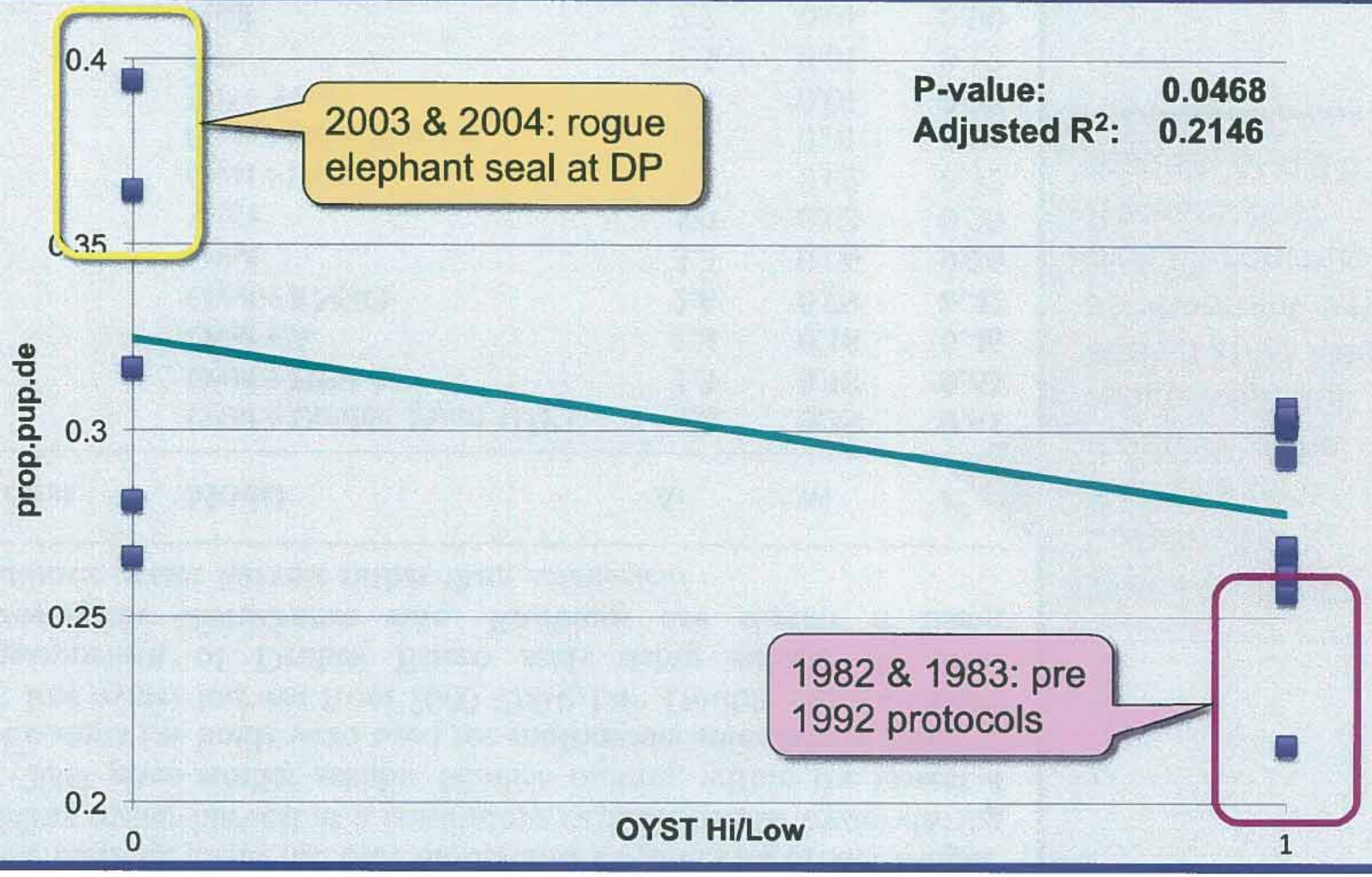
Eleven remaining years: no correlation P = 0.98; adj R^2 = 0.

Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis



Conclusion: what is driving OYST Hi/Low analysis is not DBOC years 2005-2009, and not long-term trend, but rather 2003 & 2004: if remove 2003 & 2004 only, the remaining 13 years show no significance

Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis



Conclusion: what is driving OYST Hi/Low analysis is not DBOC years 2005-2009, and not long-term trend, but rather 2003 & 2004: if remove 2003 & 2004, the remaining 13 years show no significance

Ranking of Models in Becker 2011: Proportion Pups in Drakes Estero

Table 3. A priori models ranked by delta QAICc for the proportion of Point Reyes seal pups and total seals using Drakes Estero. Δi indicates QAICc distance from the best model and wi indicates model weight. Modeling oyster harvest as a continuous variable or low oyster during 1999–2004 gives similar results. Models ranking within the lowest 4 QAICc units (in bold) were used for multimodel inference in table 5. Oyst: low oyster harvest from 2000–2004; DP: Double Point Counts; A: proportion of Drakes Estero seals using subsite A; Dist: anthropogenic disturbance rate. Rankings are similar if using continuous oyster harvest rather than *categorical*

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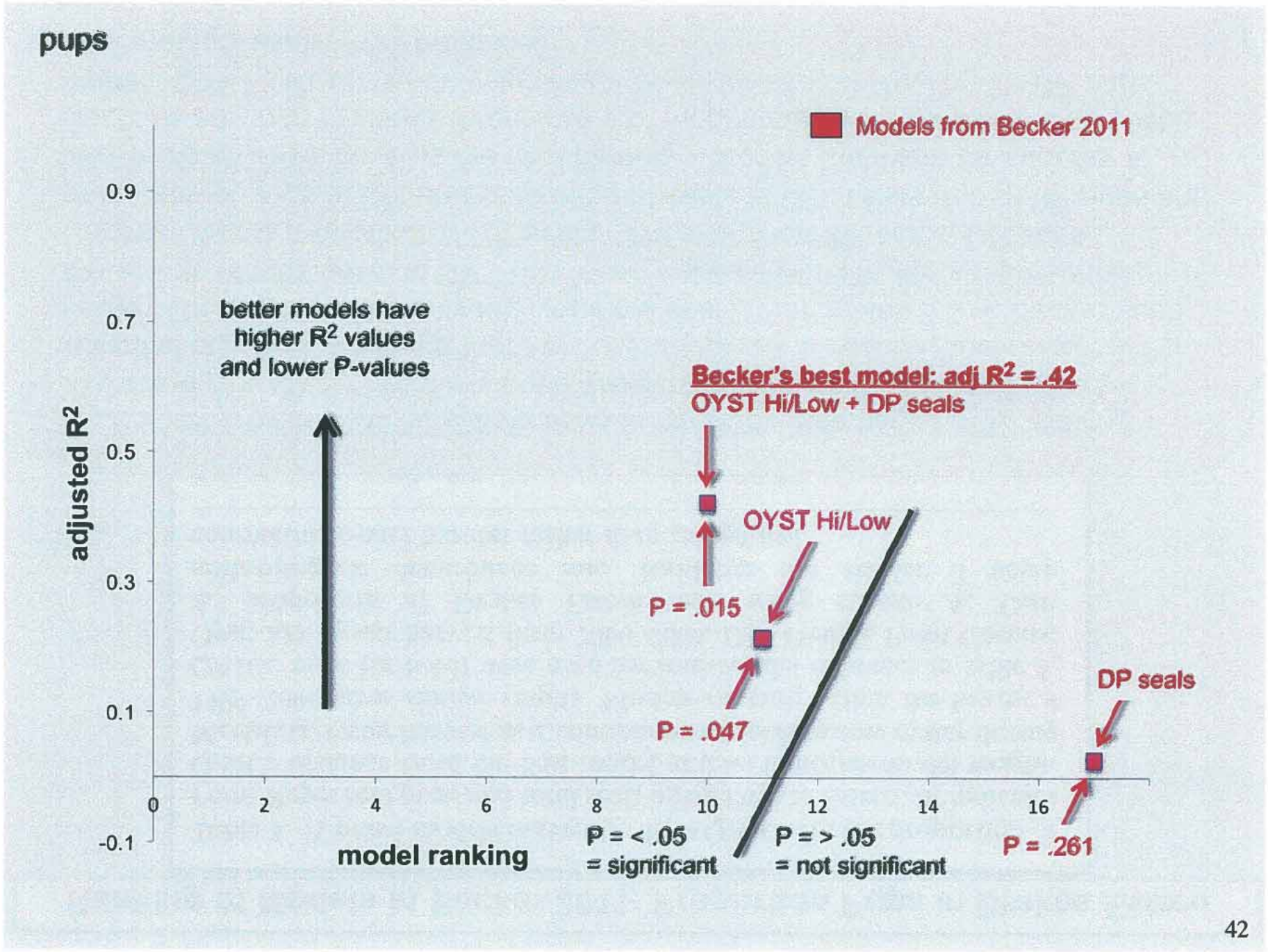
	Oyst+A	**1.4**	**0.18**	**0.46**
	Oyst+ENSO	**2.6**	**0.09**	**0.42**
	Oyst	**3.3**	**0.06**	**0.26**
	Year	5.0	0.03	0.20
	Oyst+Dist	5.6	0.02	0.32
	Oyst+DP+Dist+A	6.3	0.01	0.66
	DP+Year	6.4	0.01	0.29
	DP	7.3	0.01	0.12
	Null	7.7	0.01	0.00
	Regional pup count	10.3	0.00	0.02

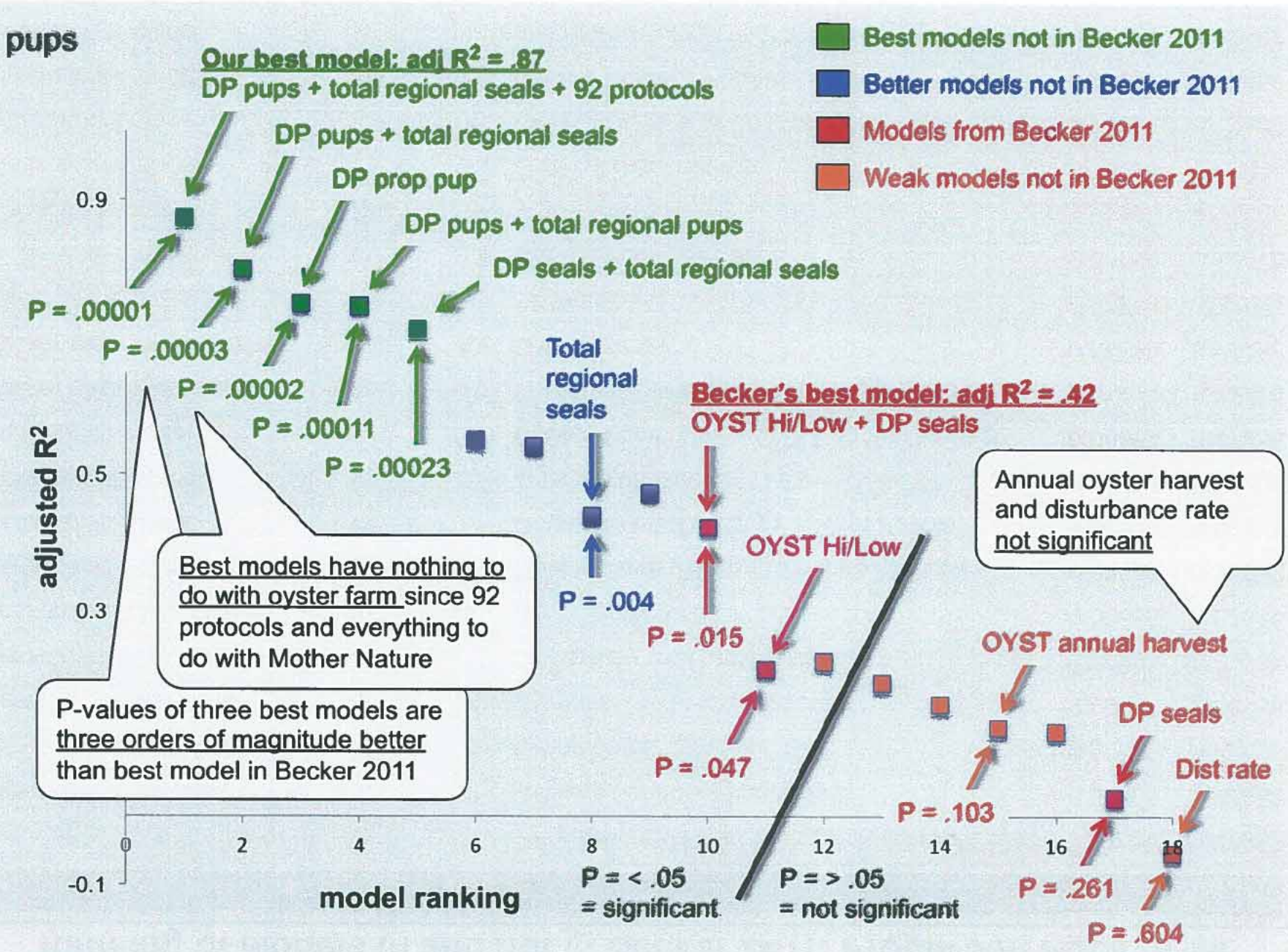
Why was OYST Hi/ Low in all of Becker's best models? If the rogue elephant seal in 2003 was so important, why didn't it come up in Becker's best models, or did it?

Ranking of Models in Becker 2011: Proportion Pups in Drakes Estero

Table 3. A priori models ranked by delta QAICc for the proportion of Point Reyes seal pups and total seals using Drakes Estero. Δi indicates QAICc distance from the best model and wi indicates model weight. Modeling oyster harvest as a continuous variable or low oyster during 1999–2004 gives similar results. Models ranking within the lowest 4 QAICc units (in bold) were used for multimodel inference in table 5. Oyst: low oyster harvest from 2000–2004; DP: Double Point Counts; A: proportion of Drakes Estero seals using subsite A; Dist: anthropogenic disturbance rate. Rankings are similar if using continuous oyster harvest rather than *categorical*

Dr. Becker provided the NPS data used in his study (see pages 5-8). Having explained why OYST Hi/Low is not a good model, we next examined other potential models. We found that the best models all included Double Point (DP), usually DP pups, and usually total regional seals. For Tables 3 & 4, Becker used the counts of total seals at DP. This is inconsistent with Becker's representation of Sandbar A as a proportion of DE seals. We examined DP seals, DP pups, proportion of pups at DP, and proportion of seals at DP. Measures of DP pups and total regional seals gave us the best models – models that were far superior to Becker's and with P-values three orders of magnitude better than Becker's best model. OYST Hi/Low is not a significant predictor after controlling for DP pups, total regional seals, + 92 protocols.


pups
Models from Becker 2011
0.9
0.7
0.5
0.3
0.1
-0.1
adjusted R2
better models have
higher R2 values
and lower P-values
Becker's best model: adj R2 = .42
OYST Hi/Low + DP seals
OYST Hi/Low
P = .015
P = .047
DP seals
P = .261
0
2
4
6
8
10
12
14
16
model ranking
P = < .05
= significant
P = > .05
= not significant


pups
Best models not in Becker 2011
Better models not in Becker 2011
Models from Becker 2011
Weak models not in Becker 2011
Our best model: adj R² = .87
DP pups + total regional seals + 92 protocols
DP pups + total regional seals
DP prop pup
DP pups + total regional pups
DP seals + total regional seals
P = .00001
P = .00003
P = .00002
P = .00011
P = .00023
Total regional seals
P = .004
Becker's best model: adj R² = .42
OYST Hi/Low + DP seals
OYST Hi/Low
P = .015
P = .047
Annual oyster harvest and disturbance rate not significant
OYST annual harvest
DP seals
Dist rate
P = .103
P = .261
P = .604
Best models have nothing to do with oyster farm since 92 protocols and everything to do with Mother Nature
P-values of three best models are three orders of magnitude better than best model in Becker 2011
adjusted R²
0.9
0.5
0.3
-0.1
0
2
4
6
8
10
12
14
16
18
model ranking
P = < .05
= significant
P = > .05
= not significant

Ranking of Models in and not in Becker 2011: Proportion Pups in DE

notes	In Becker?	rank	model	P-value	Adj R^2
Top multi-model	no	1	DP pups + total regional seals + 92 protocols	0.00001	0.87357
Top multi-model class	no	2	DP pups + total regional seals	0.00003	0.79850
Top single model	no	3	DP proportional pups	0.00002	0.74851
Best multi-model class	no	4	DP pups + total regional pups	0.00011	0.74453
Best multi-model class	no	5	DP seals + total regional seals	0.00023	0.71156
Best (not on slide #43)	no	(6*)	DP proportion seals	0.00033	0.61526
Better multi-model	no	6	Double Point (DP) pups + OYST Hi/Low	0.00330	0.54992
Better multi-model	no	7	Double Point (DP) pups + 92 protocols	0.00375	0.54016
Better single model	no	8	Total regional seals	0.00428	0.43832
Better multi-model	no	9	Double Point pups + OYST annual harvest	0.00854	0.47256
Becker best multi-model	yes	10	OYST Hi/Low + Double Point (DP) seals	0.01474	0.42230
Becker best single model	yes	11	OYST Hi/Low	0.04680	0.21456
Weak single model	no	12	92 protocols	0.04201	0.22589
Weak single model	no	13	Double Point (DP) pups	0.05640	0.19475
Weak single model	no	14	Total regional pups	0.07519	0.16369
Weak single model	no	15	OYST annual harvest	0.10279	0.12935
Weak single model	no	16	OYST Hi/Low w/2005 Low	0.10825	0.12362
Weak single model	yes	17	Double Point (DP) seals	0.26092	0.02653
Weak single model	no	18	disturbance rate	0.60439	-0.05406

Becker's best model -- OYST Hi/Low – has no impact on top five models

notes	rank	model	P-value	Adj R^2
Top multi-model	1	DP pups + total regional seals + 92 protocols	0.00001	0.87357
With OYST Hi/Low		DP pups + total regional seals + 92 protocols + OYST Hi/Low	0.00004	0.87163
		P-value for OYST Hi/Low = 0.3826 (not significant)		
Top multi-model class	2	DP pups + total regional seals	0.00003	0.79850
With OYST Hi/Low		DP pups + total regional seals + OYST Hi/Low	0.00016	0.78272
		P-value for OYST Hi/Low = 0.7266 (not significant)		
Top single model	3	DP proportional pups	0.00002	0.74851
With OYST Hi/Low		DP proportional pups + OYST Hi/Low	0.00010	0.74799
		P-value for OYST Hi/Low = 0.3434 (not significant)		
Best multi-model class	4	DP pups + total regional pups	0.00011	0.74453
With OYST Hi/Low		DP pups + total regional pups + OYST Hi/Low	0.00037	0.74518
		P-value for OYST Hi/Low = 0.3318 (not significant)		
Best multi-model class	5	DP seals + total regional seals	0.00023	0.71156
With OYST Hi/Low		DP seals + total regional seals + OYST Hi/Low	0.00106	0.69020

None of our top five models included OYST Hi/Low. When the five models were run using multi-variant regression analysis and an additional independent variable – OYST Hi/Low – was added, the P-value increased (i.e., significance decreased), the adjusted R^2 either decreased or did not significantly change, and the contribution of OYST Hi/Low was not significant. In contrast to the conclusion in Becker et al. 2011, OYST Hi/Low did not have a significant impact on the proportion of pups in Drakes Estero.

An important test of the models: how robust are the models without 2003 & 2004? (i.e., without the rogue elephant seal at DP in 2003)

Top model: DP pups + total regional seals + 92 protocols

P-value: 0.00001
Adjusted R^2: 0.87

highly significant

w/o '03 & '04 → with other 13 yrs

P-value: 0.005
Adjusted R^2: 0.65

highly significant

Becker's best model: OYST Hi/Low + DP seals

P-value: 0.015
Adjusted R^2: 0.42

significant

w/o '03 & '04 → with other 13 yrs

P-value: 0.874
Adjusted R^2: 0 (negative)

not significant

If the models represent a significant long-term pattern, then they should still be significant with only 13 of 15 years. Becker's best models fail that test. Becker's best models (with OYST Hi/Low) depend on '03 & '04 whereas the much better models (DP pups + total regional seals) do not.

More complete test of models: how robust are they without 2003 & 2004?

notes	rank	model	P-value	Adj R^2
Top multi-model	1	DP pups + total regional seals + 92 protocols	0.00001	0.87357
Without 2003 & 2004		DP pups + total regional seals + 92 protocols	0.00529	0.65423
Top single model	3	DP proportional pups	0.00002	0.74851
Without 2003 & 2004		DP proportional pups + OYST Hi/Low	0.00478	0.48734
Becker's best multi-model	10	OYST Hi/Low + DP seals	0.01474	0.42230
Without 2003 & 2004		OYST Hi/Low + DP seals	0.87444	- 0.16823
Becker's best single model	11	OYST Hi/Low	0.04680	0.21456
Without 2003 & 2004		OYST Hi/Low	0.60458	- 0.06344

The analysis of Becker 2011 presented earlier here showed that the statistical significance using OYST Hi/Low depended upon 2003 & 2004, the years heavily influenced by the rogue elephant seal at Double Point. As shown above, without 2003 & 2004, OYST Hi/Low, either as Becker's best single model or as Becker's top model with DP seals, was no longer significant. The remaining 13 of 15 years showed no statistical significance. In contrast, our top multi-model and top single model both retained their statistical significance without 2003 & 2004, suggesting that these models represent meaningful predictors that go beyond the rogue elephant seal in 2003 that drove the transient spatial displacement.

Becker 2011 Did Not Take the Advice of National Academy of Sciences

notes	rank	model	P-value	Adj R^2
Top multi-model	1	DP pups + total regional seals + 92 protocols	0.00001	0.87357
Top multi-model class	2	DP pups + total regional seals	0.00003	0.79850
Top single model	3	DP proportional pups	0.00002	0.74851
Best multi-model class	4	DP pups + total regional pups	0.00011	0.74453
Best multi-model class	5	DP seals + total regional seals	0.00023	0.71156

Four of the top five models include total regional seals or pups, and the 5th uses total regional pups to derive the proportion. This analysis was suggested by NAS panel member Dr. Francis O'Beirn (Trinity College Dublin and leader at the Marine Institute in Galway) at the September 4, 2008 meeting of the NAS panel. After Becker's presentation, Dr. O'Beirn noted that seals increased in 2002-2004 and then decreased in 2005 throughout the region, and was thus unlikely to be due to the oyster farm.

> Dr. Francis O'Beirn: *My point is that during the period that you're apportioning it to aquaculture, which is the latter years, 2005, 2006, and 07, a similar decrease has been observed* [at other regional sites]
>
> Dr. Ben Becker: *I did not mean to imply that there is any relationship to the total population size in the estero declining in relation to mariculture … The paper was talking about subsites in the upper estero related to mariculture.*

Dr. Becker agreed with Dr. O'Beirn. That was a key exchange. But Becker 2011 never examined the relationship of the proportion of pups in DE vs. total regional seals. That model alone is better than Becker's best model, and in combination with other variables, the top models are far superior (three orders of magnitude more significant).

Proportion and Effect Size of Pups and Seals in Drakes Estero

Table 4. Multimodel weighted coefficients of all models within 4 QAICc of the best model for pups and total seals in Drakes Estero (see Table 3). Models represent an Akaike weight (wi) of 0.87 for both pups and total seals. Number in parentheses after the 'low oyster' coefficients represent the bootstrapped standard error estimate of 2000 replicates. Proportional change represents change in use of Drakes Estero. Effect size is based on mean seal counts of all Point Reyes area colonies during the study period

Variable	Logit coefficients		Proportional change		Effect size	
	Pups	Total	Pups	Total	Pups	Total
Intercept	−0.26±0.19	−0.37±0.16				
Low oyster (low/high)	−0.27±0.08 (0.05)	−0.23±0.07 (0.03)	−0.07±0.02	−0.05±0.02	−65±18	−192±58
Double Point (per 100 seals)	−0.04±0.02	−0.04±0.02	−0.010±0.005	−0.010±0.005	−10±5	−36±18
Subsite A (low to high)	−0.43±0.22	−0.11±0.07	−0.09±0.05	−0.03±0.02	−91±51	−106±71
Oyster (per 100,000 lbs)*	−0.06±0.02	−0.08±0.03	−0.019±0.006	−0.020±0.007	−19±6	−71±25

*Not multimodel: from Oyster+Double Point count model.

Variable	Proportional change		Effect size	
	Pups	Total	Pups	Total
Intercept				
Low oyster (low/high)	−0.07±0.02	−0.05±0.02	−65±18	−192±58
Double Point (per 100 seals)	−0.010±0.005	−0.010±0.005	−10±5	−36±18
Subsite A (low to high)	−0.09±0.05	−0.03±0.02	−91±51	−106±71
Oyster (per 100,000 lbs)*	−0.019±0.006	−0.020±0.007	−19±6	−71±25

Effect size for OYST Hi/Low and Double Point seals is similar

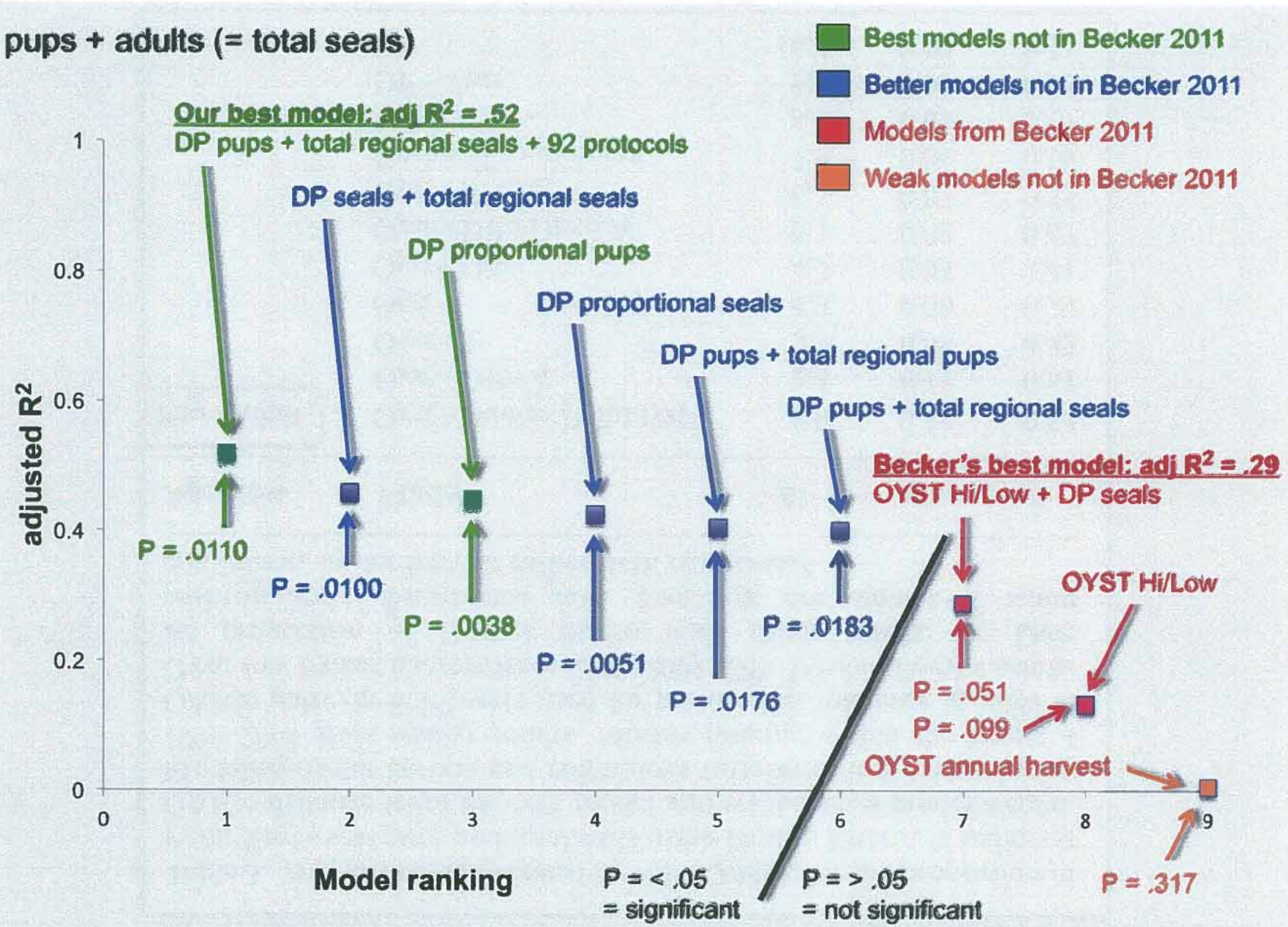
Proportion and Effect Size of Pups in Drakes Estero

model	variable	Prop. change pups	Pup effect size
DP pups + total reg seals + 92 protocols	**Double Point (DP) pups**	**- 10.2 +/- 1.5%**	**- 103 +/- 15**
BEST MODEL	**Total regional seals**	**+ 8.9 +/- 2.0%**	**+ 90 +/- 20**
	92 protocols	**+ 3.8 +/- 1.3%**	**+ 38 +/- 13**
	If add OYST Hi/Low, no significant improvement	Not significant	Not significant
DP pups + total regional seals	Double Point pups	- 9.9 +/- 2.1%	- 100 +/- 21
	Total regional seals	+ 11 +/- 1.7%	+ 111 +/- 17
DP proportional pups (to total reg. pups)	DP proportional pups	- 16.8 +/- 2.6%	- 170 +/- 26
OYST Hi/Low + DP seals (Becker's best)	DP seals	- 9 +/- 4%	- 91 +/- 40
	OYST Hi/Low	- 6.0 +/- 1.9%	- 61 +/- 19
OYST Hi/Low	OYST Hi/Low	- 4.7 +/- 2.1%	- 48 +/- 21
OYST annual harvest	OYST annual harvest	Not significant	Not significant

Ranking of Models in Becker 2011: Proportion Seals in Drakes Estero

Table 3. A priori models ranked by delta QAICc for the proportion of Point Reyes seal pups and total seals using Drakes Estero. Δi indicates QAICc distance from the best model and wi indicates model weight. Modeling oyster harvest as a continuous variable or low oyster during 1999–2004 gives similar results. Models ranking within the lowest 4 QAICc units (in bold) were used for multimodel inference in table 5. Oyst: low oyster harvest from 2000–2004; DP: Double Point Counts; A: proportion of Drakes Estero seals using subsite A; Dist: anthropogenic disturbance rate. Rankings are similar if using continuous oyster harvest rather than *categorical*

Age class	Model	Δi	wi	r^2
Pup+Adult	**Oyst+Double Point (DP)**	**0.0**	**0.55**	**0.54**
	Oyst+DP+A	**2.4**	**0.16**	**0.61**
	Oyst+A	**3.9**	**0.08**	**0.42**
	Oyst	4.3	0.06	0.29
	Oyst+Dist	4.5	0.05	0.41
	Oyst+DP+Dist+A	6.1	0.02	0.67
	Oyst+ENSO	6.3	0.02	0.35
	Regional total count	7.9	0.01	0.19
	Year	8.5	0.01	0.17
	DP+Year	9.6	0.00	0.25
	DP	10.4	0.00	0.11


pups + adults (= total seals)
Best models not in Becker 2011
Better models not in Becker 2011
Models from Becker 2011
Weak models not in Becker 2011
Our best model: adj R2 = .52
DP pups + total regional seals + 92 protocols
DP seals + total regional seals
DP proportional pups
DP proportional seals
DP pups + total regional pups
DP pups + total regional seals
Becker's best model: adj R2 = .29
OYST Hi/Low + DP seals
OYST Hi/Low
OYST annual harvest
P = .0110
P = .0100
P = .0038
P = .0051
P = .0176
P = .0183
P = .051
P = .099
P = .317
adjusted R2
Model ranking
P = < .05
= significant
P = > .05
= not significant

Ranking of Models in and not in Becker 2011: Proportion Seals in DE

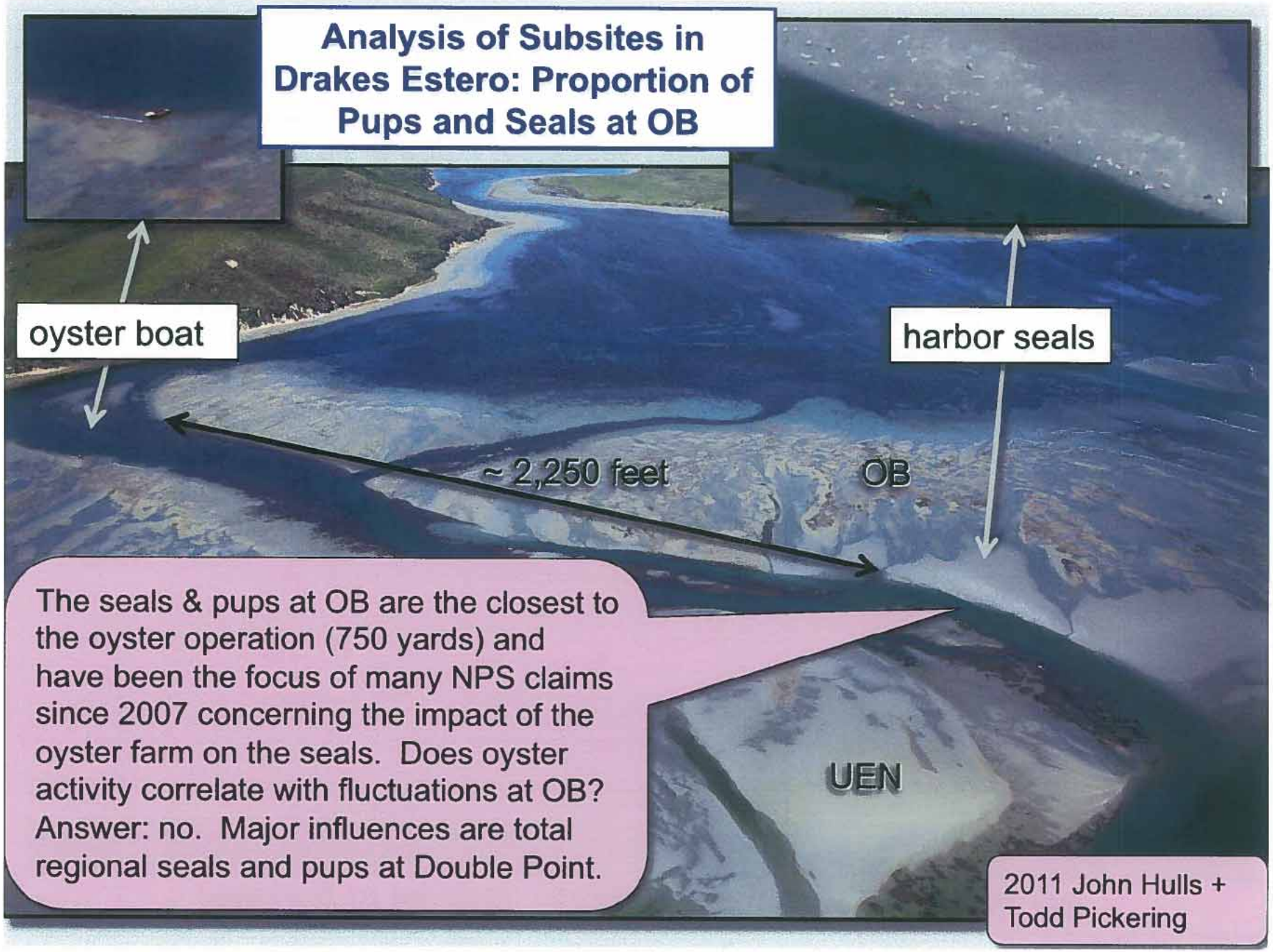
notes	In Becker?	rank	model	P-value	Adj R^2
Best multi-model	no	1	DP pups + total regional seals + 92 protocols	0.011	0.5192
Better multi-model	no	2	DP seals + total regional seals	0.010	0.4585
Best single model	no	3	DP proportional pups	0.004	0.4478
Better single model	no	4	DP proportional seals	0.005	0.4246
Better multi-model	no	5	DP pups + total regional pups	0.017	0.4047
Better multi-model	no	6	DP pups + total regional seals	0.018	0.4011
Becker best multi-model	yes	7	OYST Hi/Low + DP seals (OYST H/L P=.031)	0.051	0.2892
Becker best single model	yes	8	OYST Hi/Low	0.099	0.1331
Weak single model	no	9	OYST annual harvest	0.317	0.0058

The lessons from the analysis of total seals in Drakes Estero is similar to what was learned from the analysis of pups. The best models mostly include total regional seals and some measure of pups or seals at Double Point. As shown in next slide, OYST Hi/Low has no impact on best models. Finally, OYST Hi/Low is driven by 2003 and 2004, whereas best models are robust without those years.

Becker's best model -- OYST Hi/Low – has no impact on top models

notes	rank	model	P-value	Adj R^2
Top multi-model	1	DP pups + total regional seals + 92 protocols	.0110	0.5192
With OYST Hi/Low		DP pups + total regional seals + 92 protocols + OYST Hi/Low	.0267	0.4904
		P-value for OYST Hi/Low = 0.551 (not significant)		
Top single model	3	DP proportional pups	.0038	0.4478
With OYST Hi/Low		DP pups + total regional seals + 92 protocols + OYST Hi/Low	.0146	0.4233
		P-value for OYST Hi/Low = 0.669 (not significant)		

None of our top six models included OYST Hi/Low. When the top multi-model and top single model were run using multi-variant regression analysis and an additional independent variable – OYST Hi/Low – was added, the P-value increased (i.e., significance decreased), the adjusted R^2 either decreased, and the contribution of OYST Hi/Low was not significant. In contrast to the conclusion in Becker et al. 2011, OYST Hi/Low does not have a significant impact on the proportion of seals in Drakes Estero.


Analysis of Subsites in Drakes Estero: Proportion of Pups and Seals at OB
oyster boat
harbor seals
~ 2,250 feet
OB
UEN
The seals & pups at OB are the closest to the oyster operation (750 yards) and have been the focus of many NPS claims since 2007 concerning the impact of the oyster farm on the seals. Does oyster activity correlate with fluctuations at OB? Answer: no. Major influences are total regional seals and pups at Double Point.
2011 John Hulls + Todd Pickering

Ranking of Models: Proportion Pups and Seals at OB

notes	Dependent variable	Independent variables	P-value	Adj R^2
Top model	**OB pups**	**prop.pups.DP + total regional seals**	**0.002**	**0.645**
+ OYST = NS	OB pups	add OYST Hi/Low (P = 0.282, not significant)	0.005	0.655
	OB pups	prop.pups.DP	0.071	0.200
	OB pups	OYST Hi/Low	0.088	0.172
	OB pups	Total regional seals	0.136	0.116
	OB pups	Disturbance rate	0.941	-0.090
Top model	**prop.pups.OB**	**Total regional seals**	**0.001**	**0.583**
	prop.pups.OB	prop.pups.DP	0.087	0.173
	prop.pups.OB	OYST Hi/Low	0.187	0.075
	prop.pups.OB	Disturbance rate	0.754	-0.081

Conclusions concerning pups and seals at OB:

(1) Just as with seals and pups of Drakes Estero, so too the seals and pups at subsite OB, the haul-out site closest to the oyster boats, do not correlate with OYST Hi/Low and do not correlate with the disturbance rate.

(2) Rather the seals and pups at OB do correlate with Mother Nature –total regional seals and in some instances Double Point pups outside Drakes Estero along the PRNS coast.

(3) As mentioned earlier, this relationship to total regional seals was first suggested on Sept 4, 2009 by NAS panel member Dr. Francis O'Beirn.

Ranking of Models: Proportion Pups in Upper Estero (UEN, OB, UEF) (15 year analysis compared to pups in Drakes Estero and pups in region)

notes	model	P-value	Adj R^2
prop.pup.upper estero/ total Drakes Estero pups	Double Point (DP) proportional pups (as a proportion over total regional pups)	0.00862	0.37900
	Total regional seals	0.01052	0.36117
	Disturbance rate	0.58195	- 0.05115
	OYST Hi/Low	0.70276	- 0.06446
	OYST annual harvest	0.94747	- 0.07655
Prop.pup.upper estero/ total regional pups	DP proportional pups (over total regional pups)	0.00032	0.61564
	Total regional seals	0.00121	0.53286
	OYST Hi/Low	0.28304	0.01783
	Disturbance rate	0.63760	- 0.05799
	OYST annual harvest	0.59336	- 0.05266

Conclusions concerning pups at the upper estero sites (UEN, OB, & UEF):

(1) Just as with seals and pups of Drakes Estero, and seals and pups of OB, so too the pups at the upper estero sites (UEN, OB, & UEF) do not correlate with OYST Hi/Low and do not correlate with the disturbance rate.

(2) Rather the pups at the upper estero sites do correlate with Mother Nature – total regional seals and Double Point pups outside Drakes Estero along coast.

Analysis of Becker et al. 2011: conclusions part 1

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

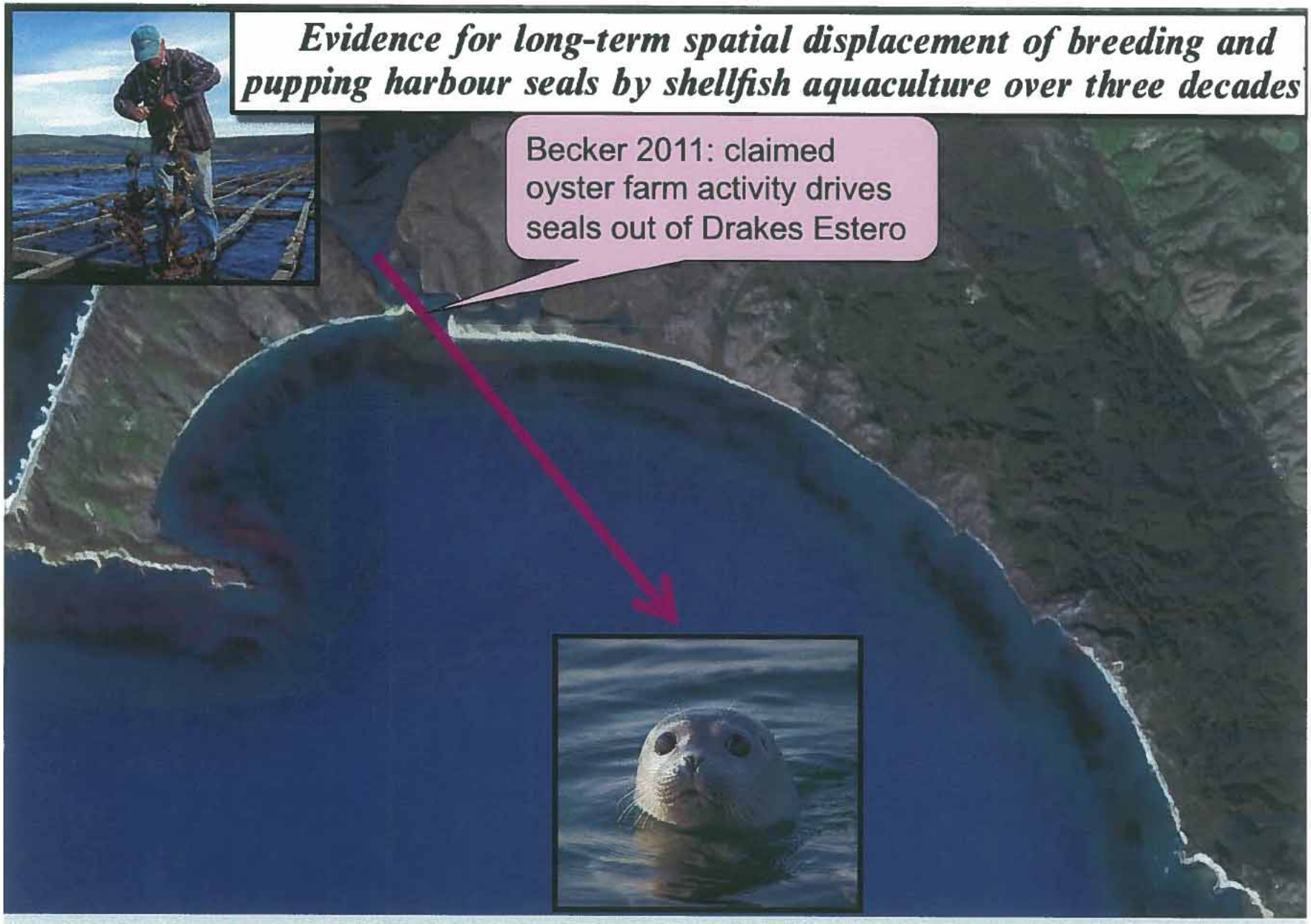
1. Analysis reveals no "*evidence for long-term spatial displacement*"

2. No "*evidence*" that oyster farm displaced seals out of Estero

3. Mother Nature leads to movements of seals into & out of Estero
Major factors: seals at Double Point (DP) & total regional seals

4. Rogue elephant seal at DP in 2003 displaced seals into Estero
Becker 2011 best models are driven by transient spike in 2003 & 2004

5. Top models using NPS data are far superior to Becker's best model
Best P-values are 1000 times more significant than in Becker 2011


Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades
Becker 2011: claimed oyster farm activity drives seals out of Drakes Estero

analysis of NPS data:
shows natural forces drive
seals into Drakes Estero

increased total
regional seals

rogue elephant
seal at DP in 2003

Analysis of Becker et al. 2011: concluding comments

1. Title says "*long-term spatial displacement*" but analysis shows transient; authors failed to note their statistics driven by 2003 & 2004

2. Title says "*evidence*" oyster farm displaced seals but models fail; authors' data generates models 1000 times better than oyster activity

3. Title says "*three decades*" of data but 14 year gap; authors cherry picked 1982 & 1983 data – NPS previously denied these data existed

4. Analysis shows regional harbor seal population, events at Double Point, and elephant seals drive movements of harbor seals into Estero

5. Authors used incorrect seal haul-out maps, incorrect oyster bag maps, and misinterpreted aerial photos; never asked for Lunny data

6. Authors missed opportunity to determine if adaptive management succeeded with 92 (oyster boats) & 96 (kayak) management changes

7. Authors missed opportunity to use data to study biology of harbor seals and population dynamics; authors too focused on oyster farm

NPS Science & Implications for the Oyster Farm EIS

by Dr. Corey Goodman

October 16, 2011

Dance Palace, Point Reyes Station, CA

Sponsored by:

Tomales Bay Association (TBA) and

Alliance for Local Sustainable Agriculture (ALSA)

National Park Service
U.S. Department of the Interior

Point Reyes National Seashore
California

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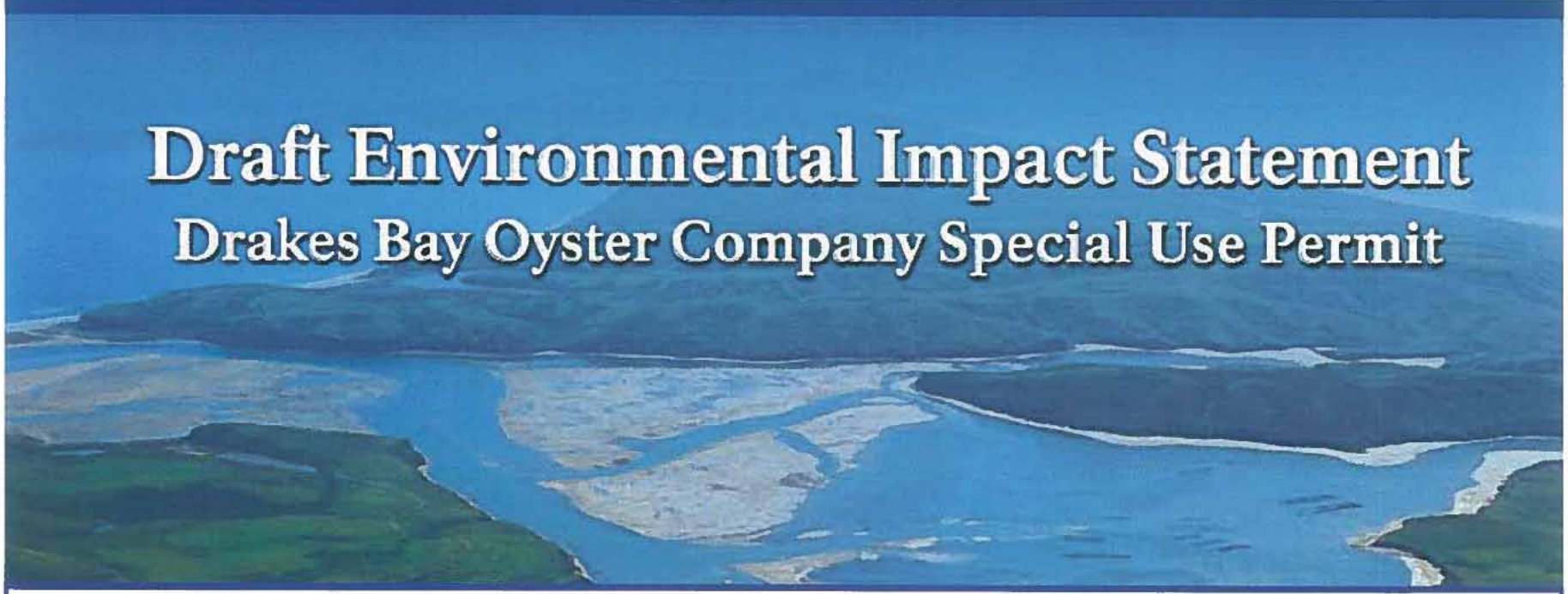


The NPS draft Environmental Impact Statement:

- **What is the scientific evidence for environmental impacts?**
- **What role does the Becker, Press, & Allen 2011 paper play?**

Why did I get involved? Supervisor Kinsey asked me

April 5, 2007: NPS Superintendent Don Neubacher met with Marin County Supervisor Steve Kinsey. Kinsey reported that Neubacher made ***"strong environmental accusations"*** against DBOC including overwhelming data of harm to harbor seals; claimed DBOC ***"committed environmental felonies."***

Apr 28 2007: based on my scientific credentials and involvement in science-based public policy issues (e.g., Chair of National Academy of Sciences' Board on Life Sciences), Marin County **Supervisor Steve Kinsey contacted me** on April 28 2007, asked me to examine NPS science & testify at May 8 '07 hearing

May 8 2007: **did not know Kevin Lunny** when testified at Marin County hearing; involved as **public service for scientific integrity** – good science driving public policy

Why did Supervisor Steve Kinsey ask me to get involved?

1) **Biology professor for 25 years** at UC Berkeley & Stanford
2) **Current faculty** at U.C. San Francisco
3) **Published over 200 peer-reviewed papers**
4) **Elected member of National Academy of Sciences**, Amer. Philosophical Soc., & Amer. Academy of Arts & Sciences
5) **Winner of numerous scientific awards** including Alan T. Waterman Award, Canada Gairdner International Award, March-of-Dimes Prize, & Dawson Prize in Genetics (2011)
6) **Chair of National Academy of Sciences' Board on Life Sciences** for 6 years; committee oversees environmental & biological studies for federal government
7) **Member of California Council on Science & Technology**; oversees science & technology studies for state government
8) **Involvement in science-based public policy** – good science driving policy rather than policy driving bad science

My testimony at the May 8 2007 Marin County hearing at the request of Supervisor Steve Kinsey

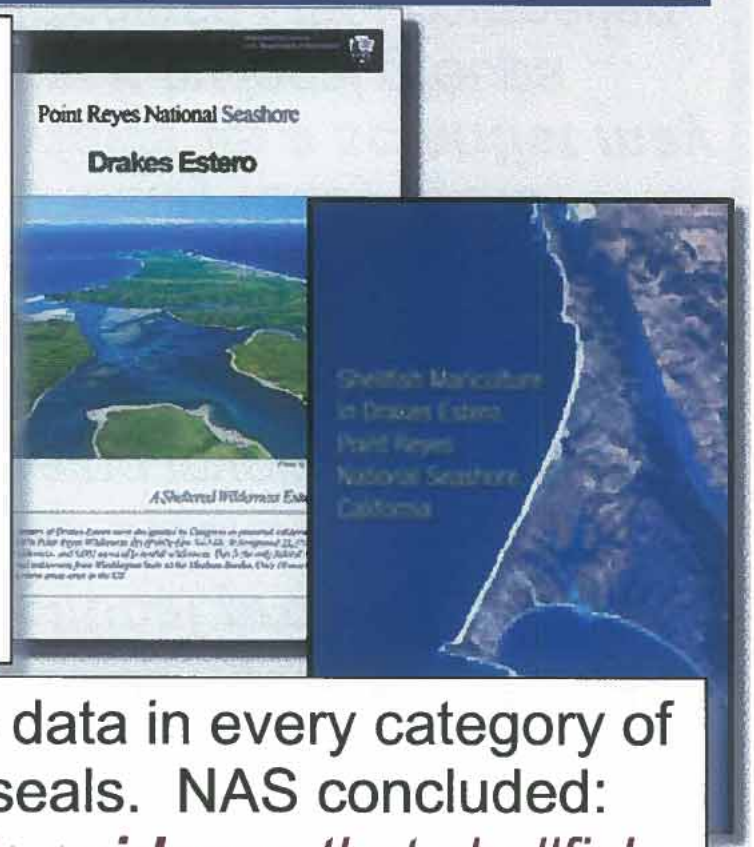
"… public policy decisions can and should be informed by quality science. But this must be science conducted rigorously, without agendas or conflicts-of-interest. ***The political process can be dangerously misled by bad or misused science.*** *One of my greatest concerns when I see science being invoked in public policy debates is to make sure that it is good science and not pseudo-science or -- even worse -- a blatant misuse of science."*

"My only hesitation in coming forward to testify today is the realization that openly ***expressing my views as a scientist may cause me to come under personal attack*** *by local groups … determined to remove [DBOC] ... Nevertheless I feel compelled to speak out for good science instructing public policy."*

Public testimony from Dr. Corey Goodman on May 8, 2007 to Marin County Supervisors at request of Marin County Supervisor Steve Kinsey on April 28, 2007

- **July 21 2007: Senator Feinstein asked that the NAS review NPS science: the NPS Drakes Estero report**
- **May 5 2009: National Academy of Sciences (NAS) panel released report: "*Shellfish Mariculture in Drakes Estero*"**

"The National Park Service report "Drakes Estero: A Sheltered Wilderness Estuary" in some instances ***selectively presented, overinterpreted, or misrepresented*** *the available scientific information on DBOC operations by exaggerating the negative and overlooking potentially beneficial effects."*



NAS found NPS misrepresented NPS data in every category of environmental harm including harbor seals. NAS concluded: *"… there is a* ***lack of strong scientific evidence*** *that shellfish farming has major adverse ecological effects on Drakes Estero"*

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Senator Feinstein legislatively asked that draft EIS follow conclusions of the National Academy of Sciences report

The May 5, 2009 NAS report concluded: *"… **there is a lack of strong scientific evidence that shellfish farming has major adverse ecological effects on Drakes Estero** …"*

But the dEIS dismissed the NAS conclusion: ***"The 2009 NAS report does not provide a definition or detection threshold for what a "major" adverse ecological effect would be** in this context, nor does it indicate that the NAS use of an impact qualifier (e.g., "major") is consistent with NEPA standards."*

dEIS dismissed NAS conclusion **because NAS did not define "*major*" – NPS says NAS report inconsistent with NEPA**

Draft Environmental Impact Statement
Drakes Bay Oyster Company Special Use Permit

Absence of "*data*" and "*evidence*" from draft Environmental Impact Statement (DEIS)

Environmental impact	"*data*" and "*evidence*" showing impact	Hypothetical "*potential*" for impact
overall	7*	514
seals	1	74
eelgrass	0	43
red-legged frog	0	10

* 7 = 1 for seals (Becker 2011) and 6 for noise measurements of oyster boats and onshore oyster operation

NPS **dEIS based upon hypothetical "*potential*" impacts** and not actual "*data*" or "*evidence*" showing impacts

Draft Environmental Impact Statement
Drakes Bay Oyster Company Special Use Permit

Absence of "*data*" and "*evidence*" from draft Environmental Impact Statement (DEIS)

Environmental impact	"*data*" and "*evidence*" showing impact	Hypothetical "*potential*" for impact
overall	7*	514
seals	1	74
eelgrass	0	
red-legged frog	0	

The one citation of "*data*" in the dEIS is from Becker 2011 which is why that paper is so key

Oyster farm has existed for nearly 80 years, and yet NPS has no data of impacts but only "*potential*" impacts; After millions of $$ on studies, shouldn't NPS have data?

Draft Environmental Impact Statement
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The dEIS raises the specter that DBOC is a threat to seven different "*special-status*" endangered species

Environmental impact	"*data*" and "*evidence*" showing impact	Hypothetical "*potential*" for impact
overall	7*	514
seals	1	74
eelgrass	0	43
red-legged frog	0	10

dEIS presented "*potential*" impact with no data for seven endangered species including e.g. red-legged frog, Myrtle's silverspot butterfly, Western snowy plover, and CA least tern

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The dEIS raises the specter that DBOC is a threat to the "*special-status*" species: the red-legged frog

- Red-legged frogs cannot live in salt water (i.e., Drakes Estero)
- Red-legged frogs live in 50+ fresh-water ponds in seashore

In 1998, NPS produced Environmental Assessment (EA) for oyster farm. With US Fish & Wildlife Service, they wrote:

"… NPS has concluded that the proposed action would not adversely affect any federally listed species or critical habitat."

"… no federally protected species … have been detected …"

"… no effect on threatened or endangered species."

In 2011 NPS dEIS, NPS reversed its 1998 NPS EA, stating DBOC has potential for adverse impacts on red-legged frogs because of ***"… increased risk for vehicle strikes."***

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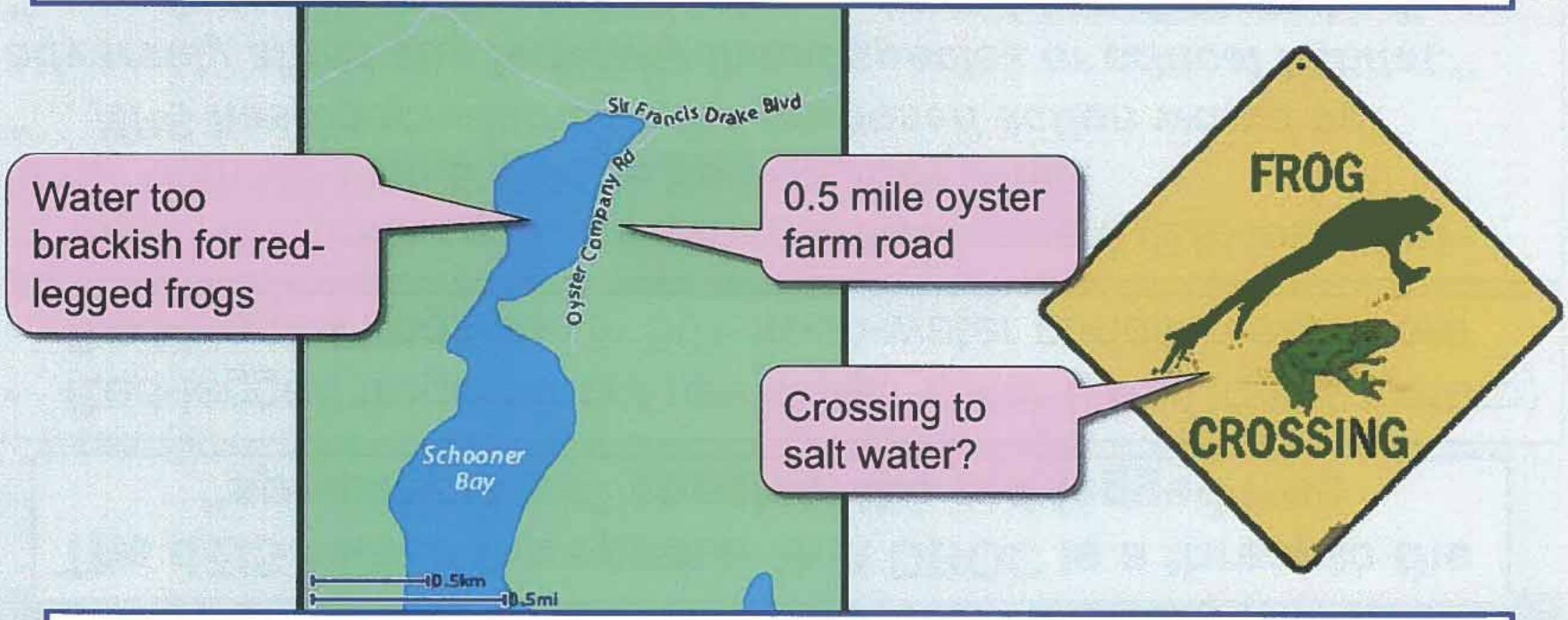
The dEIS raises the potential that DBOC might threaten red-legged frogs due to "*vehicle strikes*"



PRNS has 2.6 million visitors each year driving on 50 miles of roads, but dEIS suggests **danger to red-legged frogs from "*vehicle strikes*"** on 0.5 mile road to oyster farm (1%)

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The dEIS claims that DBOC might account for 1% (7 acres) of lost eelgrass due to shading by oyster racks …

Environmental impact	"*data*" and "*evidence*" showing impact	Hypothetical "*potential*" for impact
overall	7*	514
seals	1	74
eelgrass	0	43
red-legged frog	0	10

… but the dEIS neglects to mention that eelgrass never existed at most racks, and from 1991 to 2007, eelgrass expanded 100% (368 acres), from 368 to 736 acres

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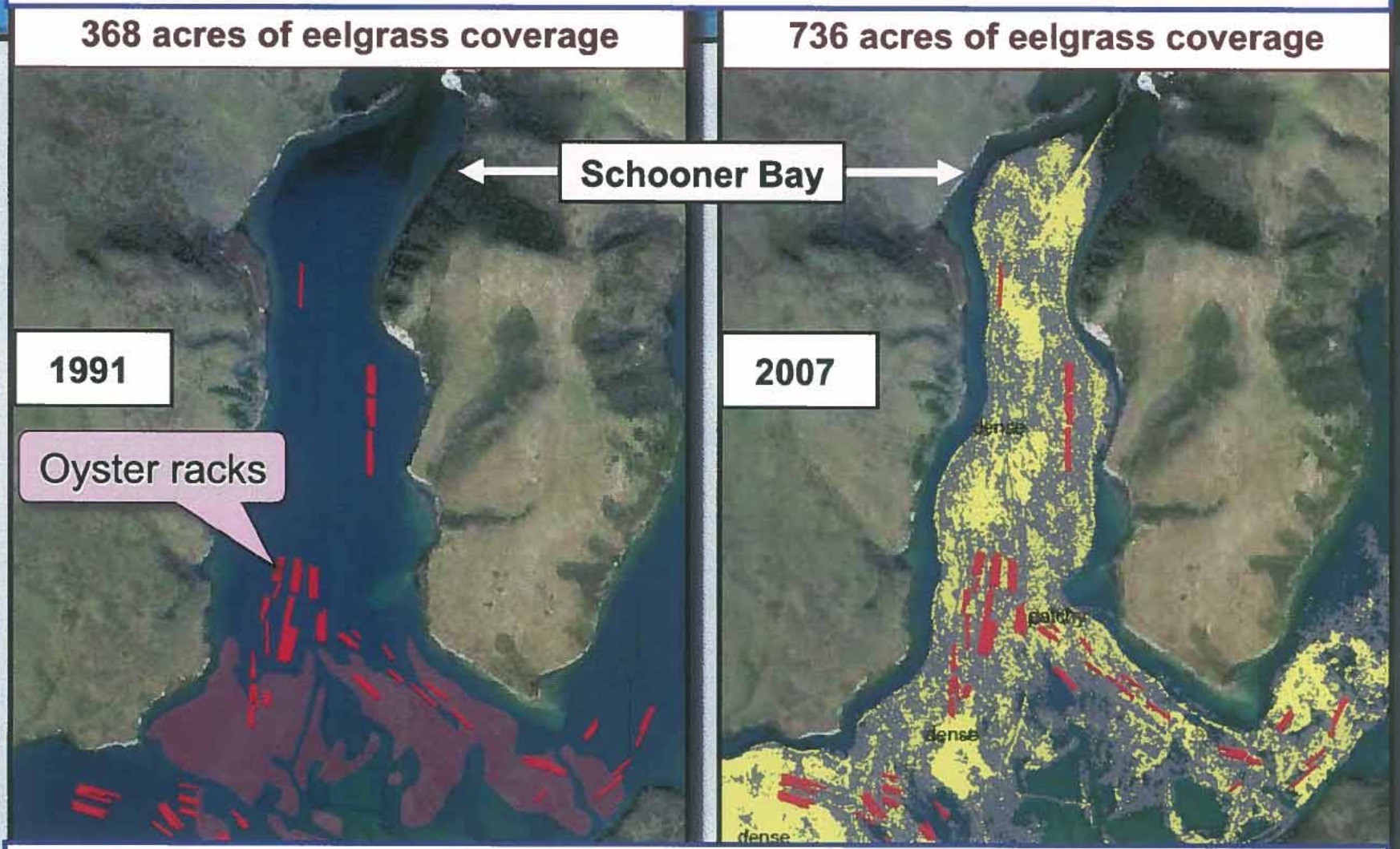
NPS-CDFG Aerial Mapping of Eelgrass Coverage in Drakes Estero



Eelgrass is thriving partly due to oysters improving water clarity

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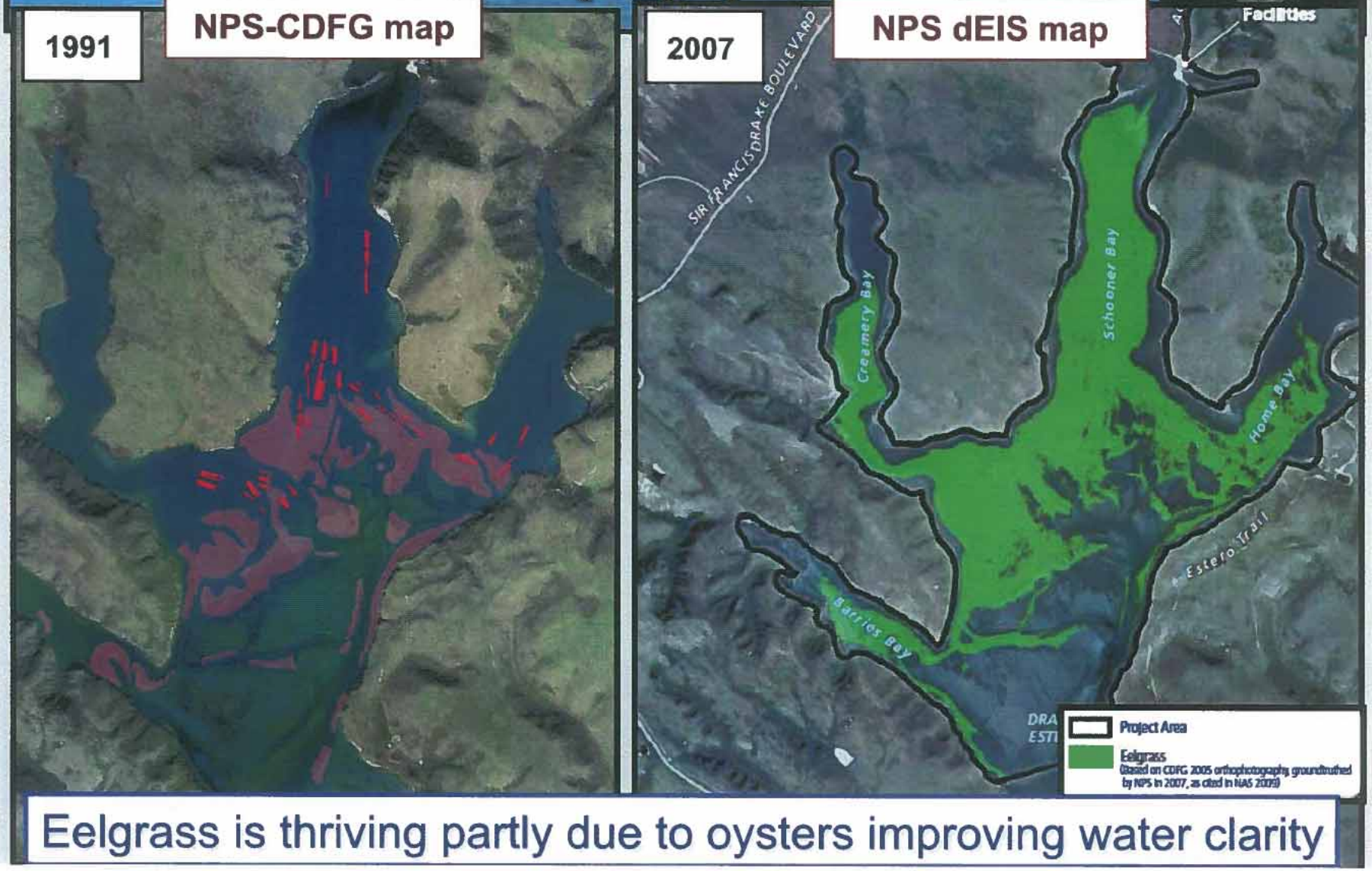

Eelgrass is thriving partly due to oysters improving water clarity

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Senator Feinstein legislatively required the draft EIS follow conclusions of the National Academy of Sciences

The 2009 NAS report concluded: *"**Eelgrass has approximately doubled** in areal cover in Drakes Estero from 1991 to 2007, implying little systemic threat from the existing intensity of oyster culturing activities. **Oysters have the potential to benefit eelgrass** because their filtering activity improves local water clarity (and hence light penetration) and because they release biodeposits … (plant nutrients)."*

But the dEIS came to the opposite conclusion: *"Although there are some highly localized beneficial impacts on eelgrass associated with commercial shellfish operations, **the overall impact … on eelgrass would be moderate and adverse**."*

Eelgrass is thriving partly due to oysters improving water clarity

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The only reference to "data" for an environmental impact is this one harbor seal reference to Becker 2011

Environmental impact	"*data*" and "*evidence*" showing impact	Hypothetical "*potential*" for impact
overall	7*	514
seals	1	74

Concerning harbor seals, the dEIS states:
"In a recent review of the longterm data at Drakes Estero, Becker, Press, and Allen (2011) used a model-based approach to show that ***harbor seals preferentially use haul-out sites less when located near active oyster mariculture sites during years of high vs. low oyster harvest****."*

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Since 2007, our community has heard four generations of NPS claims of data showing the oyster farm is harming the harbor seals, but the first three are absent from dEIS

- 2007: **1st** NPS claim to **SUPES** that DBOC caused an **80% decline** in harbor seals at one subsite: **NOT IN dEIS**
- 2007: **2nd** NPS claim to **CCC** that **DBOC disturbed harbor seals** based on **April 26 Trip Report**: **NOT IN dEIS**
- 2008-'09: **3rd** NPS claim to **NAS** that **DBOC disturbances** led to decrease in seals (**Becker 2009 paper**): **NOT IN dEIS**
- 2010-'11: **4th** NPS claim to **MMC** that **DBOC activity** led to spatial displacement of seals (**Becker 2011 paper**): **IN dEIS**

dEIS only includes the 4th generation of NPS claims of harm by DBOC to harbor seals: other claims absent

May 5 2009: National Academy of Sciences report

The NAS reported that resolving the controversy over the potential harbor seal disturbances *"... **would require a data collection system that could be independently verified, such as time and date stamped photographs.** This verification is especially important in circumstances where there is an indication of a source of disturbance that could lead to a regulatory action, as was the case with disturbances attributed to DBOC."*

"time and date stamped photographs"

Unknown to NAS, for two years since May 5 2007, NPS had cameras taking pictures every minute of every day, and had the detailed 2008 logs showing no DBOC disturbances.

NPS had two cameras for 3 ½ years taking 281,000 photos

Why didn't NPS disclose the cameras to the NAS?

2008 NPS log: detailed analysis of DBOC boats & workers

2008-5-8	8:53	Boat enters OB channel

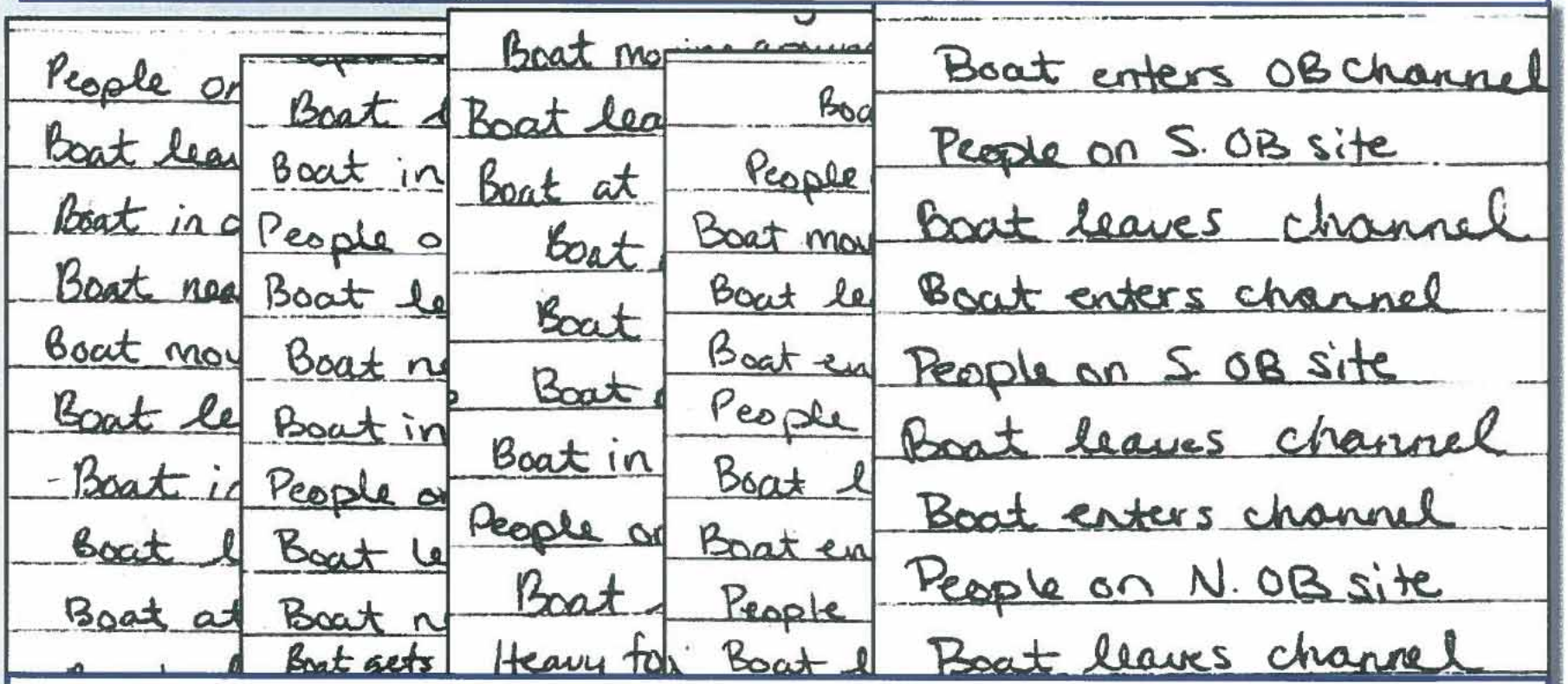
Q. Why didn't NPS disclose the cameras to NAS?

2008-5-8	11:13	Boat leaves channel
2008-5-8	3:11	Boat enters channel
2008-5-8	3:15-3:44	People on S. OB site
2008-5-8	3:45	Boat leaves channel
2008-5-10	8:25	Boat enters channel
2008-5-10	8:29-8:57	People on N. OB site
2008-5-10	8:58	Boat leaves channel

A. Because the NPS logs of 3 ½ years of minute-by-minute, day-to-day photos showed not a single disturbance of the harbor seals caused by DBOC.

2008-5-13	10:38	Boat leaves channel

2008 NPS log: no disturbances of harbor seals by DBOC



- **NPS said photos had not been analyzed, but NPS logs showed the photos had been analyzed in detail**
- **NPS said cameras were for studying wildlife, but NPS logs showed focus was on oyster boats & workers not wildlife**
- **NPS said DBOC caused seal disturbances, but NPS logs showed no DBOC disturbances to seals in 3 ½ years**

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The dEIS dismisses the NPS photos and detailed logs because of the lack of a NPS protocol for their analysis

The dEIS states:

"Because the collection of these photos was not based on documented protocols and procedures, the body of photographs does not meet the Department's standards for a scientific product. As a result, the photographs have not been relied upon in this EIS."

But dEIS includes other "*data*" without documented protocols, such as aerial photos, maps, and other data (e.g., 1982 & 1983 data from Allen's pre-NPS notebooks) from Becker 2011

dEIS dismisses 281,000 photos and NPS logs that showed no DBOC disturbances of harbor seals over several years

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

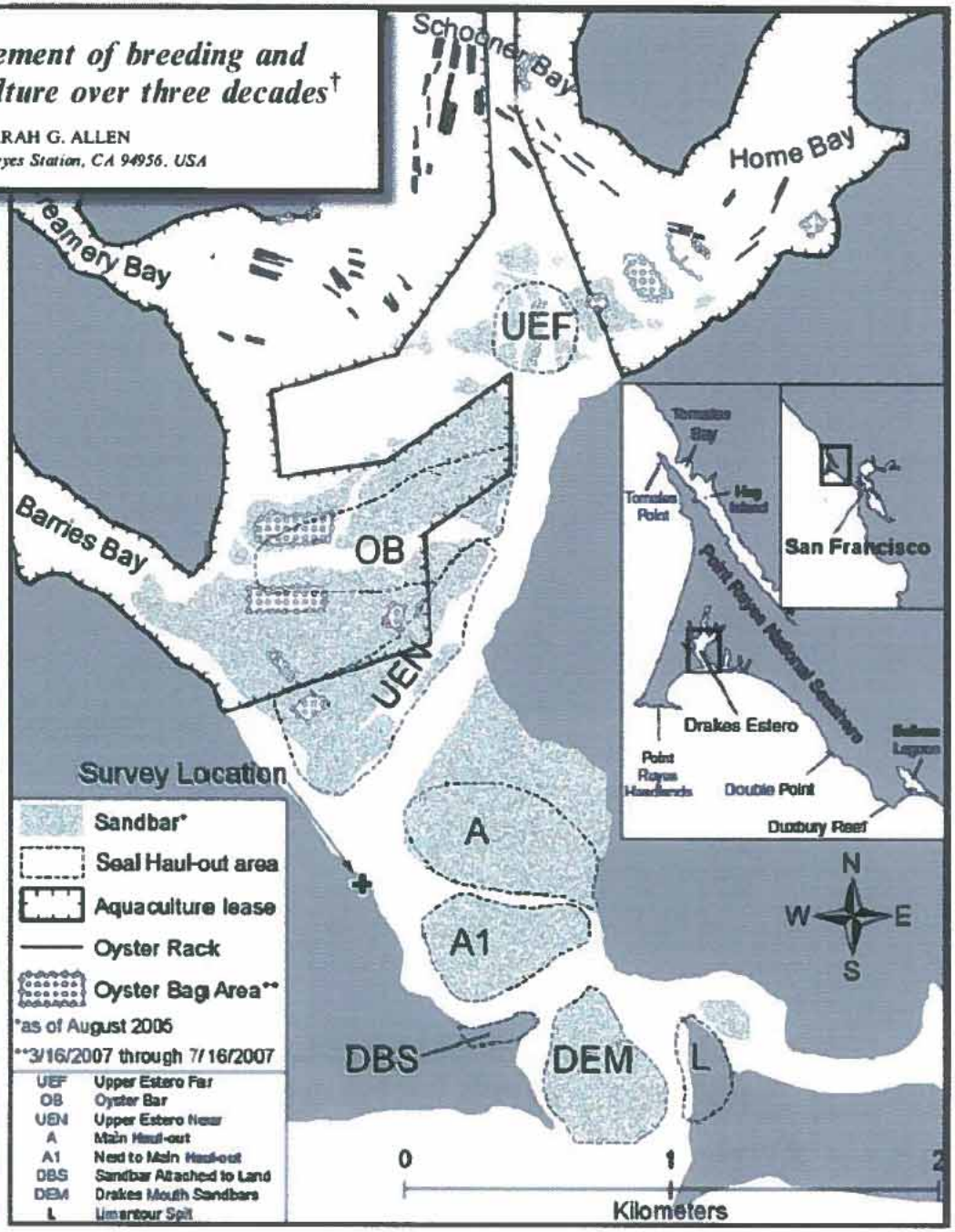
BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

Figure 1: NPS map from Becker 2009 & Becker 2011

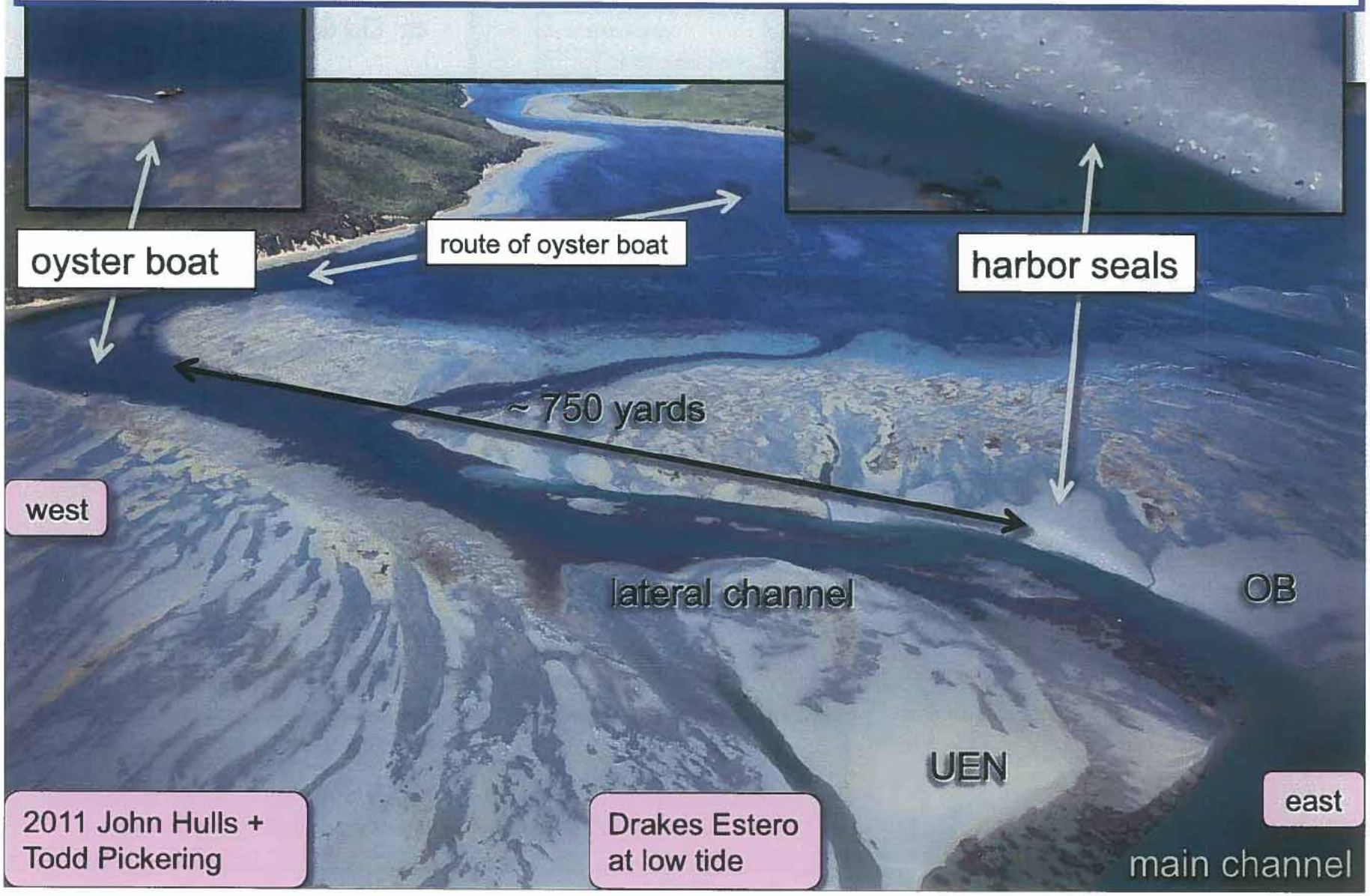
Upper Estero = UEF, OB, UEN

Middle Estero = A, A1

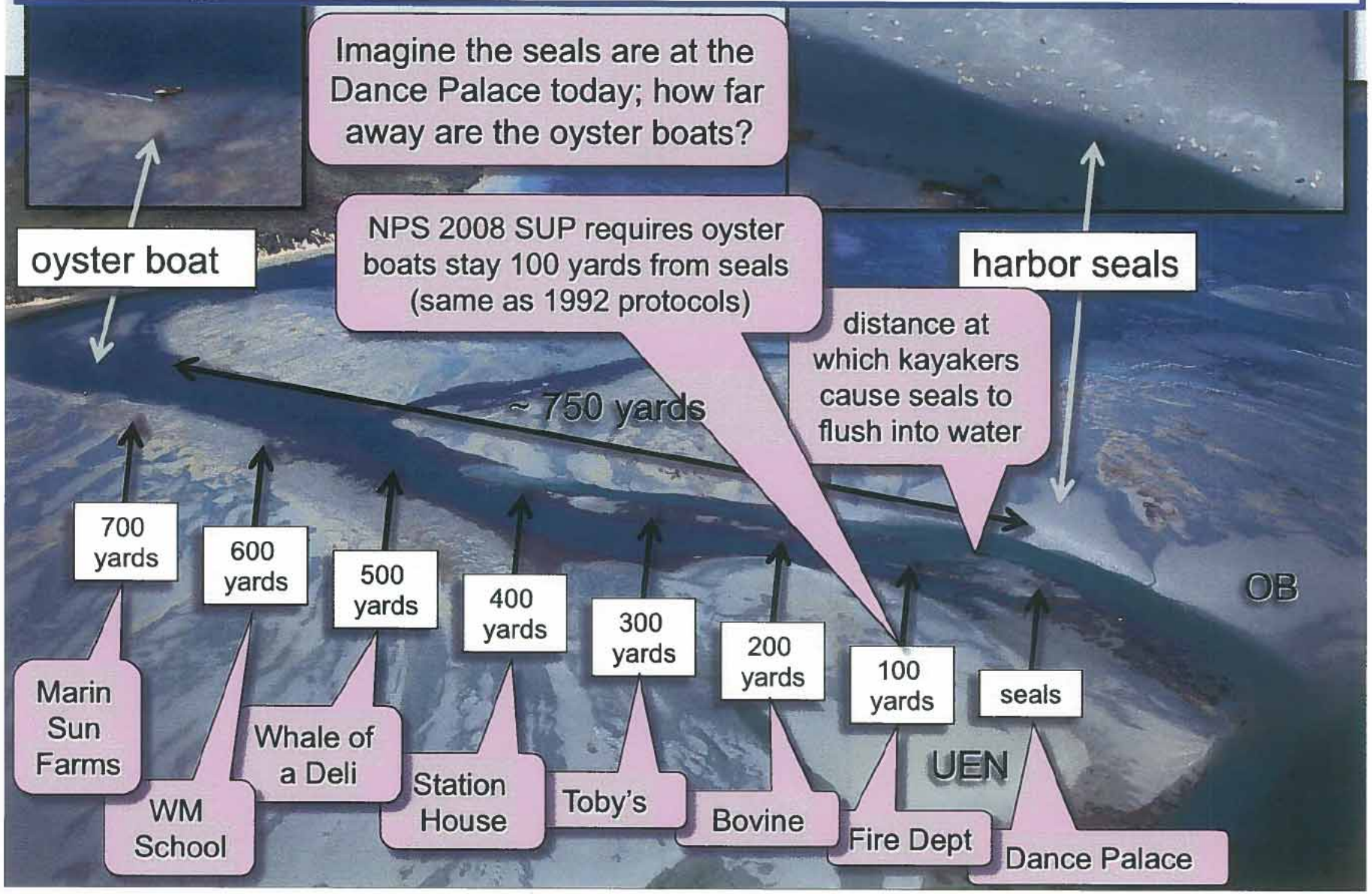
Lower Estero = DBS, DEM, L

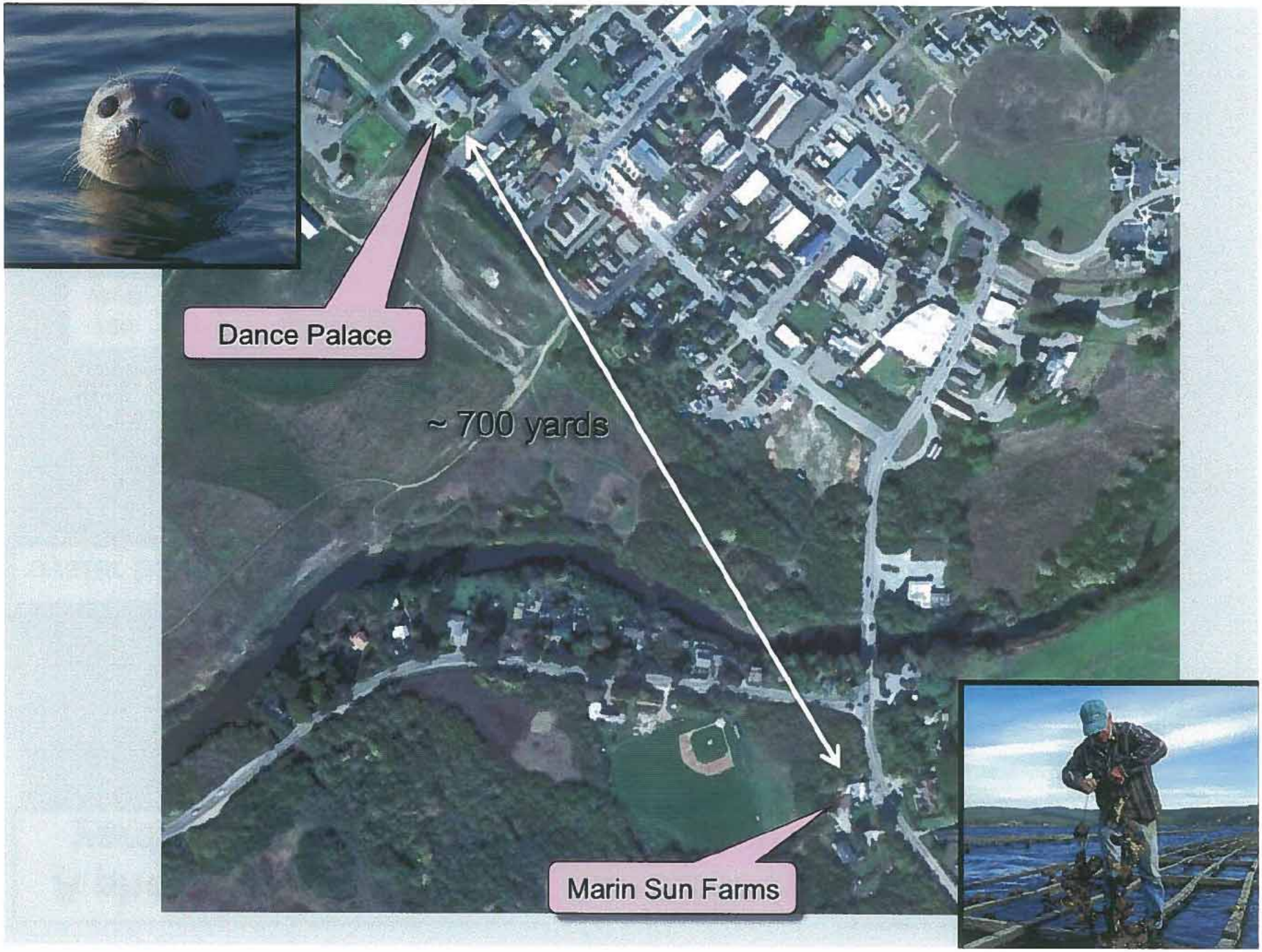


A photo you won't find in the dEIS: oyster boats stay >700 yards away from the harbor seals and don't disturb them

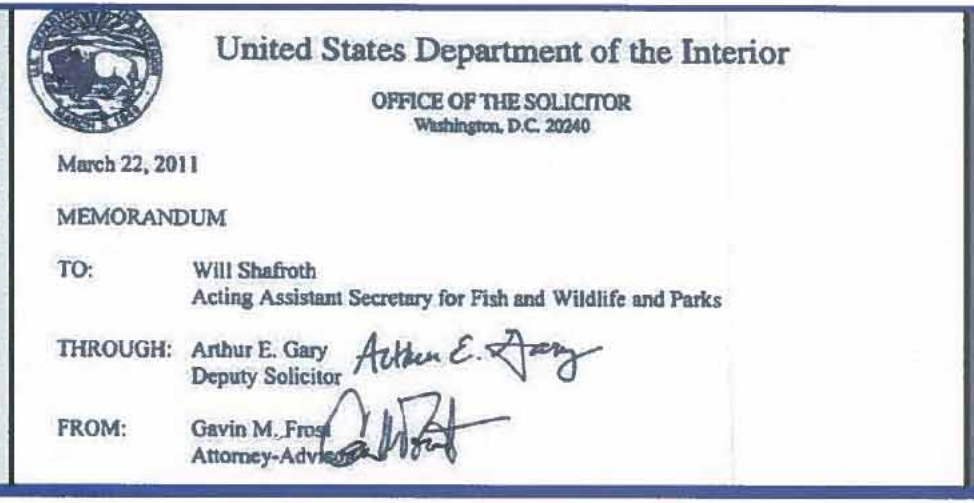


A photo you won't find in the dEIS: oyster boats stay >700 yards away from the harbor seals and don't disturb them




Dance Palace
~ 700 yards
Marin Sun Farms

On March 22, 2011, Dept. of the Interior released the public version of the Frost Report by Field Solicitor Gavin Frost



United States Department of the Interior

OFFICE OF THE SOLICITOR
Washington, D.C. 20240

March 22, 2011

MEMORANDUM

TO: Will Shafroth
Acting Assistant Secretary for Fish and Wildlife and Parks

THROUGH: Arthur E. Gary
Deputy Solicitor

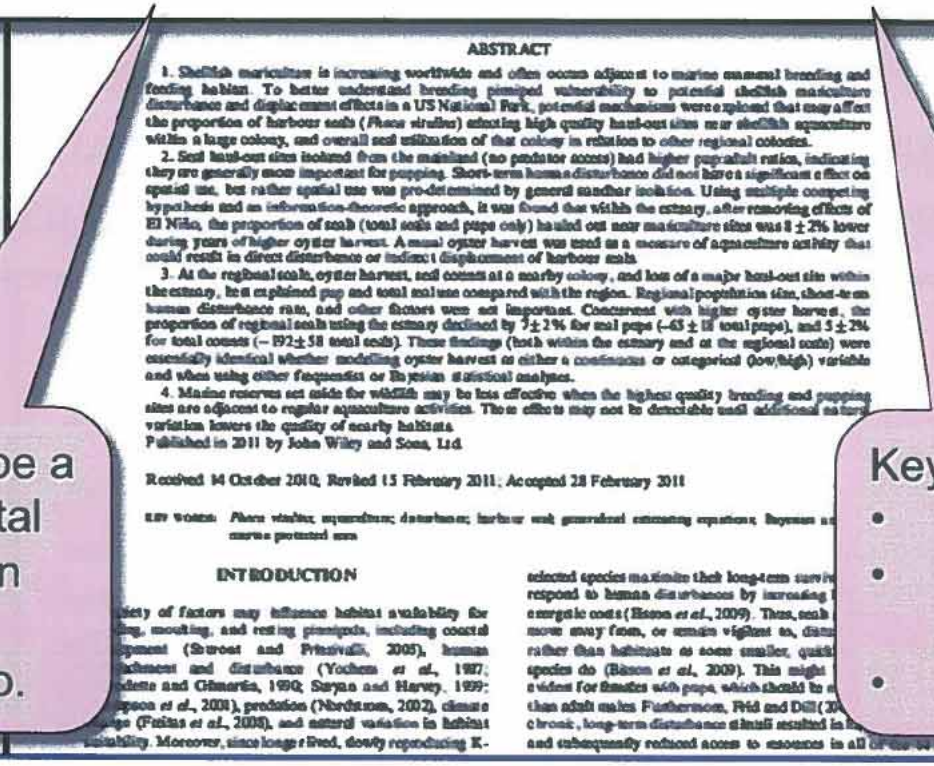
FROM: Gavin M. Frost
Attorney-Adviser

Two weeks before NPS scientists published Becker 2011 paper, Field Solicitor Gavin Frost found that their "*mistakes stem from the refusal … to modify their intuitive, but* ***statistically and scientifically unproven, belief*** *that DBOC mariculture activities …*" disturb harbor seals in Drakes Estero. Frost concluded NPS scientists showed "***bias***," "***advocacy***," "***troubling mind-set***," "**mishandled" data**, and "*willingness to allow* ***subjective beliefs*** *… to guide scientific conclusions*." Frost found the NPS scientists had **violated the NPS Code of Scientific & Scholarly Conduct**.

NPS Becker et al. paper published April 2011: is it correct?

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA



ABSTRACT

1. Shellfish mariculture is increasing worldwide and often occurs adjacent to marine mammal breeding and feeding habitat. To better understand breeding pinniped vulnerability to potential shellfish mariculture disturbance and displacement effects in a US National Park, potential mechanisms were explored that may affect the proportion of harbour seals (*Phoca vitulina*) entering high quality haul-out sites near shellfish aquaculture within a large colony, and overall seal utilization of that colony in relation to other regional colonies.

2. Seal haul-out sites isolated from the mainland (no predator access) had higher pup:adult ratios, indicating they are generally more important for pupping. Short-term human disturbance did not have a significant effect on spatial use, but rather spatial use was pre-determined by general weather isolation. Using multiple competing hypotheses and an information-theoretic approach, it was found that within the estuary, after removing effects of El Niño, the proportion of seals (total seals and pups only) hauled out near mariculture sites was 8 ± 2% lower during years of higher oyster harvest. Annual oyster harvest was used as a measure of aquaculture activity that could result in direct disturbance or indirect displacement of harbour seals.

3. At the regional scale, oyster harvest, seal counts at a nearby colony, and loss of a major haul-out site within the estuary, best explained pup and total seal use compared with the region. Regional population size, short-term human disturbance rate, and other factors were not important. Concurrent with higher oyster harvest, the proportion of regional seals using the estuary declined by 7 ± 2% for seal pups (−65 ± 18 total pups), and 5 ± 2% for total counts (−192 ± 58 total seals). These findings (both within the estuary and at the regional scale) were essentially identical whether modelling oyster harvest as either a continuous or categorical (low/high) variable and when using either frequentist or Bayesian statistical analyses.

4. Marine reserves set aside for wildlife may be less effective when the highest quality breeding and pupping sites are adjacent to regular aquaculture activities. These effects may not be detectable until additional natural variation lowers the quality of nearby habitats.

Published in 2011 by John Wiley and Sons, Ltd.

Received 14 October 2010; Revised 15 February 2011; Accepted 28 February 2011

KEY WORDS: *Phoca vitulina*; aquaculture; disturbance; harbour seal; generalized estimating equations; Bayesian analysis; marine protected area

INTRODUCTION

If true, this would be a major environmental impact of DBOC on Drakes Estero.
Q. Is it true? A. No.

Key words in title:
- "*evidence*,"
- "*long-term spatial displacement*," and
- "*over three decades*."

Q. Why is it important if this paper is correct or not?
A. Because it represents the only impact data in the dEIS.

Draft Environmental Impact Statement
Drakes Bay Oyster Company Special Use Permit

- NPS 281,000 photographs that reveal no DBOC disturbances were dismissed from dEIS; 3 ½ years of secret photo data rejected.
- **Becker, Press, & Allen 2011 paper provides the only data in dEIS of harm to harbor seals. Without it, NPS has no impact data.**
- The dEIS claims a "*potential to adversely affect seals in the future*" and proposes mitigation measures – poison pills to eliminate DBOC.
- Mitigations apply to all alternatives and will put DBOC out of business.
- Mitigations should apply to known impacts. This is a misuse of NEPA.

- Redraw **lease boundaries** to exclude many shellfish beds
- Eliminate vital **boat routes**
- Eliminate **access** to necessary CDPH sampling stations
- Restrict number of **boats**
- Restrict number of **barges**
- Restrict number of **hours** of boat use to half current use
- Restrict total **harvest levels**

Draft Environmental Impact Statement
Drakes Bay Oyster Company Special Use Permit

- Alternative D (as well as Alternatives B & C) in **the draft EIS contains poison pills to put DBOC out of business** within months.
- These poison pills are mitigations from "*potential*" impacts.
- According to Alternative D, if Salazar renews the lease for 10 years, that lease will be non-renewable.
- In contrast, Feinstein's legislation called for the opposite -- for the lease to have "*the same terms and conditions as the existing authorization.*" (DBOC's current lease has a renewal clause.)

- Redraw **lease boundaries** to exclude many shellfish beds
- Eliminate vital **boat routes**
- Eliminate **access** to necessary CDPH sampling stations
- Restrict number of **boats**
- Restrict number of **barges**
- Restrict number of **hours** of boat use to half current use
- Restrict total **harvest levels**

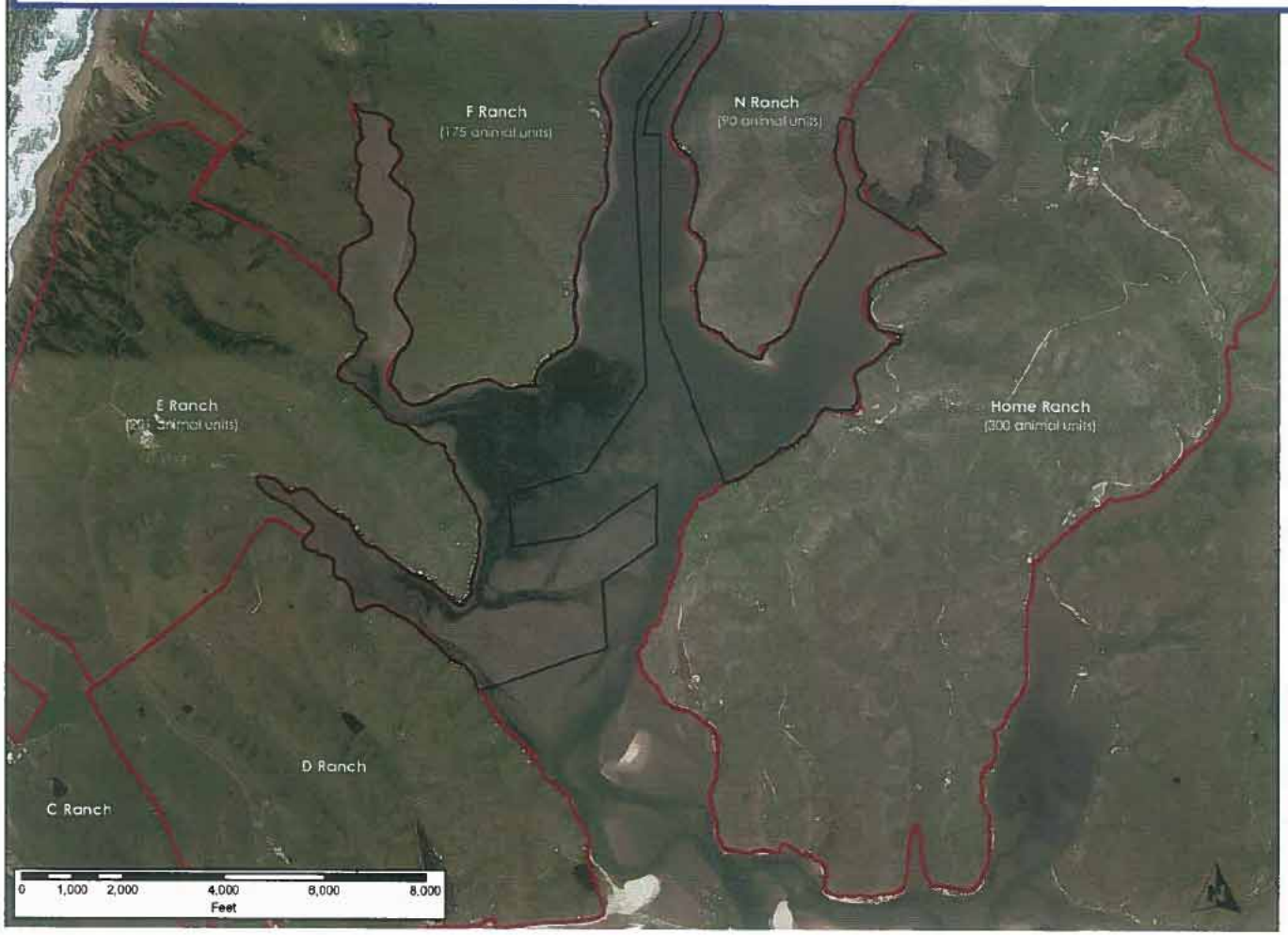
Draft Environmental Impact Statement
Drakes Bay Oyster Company Special Use Permit

- The dEIS establishes the basis for a domino effect on ag in PRNS.
- The dEIS claims that the six ranches surrounding Drakes Estero are the primary source of nonpoint-source pollution in Drakes Estero.
- The oysters help clarify the water (e.g., the eelgrass has doubled).
- Once Drakes Estero is designated "wilderness," and without oysters, the ranches surrounding it will be eliminated as the source of pollution.
- Their elimination will mark the end of agriculture in the Seashore, and a huge blow for sustainable, local, organic agriculture in Marin County.

The dEIS states: *"Six cattle ranches are located within the Drakes Estero watershed. … fecal coliform levels in most of Drakes Estero have been shown to intermittently rise after rain events associated with runoff from pastures within the watershed… Continued ranching in the vicinity of the project area has the potential to impact the following resources: water quality and socioeconomic resources."*

Draft Environmental Impact Statement
Drakes Bay Oyster Company Special Use Permit

Once Drakes Estero is designated "wilderness," and without oysters, the six ranches surrounding it will be eliminated as the source of pollution.



Drakes Estero Adjacent Ranches

Aquaculture Lease
Parcel Boundaries

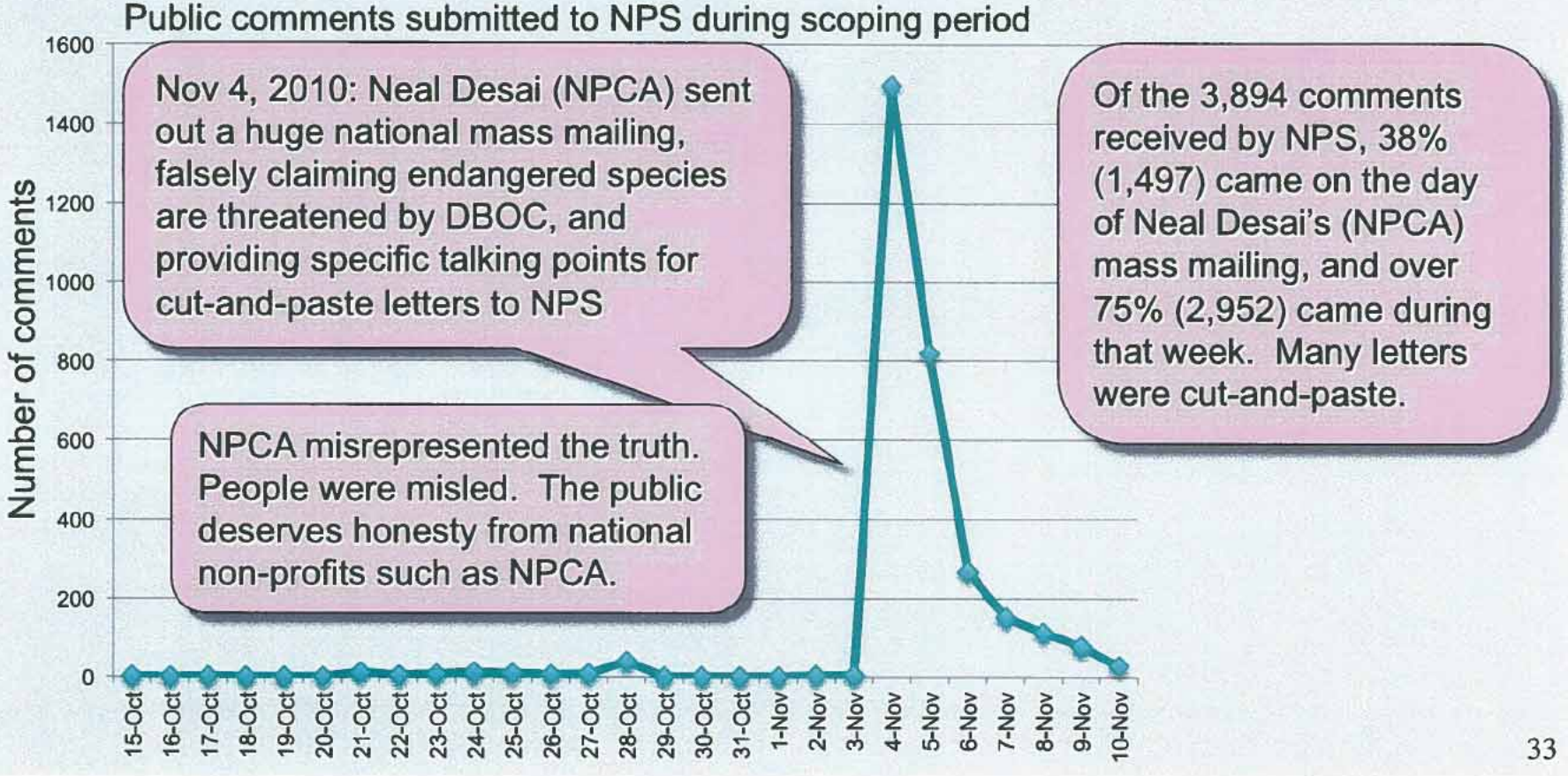
Data Sources:

USDA, National Agriculture Imagery Program, 2006

California Dept. of Health Services

Draft Environmental Impact Statement
Drakes Bay Oyster Company Special Use Permit

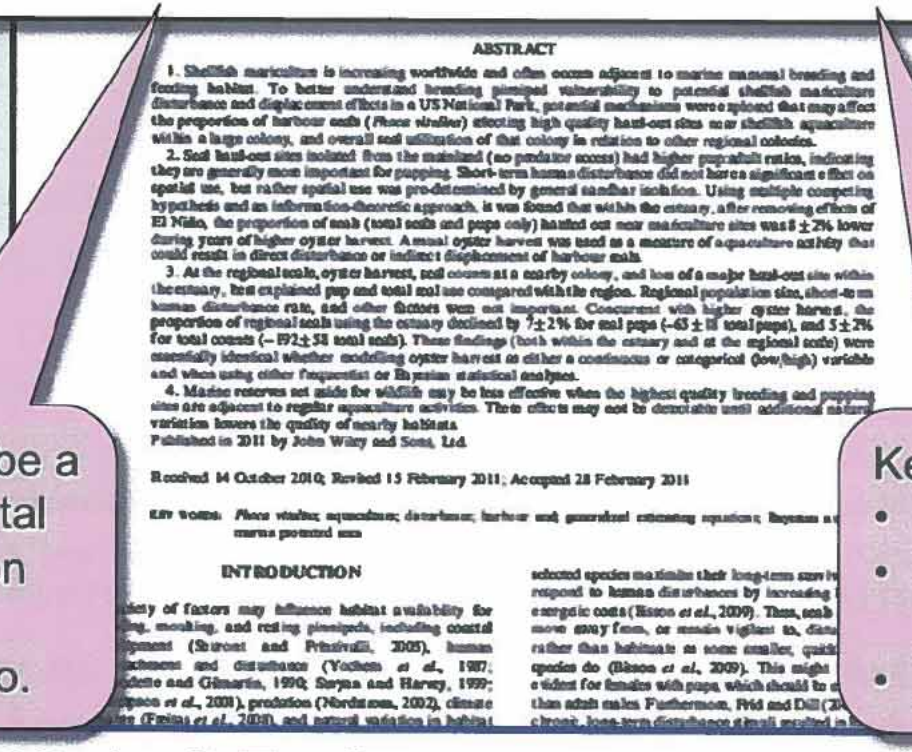
NPCA and Neal Desai turned the NPS EIS process into a national popularity contest, with people across the country being fed false information including threats to endangered species from DBOC



NPS Becker et al. paper published April 2011: is it correct?

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA



ABSTRACT

1. Shellfish mariculture is increasing worldwide and often occurs adjacent to marine mammal breeding and feeding habitat. To better understand breeding pinniped vulnerability to potential shellfish mariculture disturbance and displacement effects in a US National Park, potential mechanisms were explored that may affect the proportion of harbour seals (*Phoca vitulina*) selecting high quality haul-out sites near shellfish aquaculture within a large colony, and overall seal utilization of that colony in relation to other regional colonies.

2. Seal haul-out sites isolated from the mainland (no predator access) had higher pup:adult ratios, indicating they are generally more important for pupping. Short-term human disturbance did not have a significant effect on spatial use, but rather spatial use was pre-determined by general sandbar isolation. Using multiple competing hypothesis and an information-theoretic approach, it was found that within the estuary, after removing effects of El Niño, the proportion of seals (total seals and pups only) hauled out near mariculture sites was 8 ± 2% lower during years of higher oyster harvest. Annual oyster harvest was used as a measure of aquaculture activity that could result in direct disturbance or indirect displacement of harbour seals.

3. At the regional scale, oyster harvest, seal counts at a nearby colony, and loss of a major haul-out site within the estuary, best explained pup and total seal use compared with the region. Regional population size, short-term human disturbance rate, and other factors were not important. Concurrent with higher oyster harvest, the proportion of regional seals using the estuary declined by 7 ± 2% for seal pups (−65 ± 18 total pups), and 5 ± 2% for total counts (−192 ± 58 total seals). These findings (both within the estuary and at the regional scale) were essentially identical whether modelling oyster harvest as either a continuous or categorical (low/high) variable and when using either frequentist or Bayesian statistical analyses.

4. Marine reserves set aside for wildlife may be less effective when the highest quality breeding and pupping sites are adjacent to regular aquaculture activities. These effects may not be detectable until additional natural variation lowers the quality of nearby habitats.

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KEY WORDS: *Phoca vitulina*; aquaculture; disturbance; harbour and generalized estimating equations; Bayesian a... marine protected area

INTRODUCTION

...iety of factors may influence habitat availability for ...ing, moulting, and resting pinnipeds, including coastal ...pment (Sturont and Prinzivalli, 2005), human ...chment and disturbance (Yochem *et al.*, 1987; ...dette and Gilmartin, 1990; Suryan and Harvey, 1999; ...pson *et al.*, 2001), predation (Nordstrom, 2002), climate ...ing (Freitas *et al.*, 2008), and natural variation in habitat

selected species maximize their long-term survi... respond to human disturbances by increasing ... energetic costs (Bisson *et al.*, 2009). Thus, seals ... move away from, or remain vigilant to, dist... rather than habituate as some smaller, quick... species do (Bisson *et al.*, 2009). This might ... evident for females with pups, which should be ... than adult males. Furthermore, Frid and Dill (20... chronic, long-term disturbance stimuli resulted in ...

If true, this would be a major environmental impact of DBOC on Drakes Estero.
Q. Is it true? A. No.

Key words in title:
- "*evidence*,"
- "*long-term spatial displacement*," and
- "*over three decades*."

The NPS draft Environmental Impact Statement: Is the Becker, Press, & Allen 2011 paper correct?

Corey S. Goodman, PhD, October 16, 2011, Dance Palace, Pt. Reyes Station, CA

NPS Becker et al. paper published April 2011: conclusions

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

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ABSTRACT

Two major conclusions from Becker 2011 paper

Regional scale: spatial displacement of 7% of pups and 5% of total seals out of Drakes Estero due to oyster activity

"Concurrent with higher oyster harvest, the proportion of regional seals using the estuary declined by 7+/-2% for seal pups (–65+/-18 total pups), and 5+/-2% for total counts (192+/-58 total seals)."

Colony scale: spatial displacement of 8% of seals away from Upper Estero haul-out sites within Drakes Estero due to oyster activity

"… the proportion of seals … hauled out near mariculture sites was 8+/-2% lower during years of higher oyster harvest."

NPS Becker 2011 paper is only data in draft EIS

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

- MMC recommendation NPS not publish this paper.
- MMC did not know; Lunny did not know; Field Solicitor Frost did not know.
- Becker 2011 paper was published in April 2011; Amy Trainer announced
- Becker 2011 contains "*evidence*" of negative impact on harbor seals
- **Environmental Impact Statement relies upon Becker 2011 "*evidence*"**
- Once published using taxpayer money, all materials and methods (i.e., data and codes) must be made available to other scientists to replicate and test
- The Marine Mammal Commission undertook an analysis of Becker 2011 this summer, and asked me and others to help in that process
- With the help of the MMC, I obtained the data used for Becker 2011
- **Although experienced at statistical analysis, I sought help from scientists at Stanford, U.C. Davis, & U.C. Cooperative Extension Marin**
- This presentation is based upon that analysis of NPS data

This analysis relied entirely on NPS data provided by Becker

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

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A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
year	adult.de	adultnot.de	pup.de	pupnot.de	tot.de	totnot.de	oyst	a.max	prop.a.de	prop.a.pr	a.aval	bags.6	bags.5	tot.dp	pup.dp	prop.dp	dp.change	dist.rate	mam.dist.rat	weight	enso	92 protocol
1982	556	1674	170	492	726	2166	350004	275	0.379	0.095	1	1	1	851	263	0.294	0	0.33	1.2	1	5	0
1983	534	1678	122	444	656	2122	440139	379	0.578	0.136	1	1	1	832	262	0.299	-0.02	0.62	1.79	1	0	0
1997	854	1431	257	726	1111	2157	476791	252	0.227	0.077	1	1	1	854	357	0.261	0	0.96	1	0.3	4	1
1998	591	1362	162	366	753	1728	292188	247	0.328	0.1	1	1	1	708	187	0.285	-0.17	0.93	0.85	1	0	1
1999	637	1620	285	783	922	2403	125749	241	0.261	0.072	1	0	1	890	335	0.268	0.26	0.77	0.61	1	1	1
2000	755	1778	376	962	1131	2740	34094	325	0.287	0.084	1	0	0	1076	412	0.278	0.21	0.49	0.55	1	2	1
2001	687	1827	327	902	1014	2729	65676	309	0.305	0.083	1	0	0	913	350	0.244	-0.15	0.49	0.39	1	3	1
2002	904	2231	377	813	1281	3044	78064	297	0.232	0.069	1	0	0	1162	380	0.269	0.27	0.87	0.52	1	4	1
2003	1066	1916	486	746	1552	2662	118643	315	0.203	0.075	1	0	0	459	105	0.109	-0.6	0.74	0.75	1	5	1
2004	1183	2322	461	803	1644	3125	96754	313	0.19	0.066	1	0	0	929	264	0.195	1.02	0.42	0.33	1	6	1
2005	754	1951	332	771	1086	2722	138958	220	0.203	0.058	1	1	1	928	289	0.244	0	0.65	0.46	1	7	1
2006	784	1962	287	660	1071	2622	291538	130	0.121	0.035	0	1	1	783	245	0.212	-0.16	0.63	0.1	1	8	1
2007	759	1786	273	624	1032	2410	458000	21	0.02	0.006	0	1	1	684	215	0.199	-0.13	0.94	0.93	1	9	1
2008	627	1708	341	820	968	2528	438000	8	0.008	0.002	0	1	1	824	328	0.236	0.2	0.76	0.75	1	10	1
2009	561	1593	272	739	833	2332	458000	2	0.002	0.001	0	1	1	724	298	0.229	-0.12	0.36	0.43	1	11	1

ADULT

Year	Bolinas Lagoon	Double Point	Drakes Estero	Duxbury Reef	PR Headlands	Tomales Bay	Tomales Point
1982	109	588	556	109	213	227	426
1983	119	570	534	166	178	230	394
1997	161	497	854		117	389	287
1998	98	521	591		126	256	363
1999	133	555	637	88	130	435	279
2000	165	864	755	92	118	470	269
2001	224	563	687	71	65	518	388
2002	288	782	904	107	110	529	415
2003	312	354	1066	138	145	504	375
2004	239	665	1183	131	161	497	629
2005	318	839	754	93	84	504	313
2006	361	538	784	72	126	503	382
2007	262	469	758	81	110	481	374
2008	272	498	627	32	142	382	384
2009	281	426	581	59	131	438	255

PUP

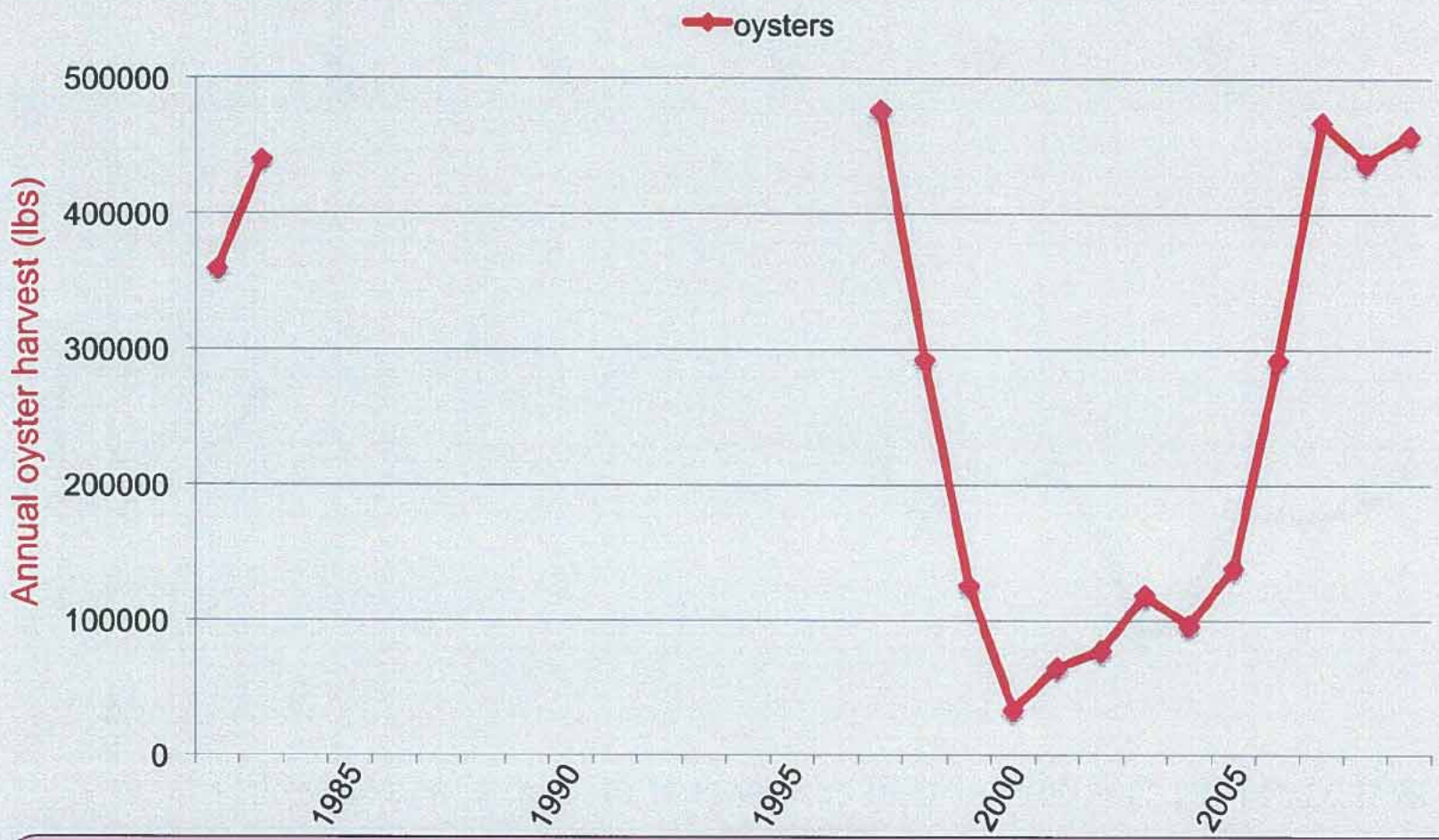
Year	Bolinas Lagoon	Double Point	Drakes Estero	Duxbury Reef	PR Headlands	Tomales Bay	Tomales Point
1982	17	283	170		19	58	135
1983	17	282	122		1	45	120
1997	51	357	257		24	141	153
1998	47	187	182		24	34	74
1999	59	335	285	10	38	190	151
2000	108	412	378	20	45	188	189
2001	123	350	327	5	51	179	194
2002	123	380	377	3	31	144	132
2003	150	105	486	4	48	178	283
2004	123	284	461	15	57	202	142
2005	143	289	332	8	44	188	101
2006	149	245	287	17	41	108	100
2007	126	215	273	7	46	72	158
2008	153	328	341	3	64	118	154
2009	143	298	272	3	68	89	129

This analysis relied entirely on NPS data shown here as provided by Becker; all NPS data was accepted as is, including disturbance rate. This is a modest data set and straight forward to analyze using statistical tests.

Becker 2011 examined long-term changes in the proportion of seals and pups in Drakes Estero compared to the entire PRNS region

proportion of pups (prop.pup.de) in Drakes Estero compared to entire PRNS region

Becker 2009 relied on annual oyster harvest for entire Drakes Estero



The National Academy of Sciences was critical of Becker's previous paper (2009) for using annual oyster harvest for entire Drakes Estero as surrogate for activity at UEN & OB during pupping season (March-May).

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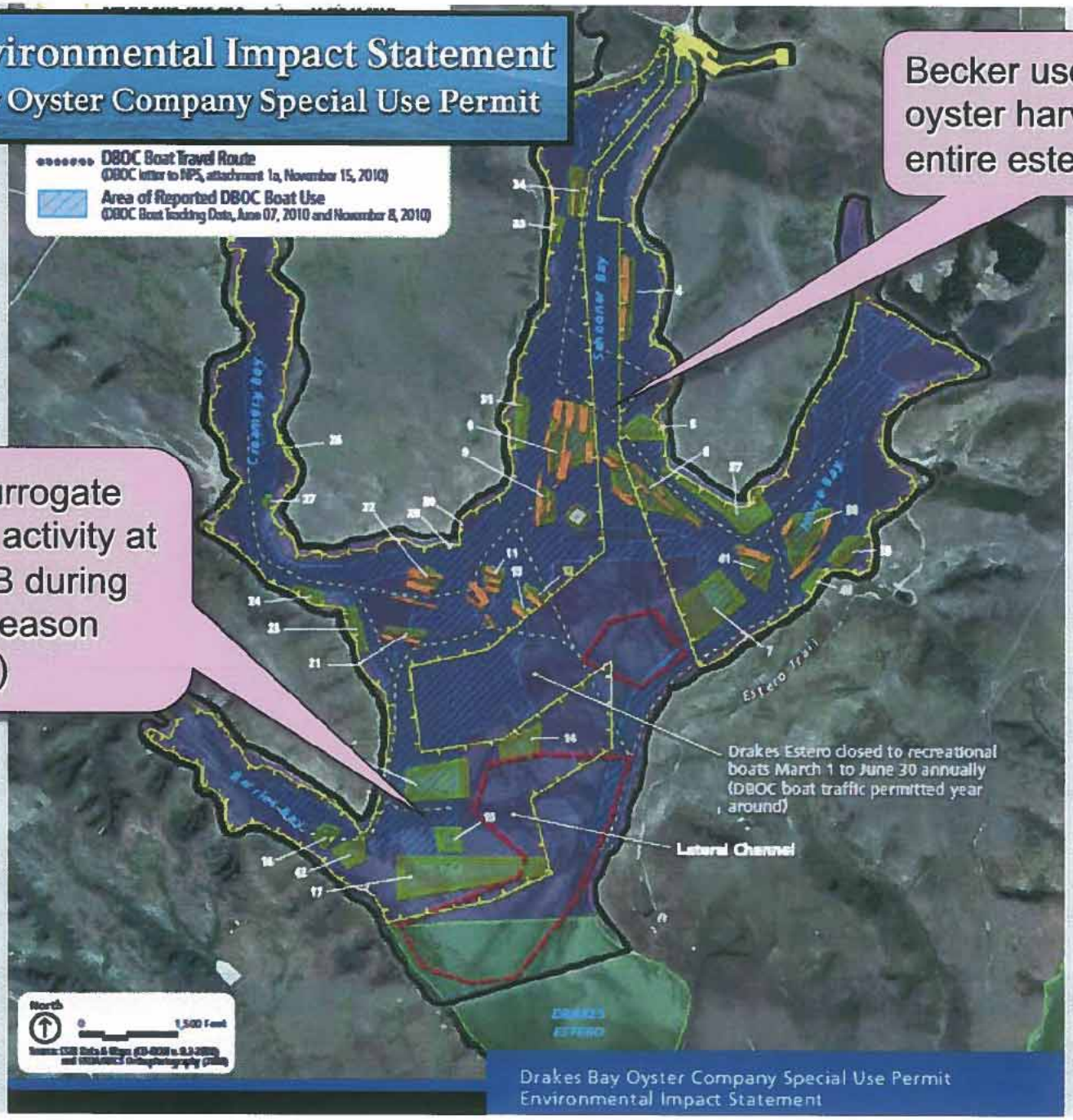


Becker 2011 sought better measure of oyster activity at UEB/OB during pupping season; used inferences to derive OYST Hi/Low analysis

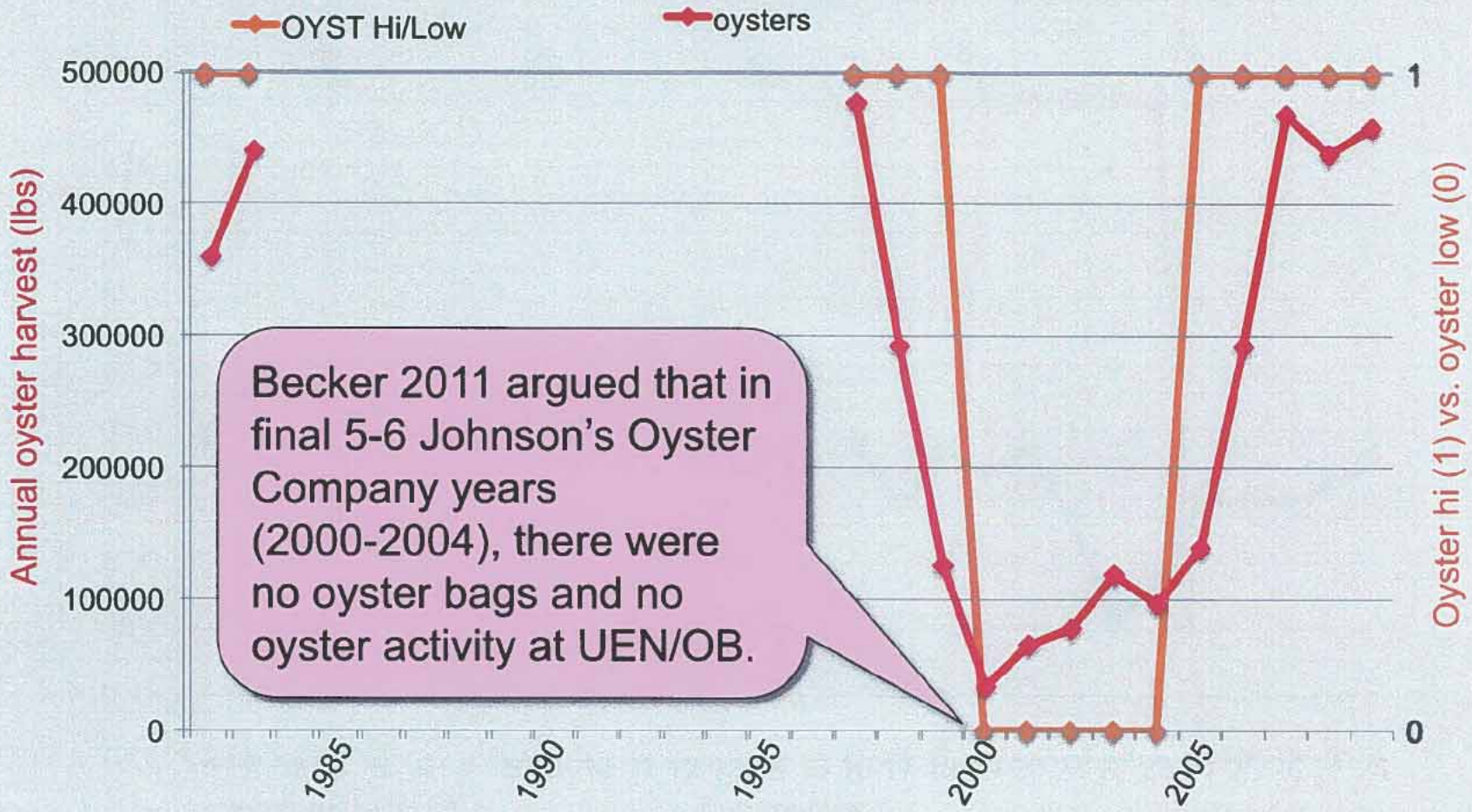
Table A1.

Year	Oyster harvest (lbs)	Inferred level of mariculture use of sandbars near seals	Source(s) of inference
1997	476,791	high	harvest data
1998	292,188	high	harvest data, higher than 2005
1999	125,749	modelled high & low	slightly higher than 2000-2004, declining
2000	34,094	low	lower than 2002-2004
2001	65,676	low	aerial image of absence of bags
2002	78,064	low	DTP, pers. obs, harvest data
2003	118,643	low	aerial image of absence of bags
2004	96,754	low	DTP, pers. obs, harvest data
2005	138,958	high	aerial image of bags, increasing harvest
2006	291,538	high	increasing harvest, bags in '05
2007	468,000	high	aerial image of bags
2008	438,000	high	aerial image of bags
2009	458,000	high	aerial image of bags

OYST Hi/Low is based upon this "inferred" level of activity at UEN/OB during pupping season (March-May)

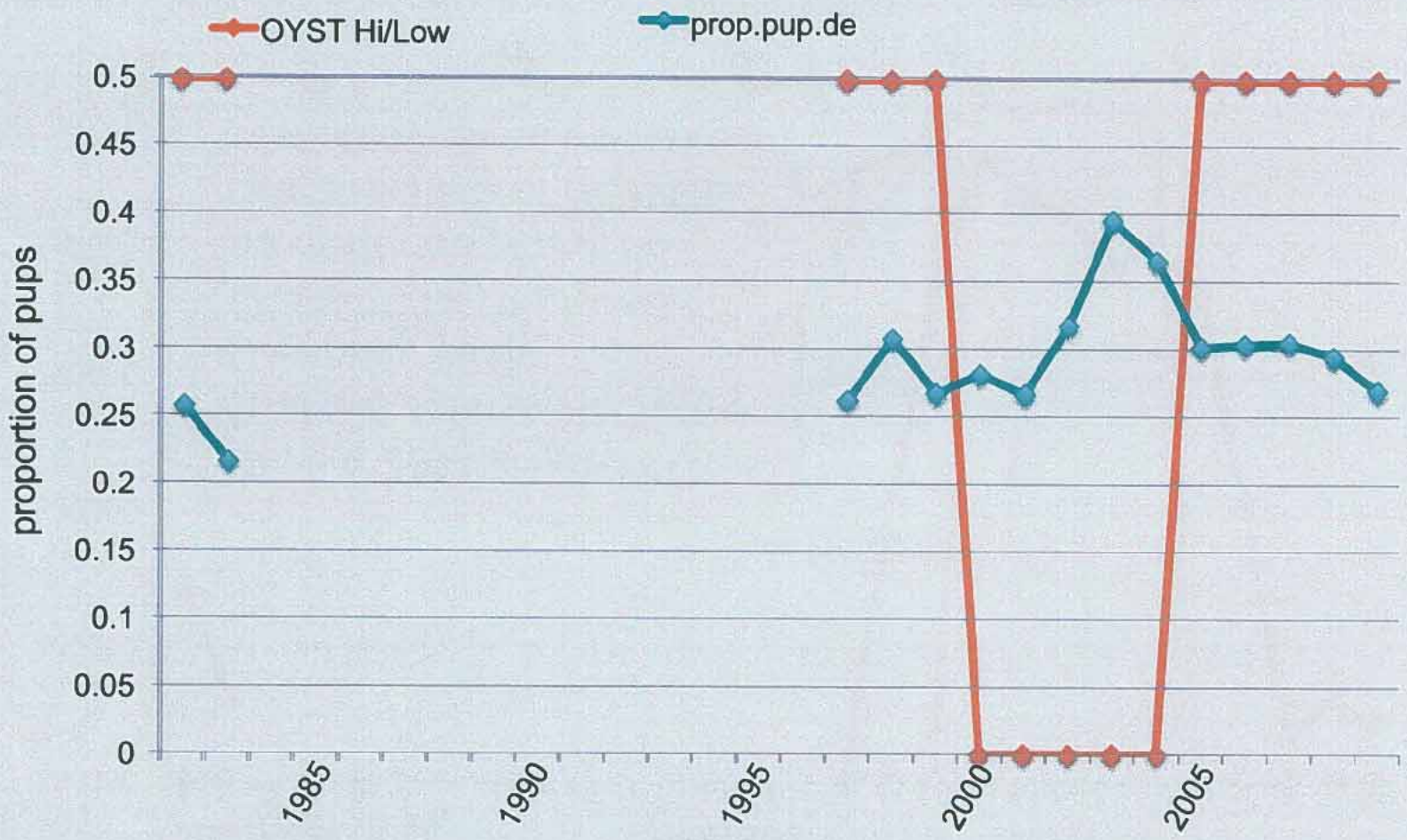
Becker's "inferences" for UEN/OB pupping season activity came from aerial photos, harvest data, and David Press observations

Becker 2011 used OYST Hi/Low categorical designation based on NPS inferences as surrogate for activity at UEN/OB during pupping season



OYST Hi/Low categorical oyster activity

Becker 2011 used statistical analysis to claim that the OYST Hi/Low categorical designation correlated with proportion of pups in Estero



OYST Hi/Low categorical oyster activity correlates with proportion of pups in Drakes Estero

NPS Becker 2011 paper based upon statistical analysis

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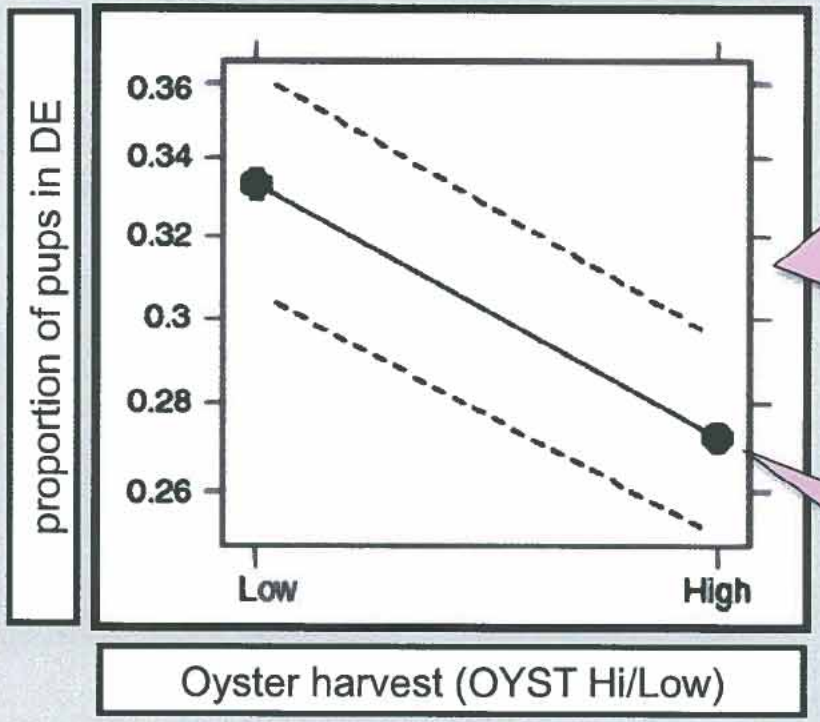
This analysis will by necessity use some statistics; it can't be avoided. The Becker 2011 paper relies on statistics. We need to understand and test it. This analysis will be simplified as much as possible. Even if you get lost, hang in -- the conclusions are simple.

You only need understand two statistical measures here: **P-value** & **R-squared**.

- **P-value**: measure of statistical significance. If $P < 0.05$ (5/100 = 1/20), then there is a 1/20 chance that the correlation occurs for a random reason. The smaller the better. For example, a $P < 0.0001$ or < 0.00001 would be terrific!
- **R-squared**: measures how much variability in what is being studied is accounted for with multiple "independent" variables. The value ranges from 0 to 1, with "0" meaning 0% of the variability is accounted for, and "1" meaning 100% of the variability is accounted for. A value of 0.7 or 0.8 would be terrific! An example will be given during the presentation to help this make sense.

Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis

Figure 6 from Becker et al. 2011



Becker 2011 showed an analysis for proportion of pups in Drakes Estero vs. OYST Hi/Low. From the intersect of this regression line, you can effectively read the ~7% spatial-displacement of pups out of Drakes Estero with increased oyster activity from ~34% (low) down to ~27% (high).

But Becker did not include the data points and thus it was difficult to see what was driving the analysis.

P-value:	**0.0468**
Adjusted R^2:	**0.2146**

P-value is just < 0.05 (= 0.047) and R-squared accounts for only 21% of variance in proportion of pups in DE.

Ranking of Models in Becker 2011: Proportion of Pups in Drakes Estero

Table 3. A priori models ranked by delta QAICc for the proportion of Point Reyes seal pups and total seals using Drakes Estero. Δi indicates QAICc distance from the best model and wi indicates model weight. Modeling oyster harvest as a continuous variable or low oyster during 1999–2004 gives similar results. Models ranking within the lowest 4 QAICc units (in bold) were used for multimodel inference in table 5. Oyst: low oyster harvest from 2000–2004; DP: Double Point Counts; A: proportion of Drakes Estero seals using subsite A; Dist: anthropogenic disturbance rate. Rankings are similar if using continuous oyster harvest rather than *categorical*

Age class	Model	Δi	wi	r^2
Pup	**Oyst+Double Point (DP)**	**0.0**	**0.35**	**0.51**
	Oyst+DP+A	**1.3**	**0.18**	**0.63**
	Oyst+A	**1.4**	**0.18**	**0.46**
	Oyst+ENSO	**2.6**	**0.09**	**0.42**
	Oyst	**3.3**	**0.06**	**0.26**
	Year	5.0	0.03	0.20
	Oyst+Dist	5.6	0.02	0.32
	Oyst+DP+Dist+A			
	DP+Year	6.4		
	DP	7.3		
	Null	7.7		
	Regional pup count	10.3		

Prop.pup.de

OYST Hi/Low

Becker's top models all included OYST Hi/Low categorical variable.

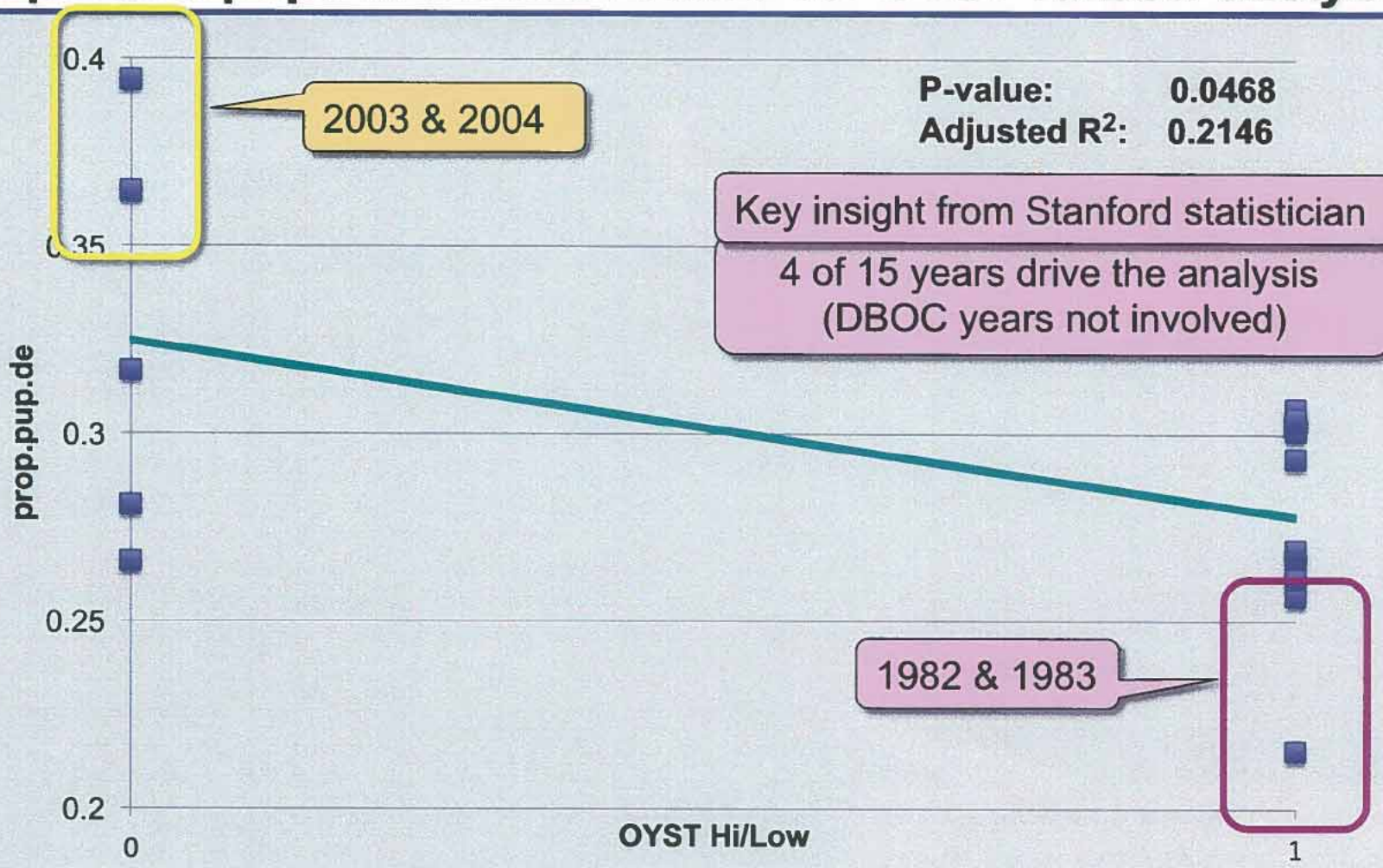
Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades

Regional scale: NPS claimed oyster farm activity drives seals **out of Drakes Estero**

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades

Colony scale: NPS claimed oyster farm activity drives seals **out of Upper Estero**

Proportion pups in Drakes Estero vs. OYST Hi/Low analysis



OYST Hi/Low is just barely statistically significant compared to proportion of pups in Drakes Estero; annual oyster harvest is not statistically significant

Analysis of NPS Becker 2011: major conclusions incorrect

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

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6. Authors used incorrect seal maps, oyster maps, & inferences
   NPS scientists never got correct data; misinterpreted aerial photos

NPS refused to respond to this analysis but released dEIS

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

- This analysis submitted to Marine Mammal Commission on Aug 29.
- **NPS rejected MMC request** on August 30 to respond to MMC-sponsored reviews by Dr. Harwood and me within 48 hours.
- **NPS refused to participate** in MMC-sponsored public meeting.
- **NPS rejected Senator Feinstein's request** to delay dEIS until validity of Becker 2011 could be resolved.
- **NPS** has now **declined invitation to participate** today.

NPS scientists have government obligation to respond to criticism of Becker 2011. This responsibility is more pronounced given the role of Becker 2011 in the dEIS. The DOI Scientific Integrity Policy (1/28/11) states:

"I will welcome constructive criticism of my scientific and scholarly activities and will be responsive to their peer review."

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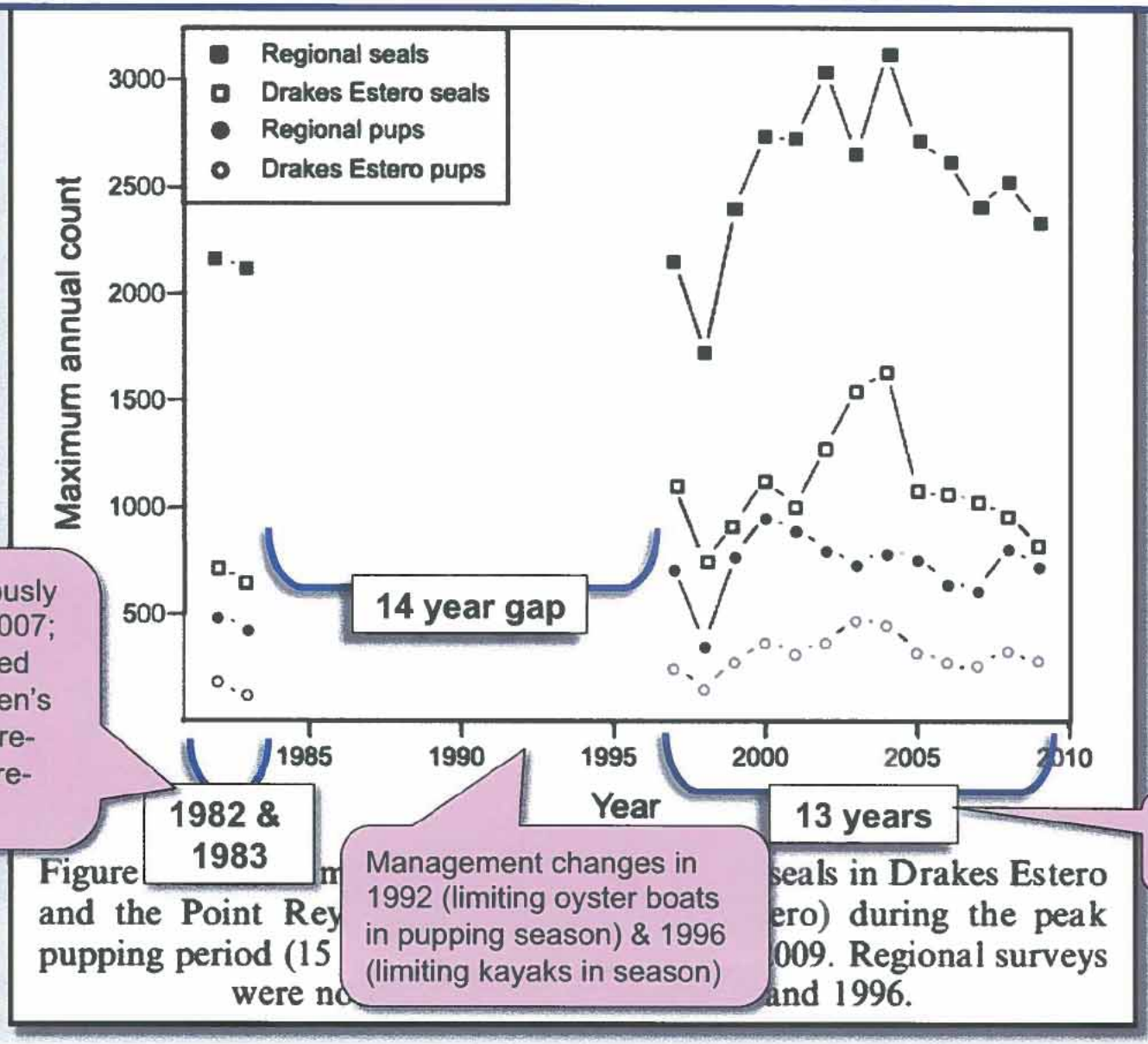

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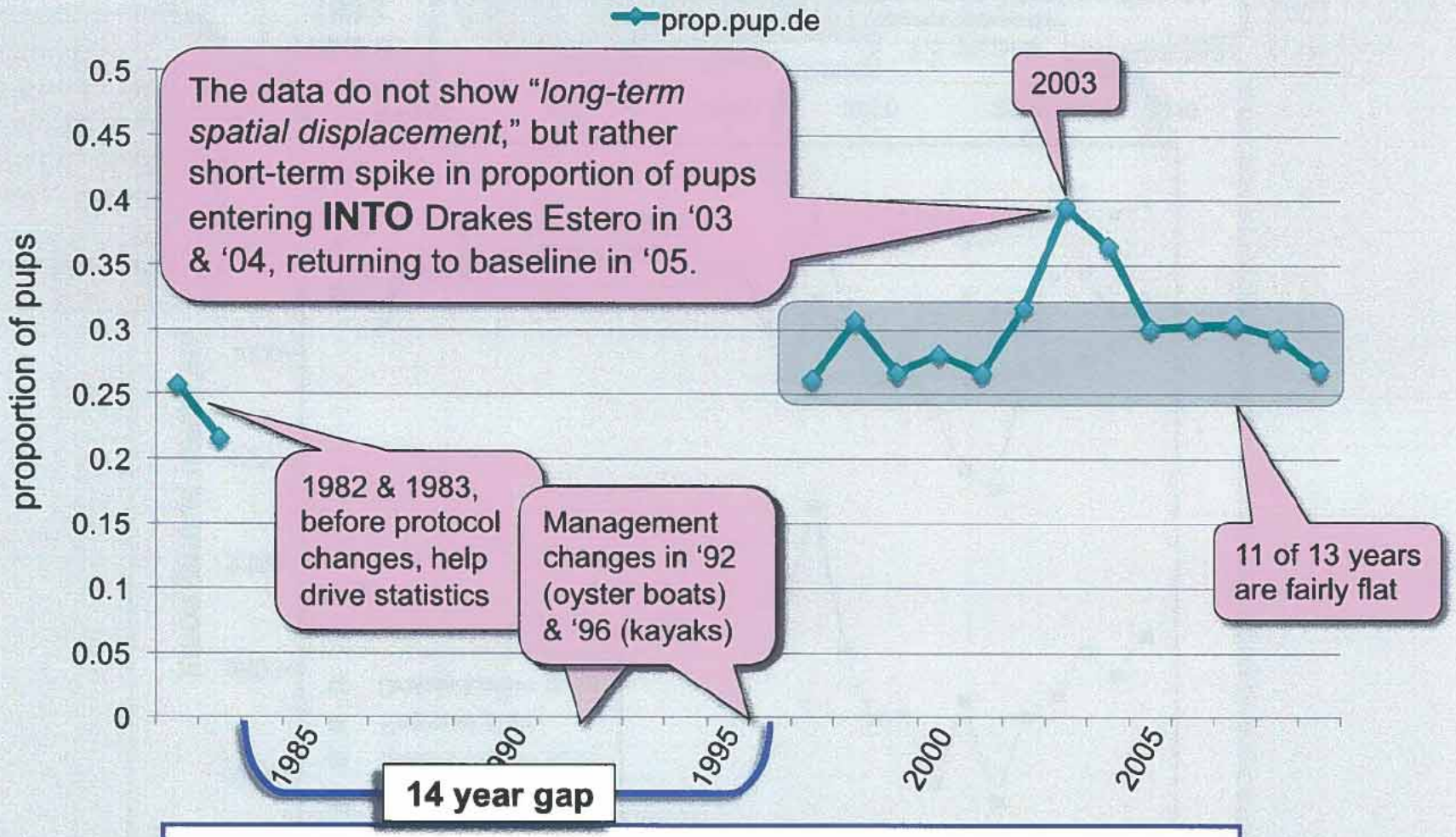

proportion of pups (prop.pup.de) in Drakes Estero compared to entire PRNS region

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Displaced over 100 seals **INTO** Estero; took two years to recover

An "*aggressive elephant seal*" at Double Point in 2003 appears to explain the short-term displacement of harbor seals INTO the Estero

From Becker 2011 paper

Maximum annual count of seals at nearest colony (*Double Point*). Seals are thought to transit between Double Point and Drakes Estero (Allen Miller, 1988; Grigg *et al.*, 2009), and in 2003 an aggressive elephant seal probably displaced numerous harbour seals from Double Point to Drakes Estero.

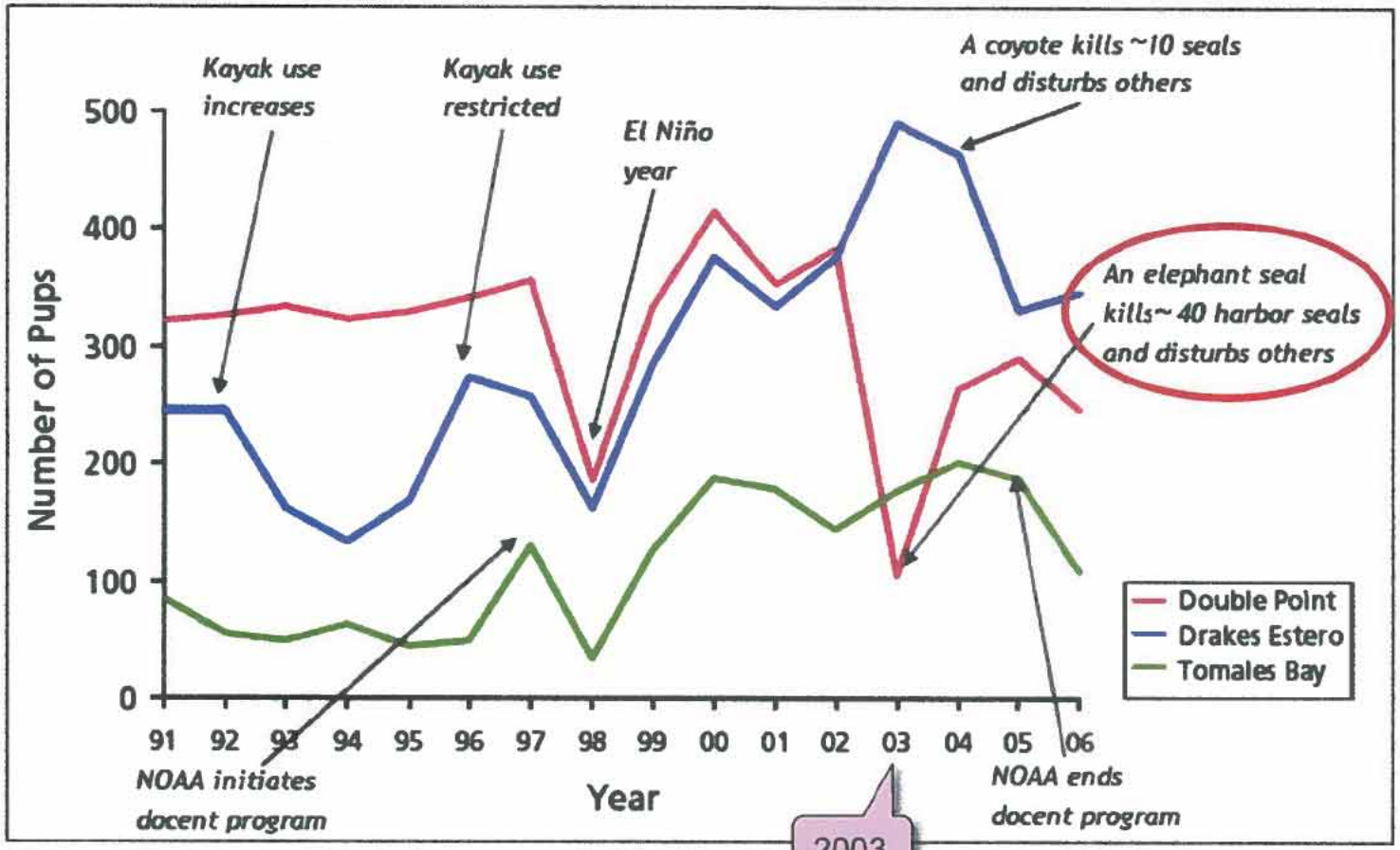
In 2003, a rogue elephant seal killed 40 harbor seals and chased ~600 harbor seals away from Double Point (DP), leading to a decrease in around 260 pups from DP. Around 50% of the pups displaced from DP – or around 130 pups – were displaced **INTO** Drakes Estero in 2003.

This can be seen on next slide from NPS May 2007 report.

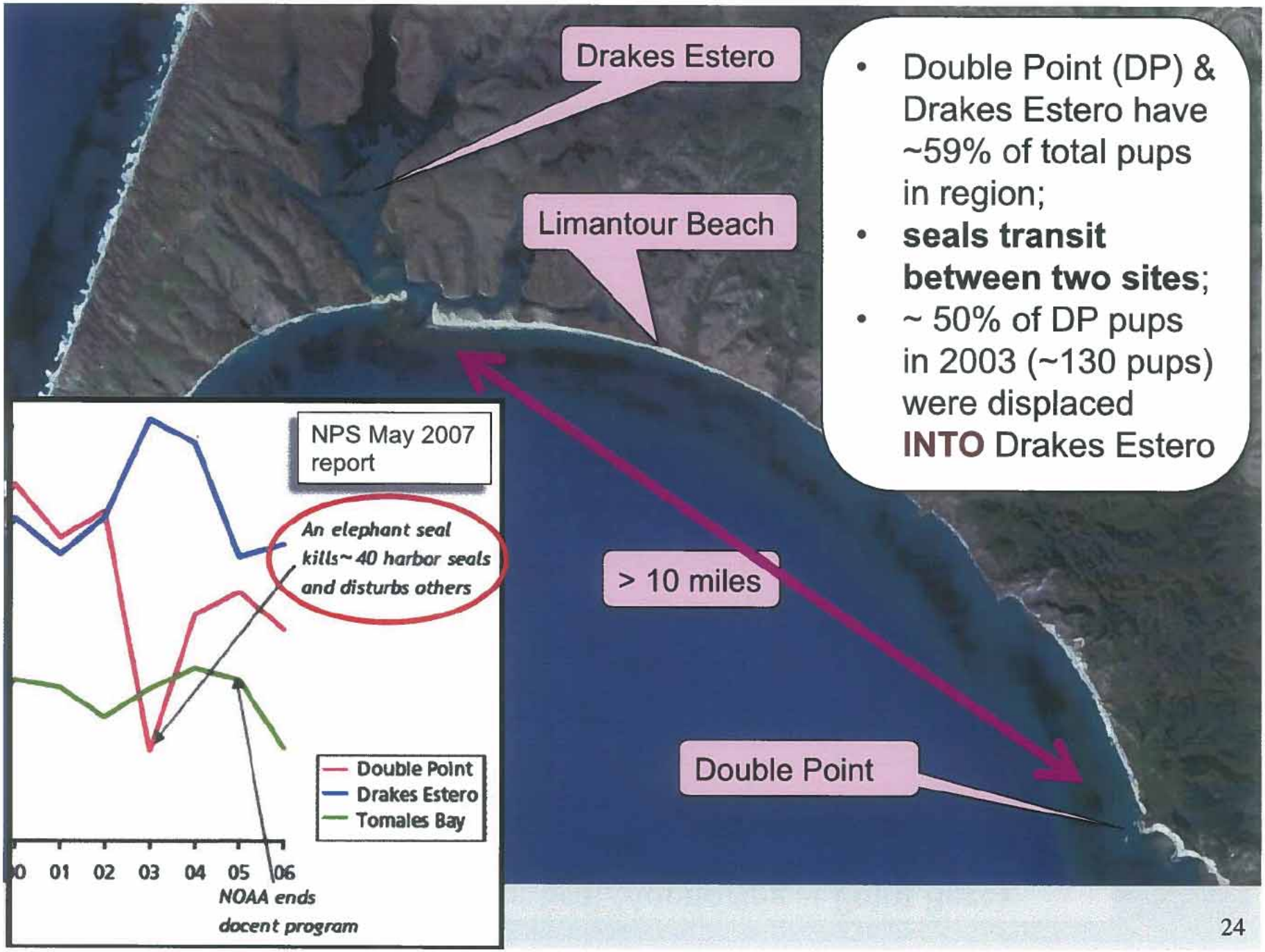
National Park Service
U.S. Department of the Interior
Pacific Coast Science and Learning Center
Research Project Summary May 2007

Harbor Seal Monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area

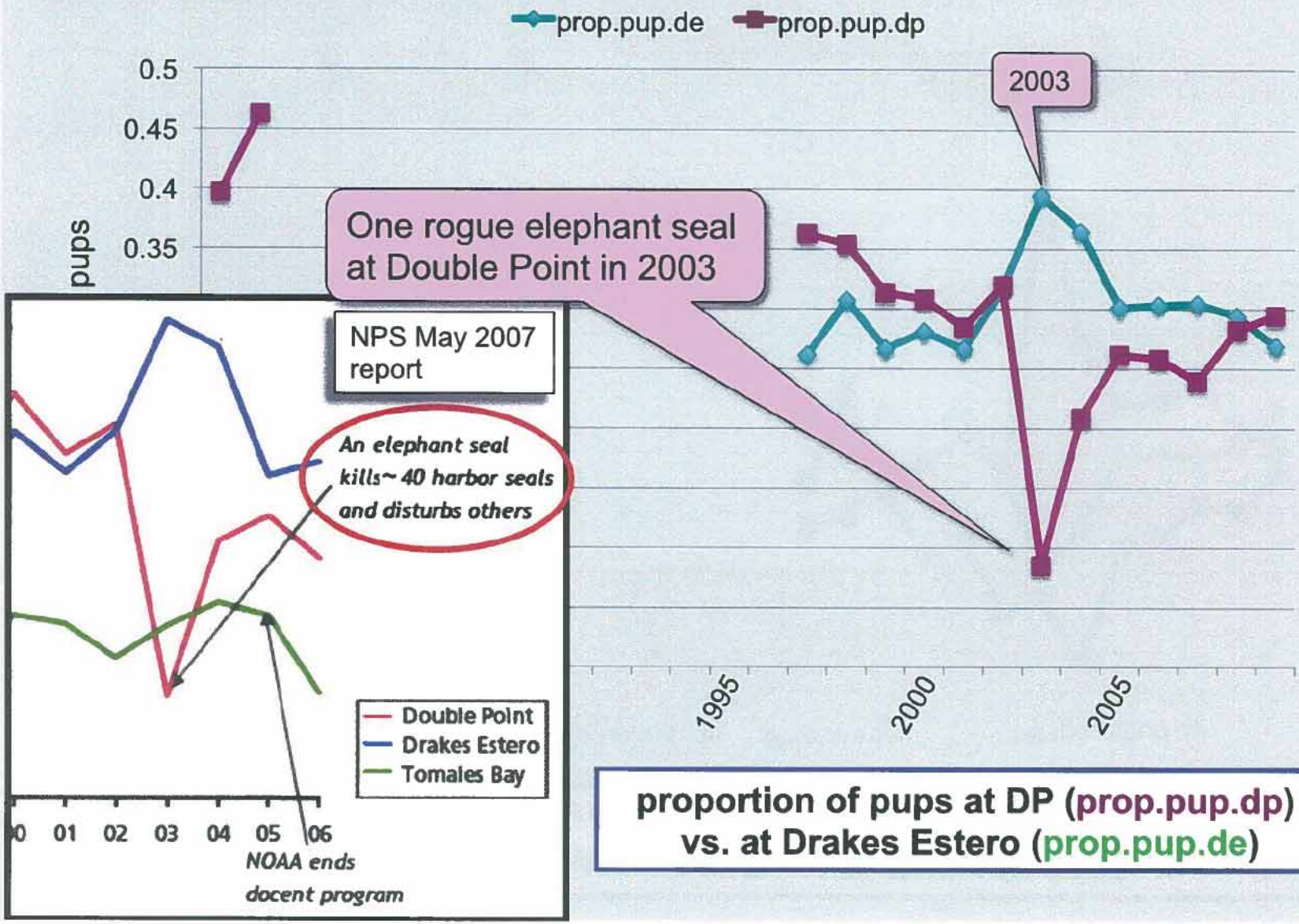
By Marcus Koenen and Sarah Allen



The harbor seal pup population is sensitive to human disturbance, climate variability and interactions with other species. Different management approaches also affect the seal population.

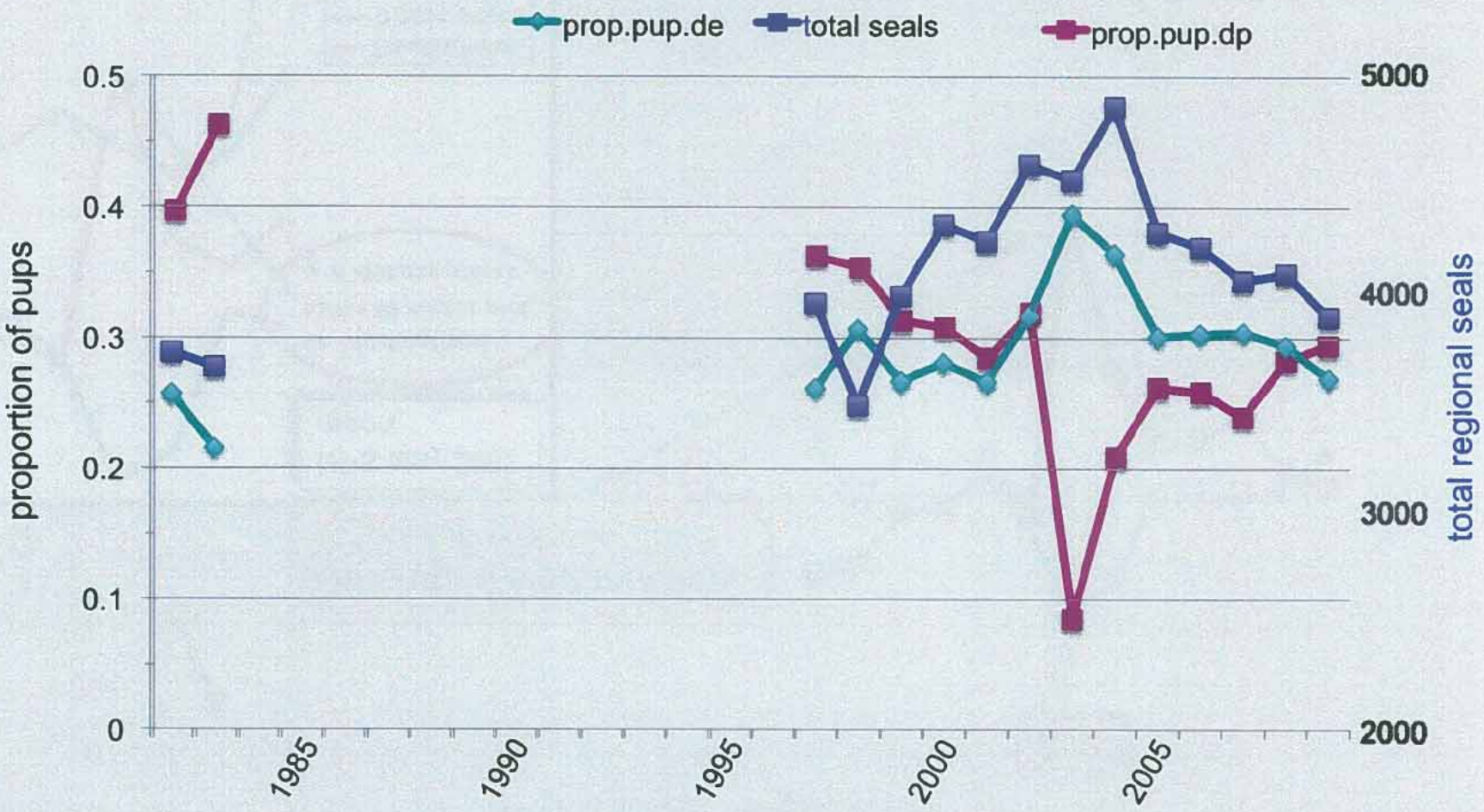

Drakes Estero
Limantour Beach
• Double Point (DP) & Drakes Estero have ~59% of total pups in region;
• **seals transit between two sites**;
• ~ 50% of DP pups in 2003 (~130 pups) were displaced **INTO** Drakes Estero
> 10 miles
Double Point
NPS May 2007 report
An elephant seal kills ~ 40 harbor seals and disturbs others
Double Point
Drakes Estero
Tomales Bay
00 01 02 03 04 05 06
NOAA ends docent program

3. Rogue elephant seal at Double Point in 2003 killed ~ 40 harbor seals
Displaced over 100 seals INTO Estero; took two years to recover



proportion of pups at DP (prop.pup.dp) vs. at Drakes Estero (prop.pup.de)

In addition to rogue elephant seal at Double Point in 2003, the other variable that appears to correlate is total regional seal population



proportion pups at Double Point + total regional seals together explain proportion of pups at Drakes Estero

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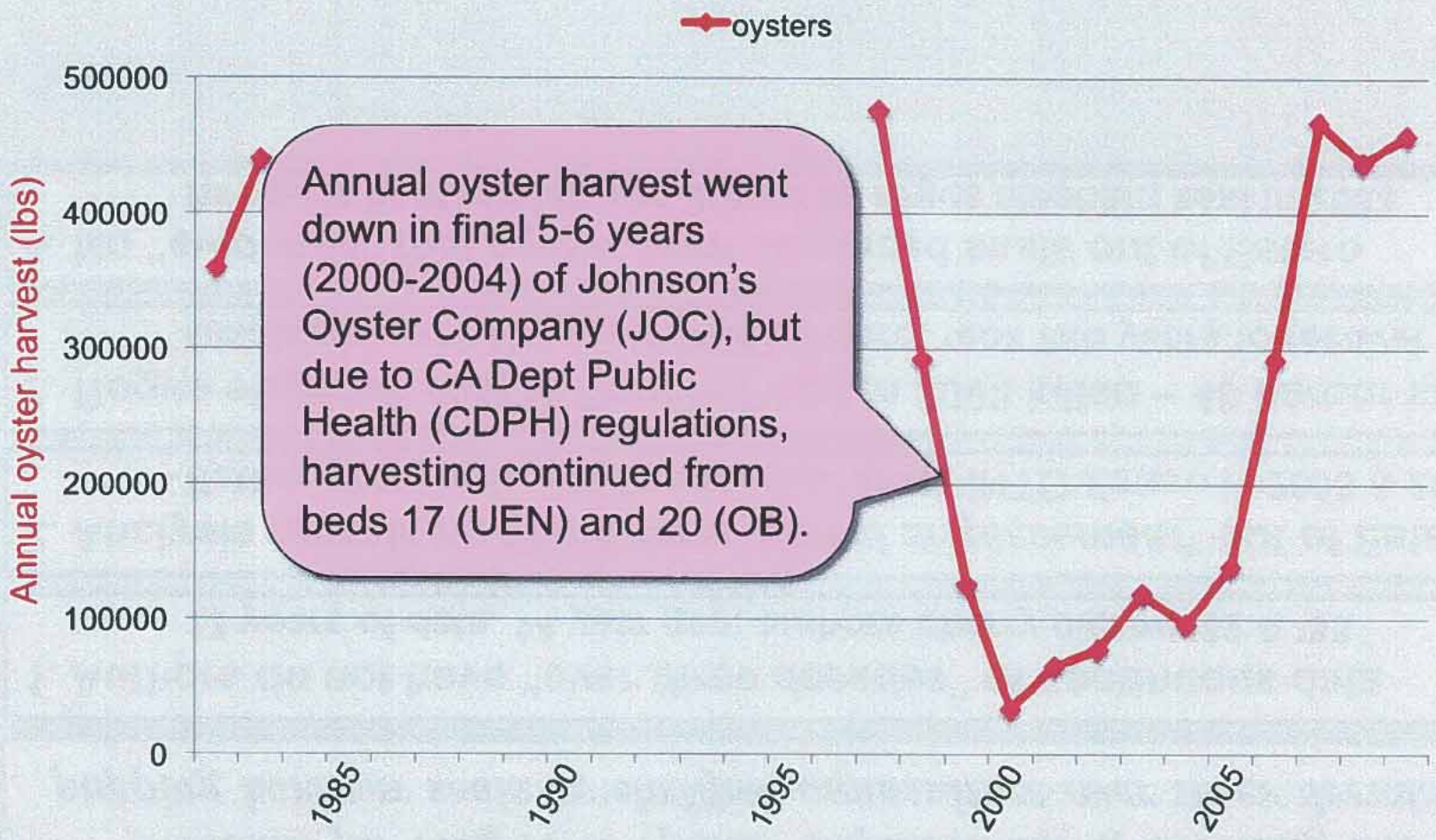
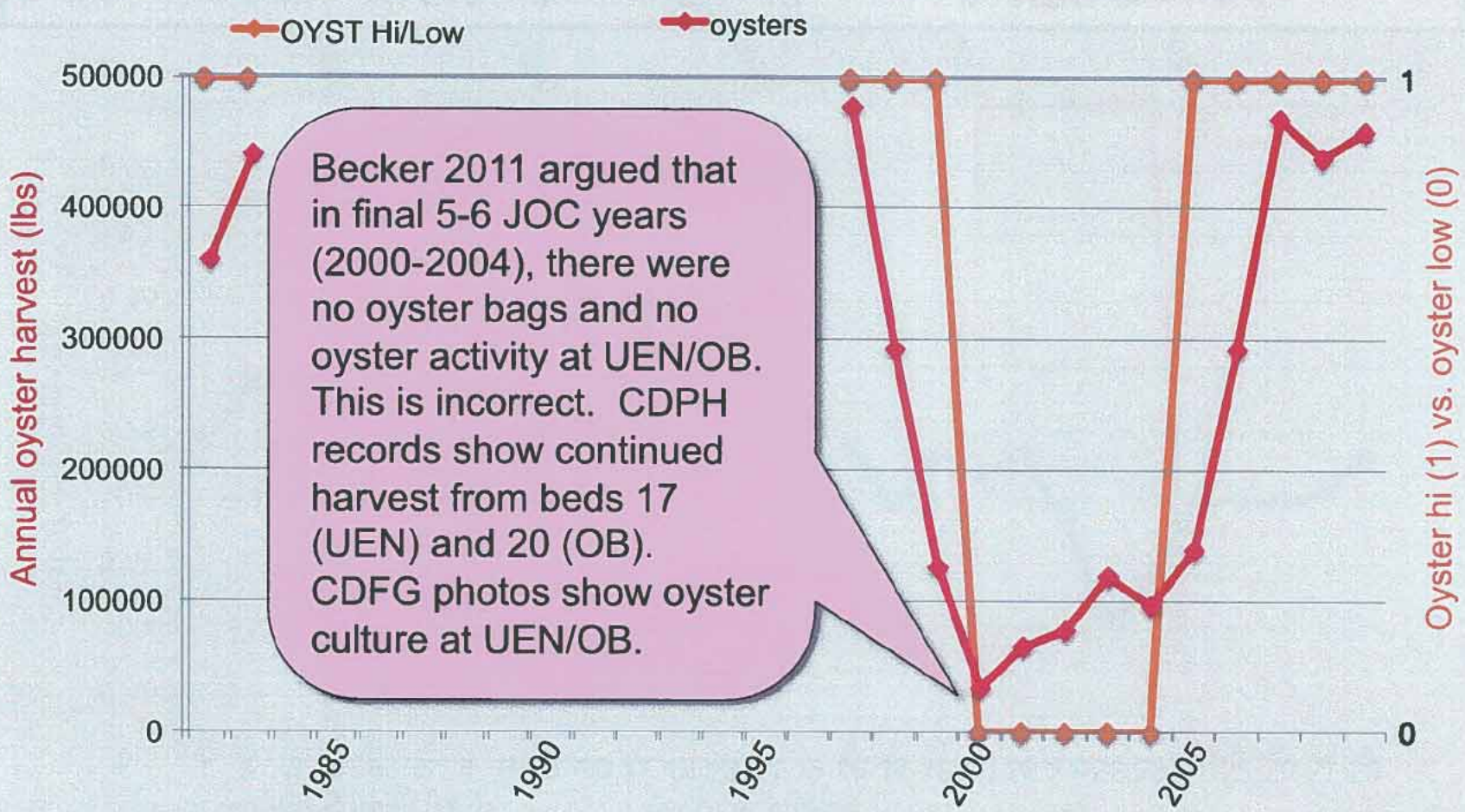
Becker used annual oyster harvest for Estero to compare to seals



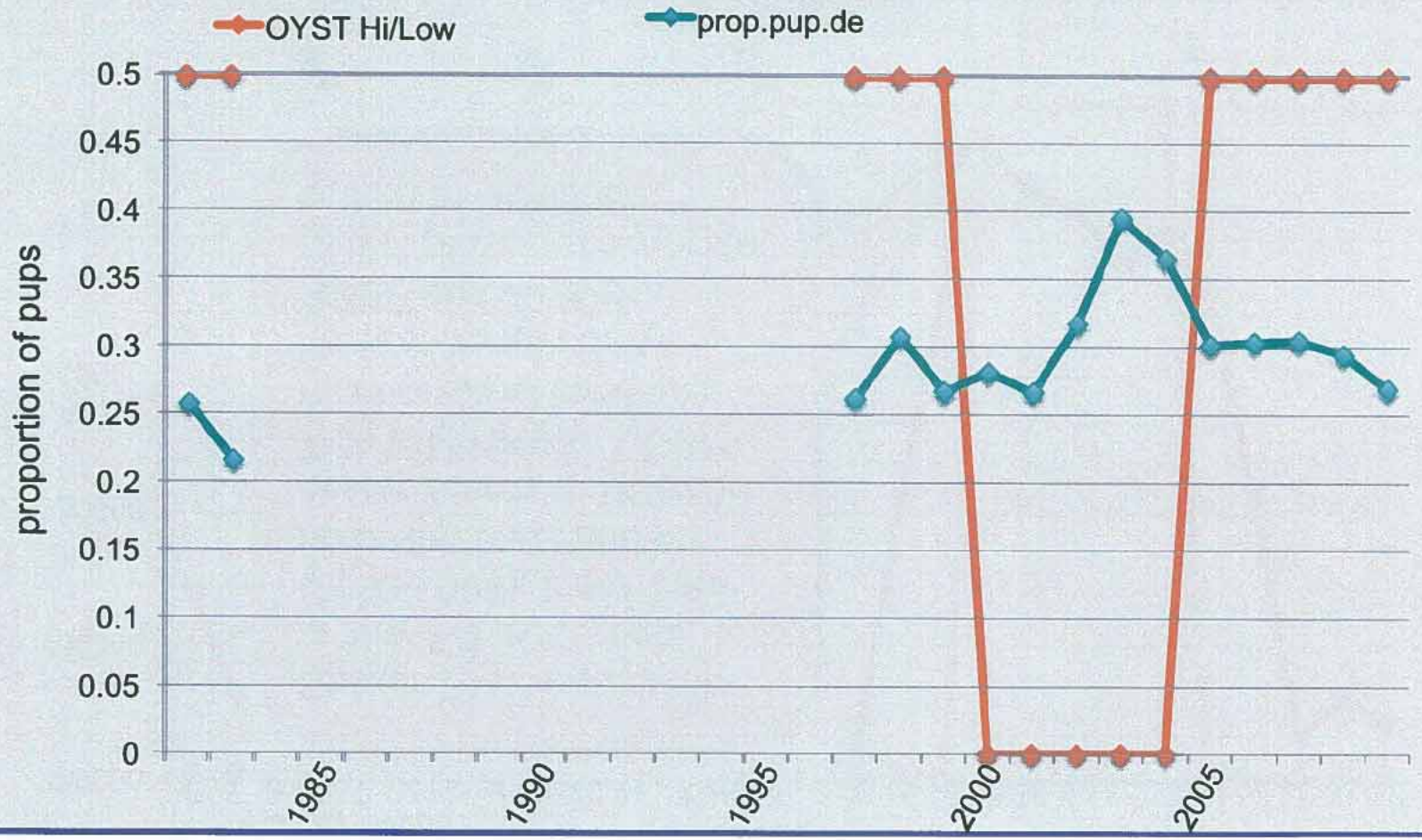
annual oyster harvest for entire estero is not a surrogate for oyster activity at UEN & OB during pupping season (Mar-May)

Becker used OYST Hi/Low categorical designation based upon NPS inferences as surrogate for activity at UEN/OB during pupping season



Becker used incorrect inferences to argue OYST Hi/Low categorical oyster activity is surrogate for UEN & OB

Becker 2011 used statistical analysis to claim that the OYST Hi/Low categorical designation correlated with proportion of pups in Estero



Is this correlation statistically significant?	A: **YES (barely)**
Is it robust to various critical tests?	A: **NO (i.e., remove '03)**
Are there better explanations?	A: **YES (Double Point)**

Ranking of Models in Becker 2011: Proportion of Pups in Drakes Estero

Table 3. A priori models ranked by delta QAICc for the proportion of Point Reyes seal pups and total seals using Drakes Estero. Δi indicates QAICc distance from the best model and wi indicates model weight. Modeling oyster harvest as a continuous variable or low oyster during 1999–2004 gives similar results. Models ranking within the lowest 4 QAICc units (in bold) were used for multimodel inference in table 5. Oyst: low oyster harvest from 2000–2004; DP: Double Point Counts; A: proportion of Drakes Estero seals using subsite A; Dist: anthropogenic disturbance rate. Rankings are similar if using continuous oyster harvest rather than *categorical*

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Prop.pup.de

OYST Hi/Low

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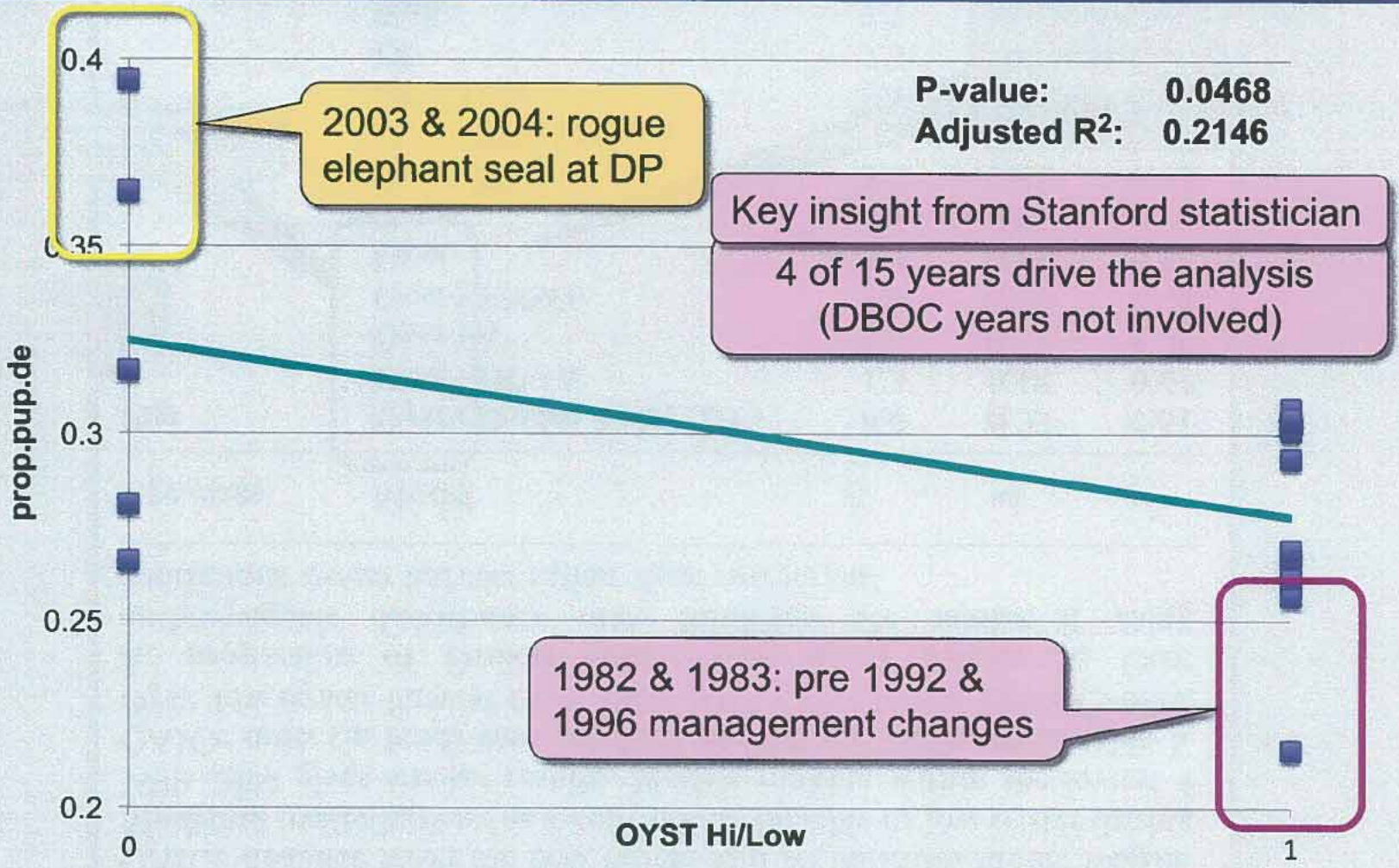
Proportion pups in Drakes Estero vs. OYST Hi/Low regression analysis



OYST Hi/Low is just barely statistically significant compared to proportion of pups in Drakes Estero; annual oyster harvest is not statistically significant

1982 and 1983 should not have been included in the analysis

Modeling the effects of El Niño, density-dependence, and disturbance on harbor seal (*Phoca vitulina*) counts in Drakes Estero, California: 1997–2007

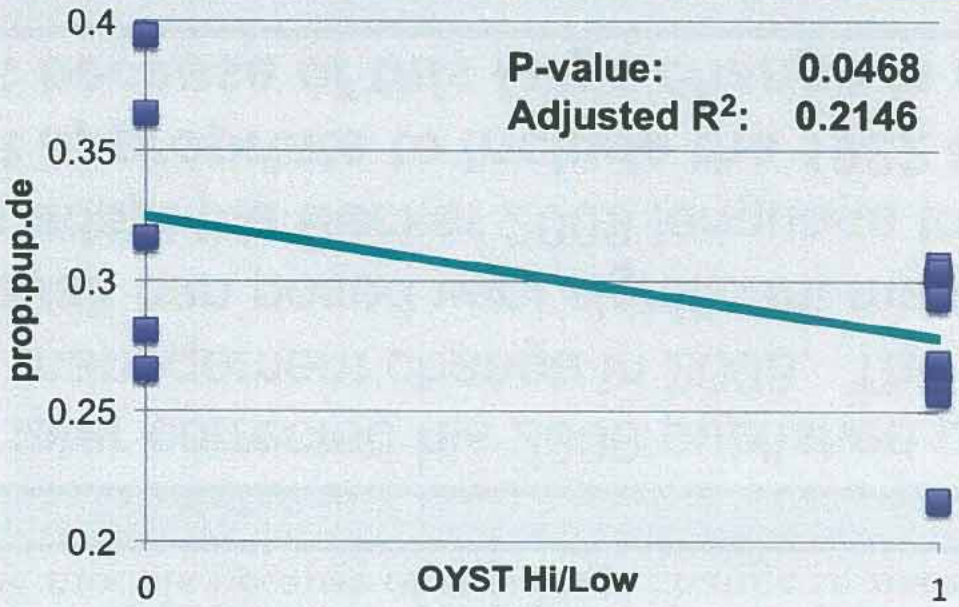
MARINE MAMMAL SCIENCE, 25(1): 1–18 (January 2009)

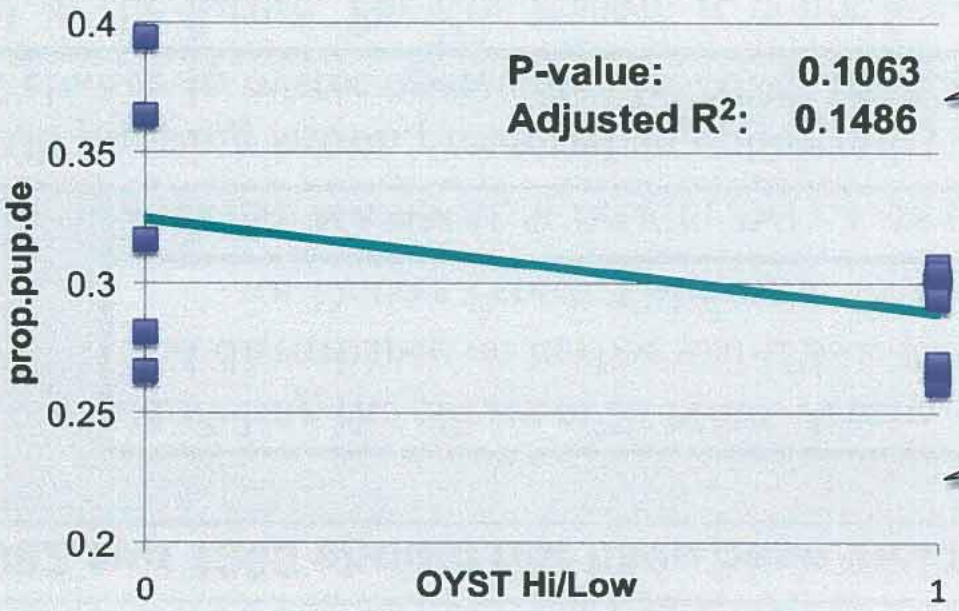
The 2008 pupping season presented an opportunity to investigate the immediate effect of a change in oyster operations. In 2008, the California Coastal Commission

less useful in the future. For this reason, it is not appropriate to include the 2008 data in the models because of this large change in management.

Becker later corrected his 2009 published paper and noted there was no management change in 2008. The 1992 protocols and 1996 kayak ban posed very significant management changes. We can adapt the Becker 2009 language to state the following: **It is not appropriate to include the 1982 & 1983 "*data in the models because of this large change in management*."**

OYST Hi/Low – Test: eliminate 1982 & 1983 – no longer significant

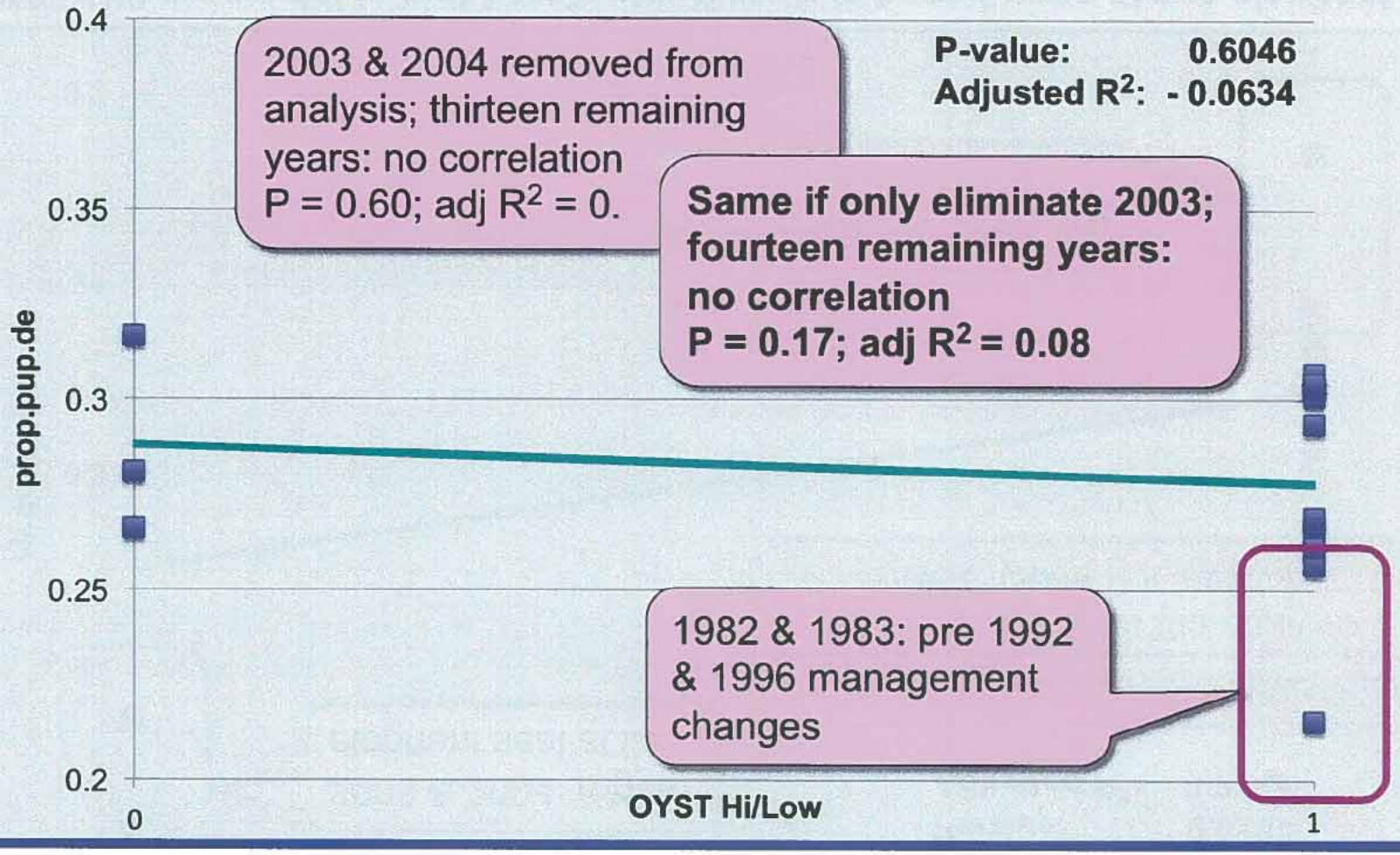




P-value no longer significant (> 0.05)

Removed 1982 & 1983 from analysis

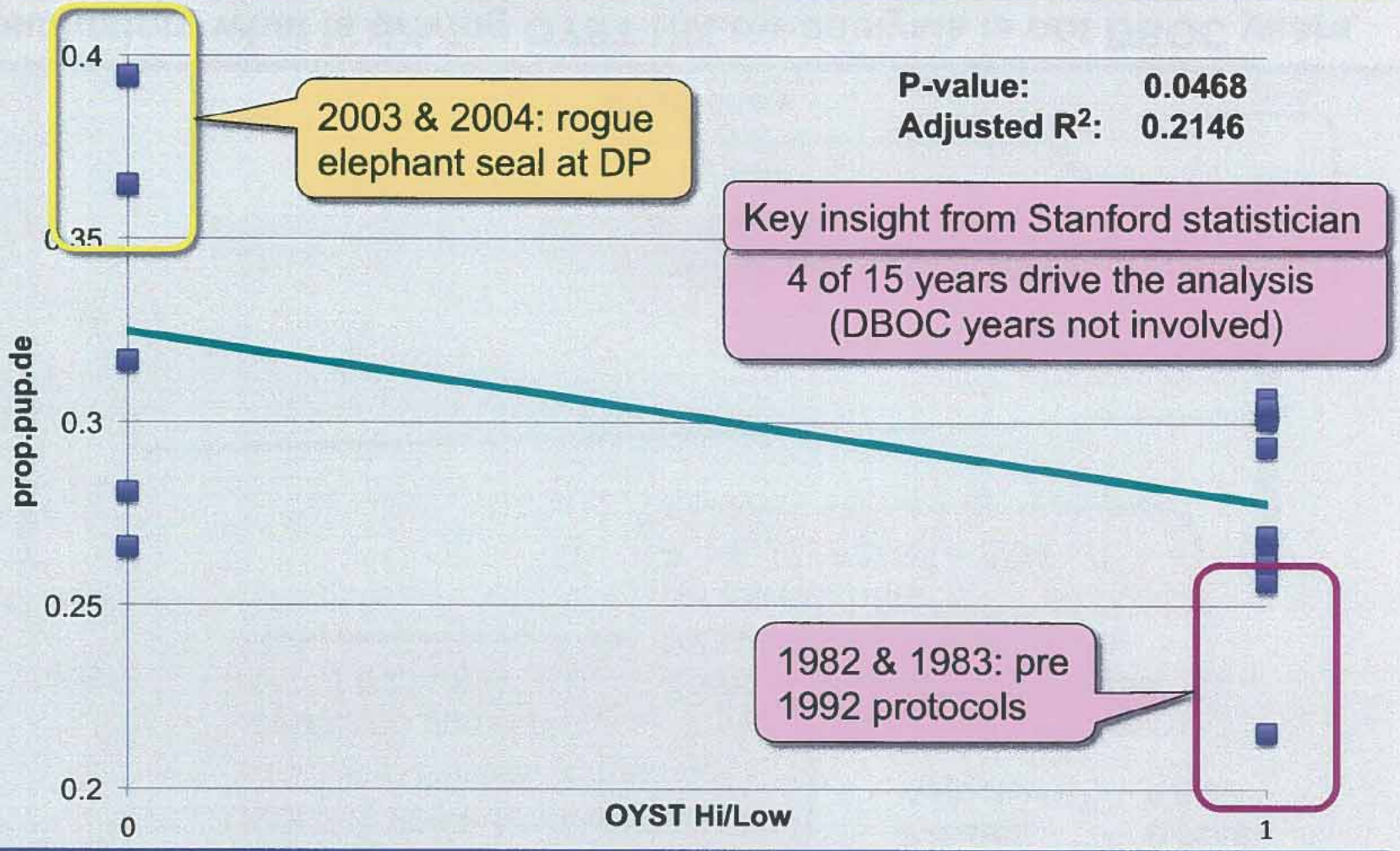
OYST Hi/Low – eliminate 2003 & 2004, or 2003 – no longer significant



Conclusion: what is driving OYST Hi/Low analysis is not DBOC years 2005-2009, and not long-term trend, but rather 2003 & 2004: if remove 2003 only, the remaining 14 years show no significance

4. No "*evidence*" that oyster farm displaced seals out of Estero

Becker's best models are driven by rogue elephant seal in 2003



OYST Hi/Low model is just barely significant; is based upon rogue elephant seal in 2003; Becker's best models are not robust to eliminating 2003 & 2004

Analysis of NPS Becker 2011: major conclusions incorrect

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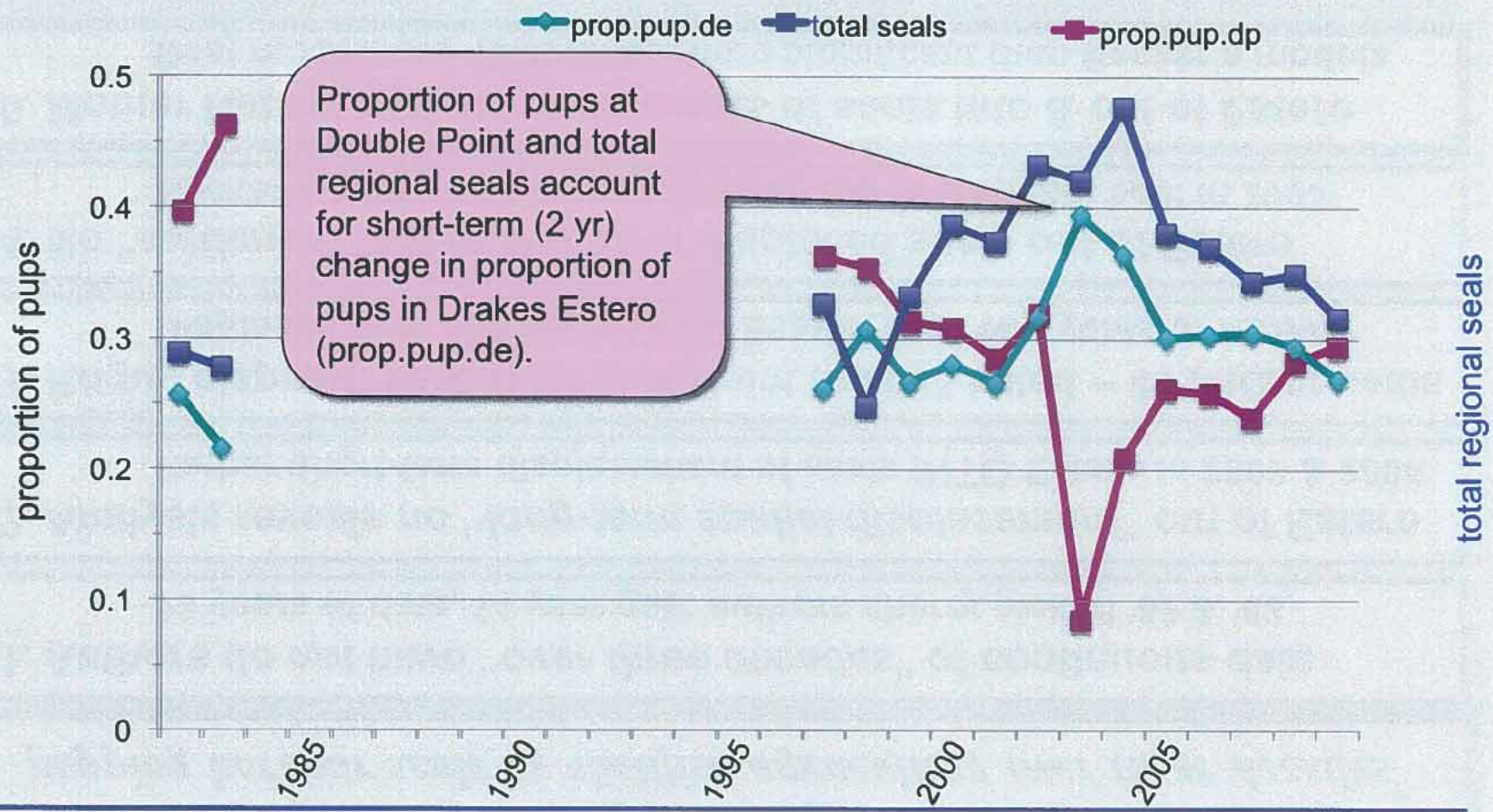
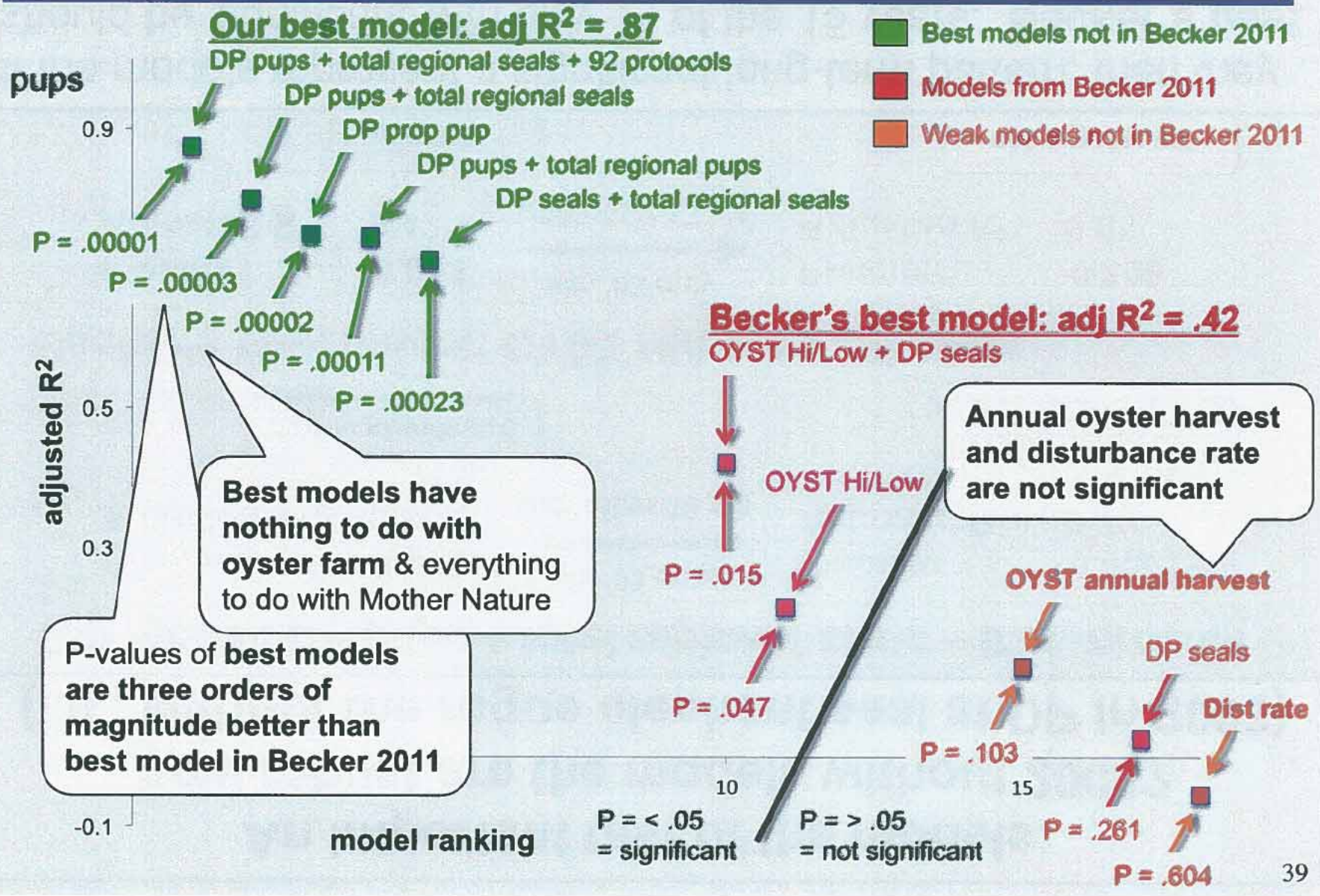


The proportion of pups at Double Point and total regional seals look better than annual oyster harvest. Q. What does statistical analysis teach us? Answer: models using these variables are 1000 times more significant.

5. Mother Nature leads to movements of seals into & out of Estero

Best models are 1000 times more significant than Becker's models



An important test of the models: how robust are the models without 2003? (i.e., without the rogue elephant seal at DP in 2003)

Top model: DP pups + total regional seals + 92 protocols

P-value: 0.00001
Adjusted R^2: 0.87

highly significant

w/o '03 only → with other 13 yrs

P-value: 0.00029
Adjusted R^2: 0.79

highly significant

Becker's best model: OYST Hi/Low + DP seals

P-value: 0.015
Adjusted R^2: 0.42

significant

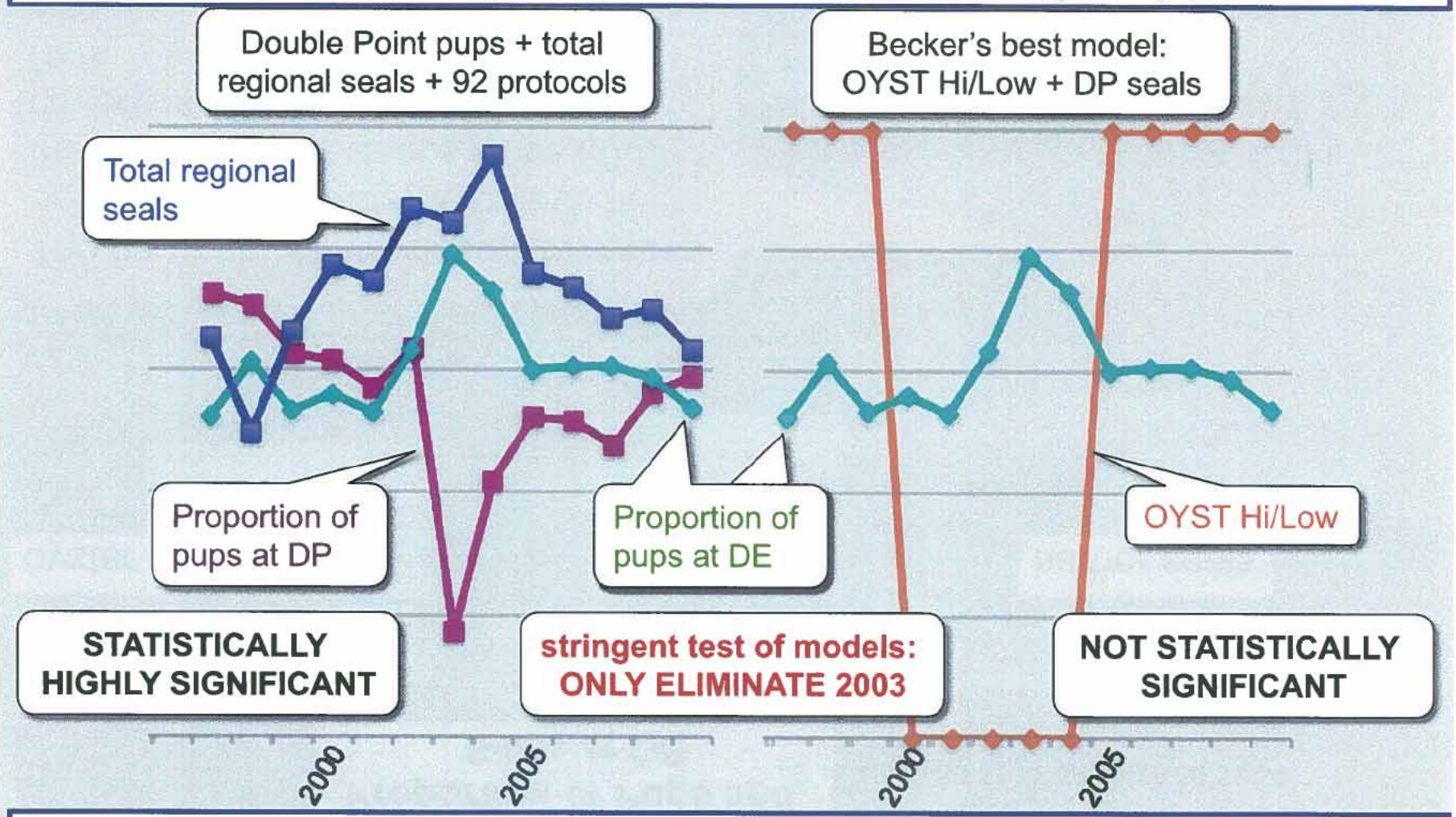
w/o '03 only → with other 13 yrs

P-value: 0.308
Adjusted R^2: 0.05

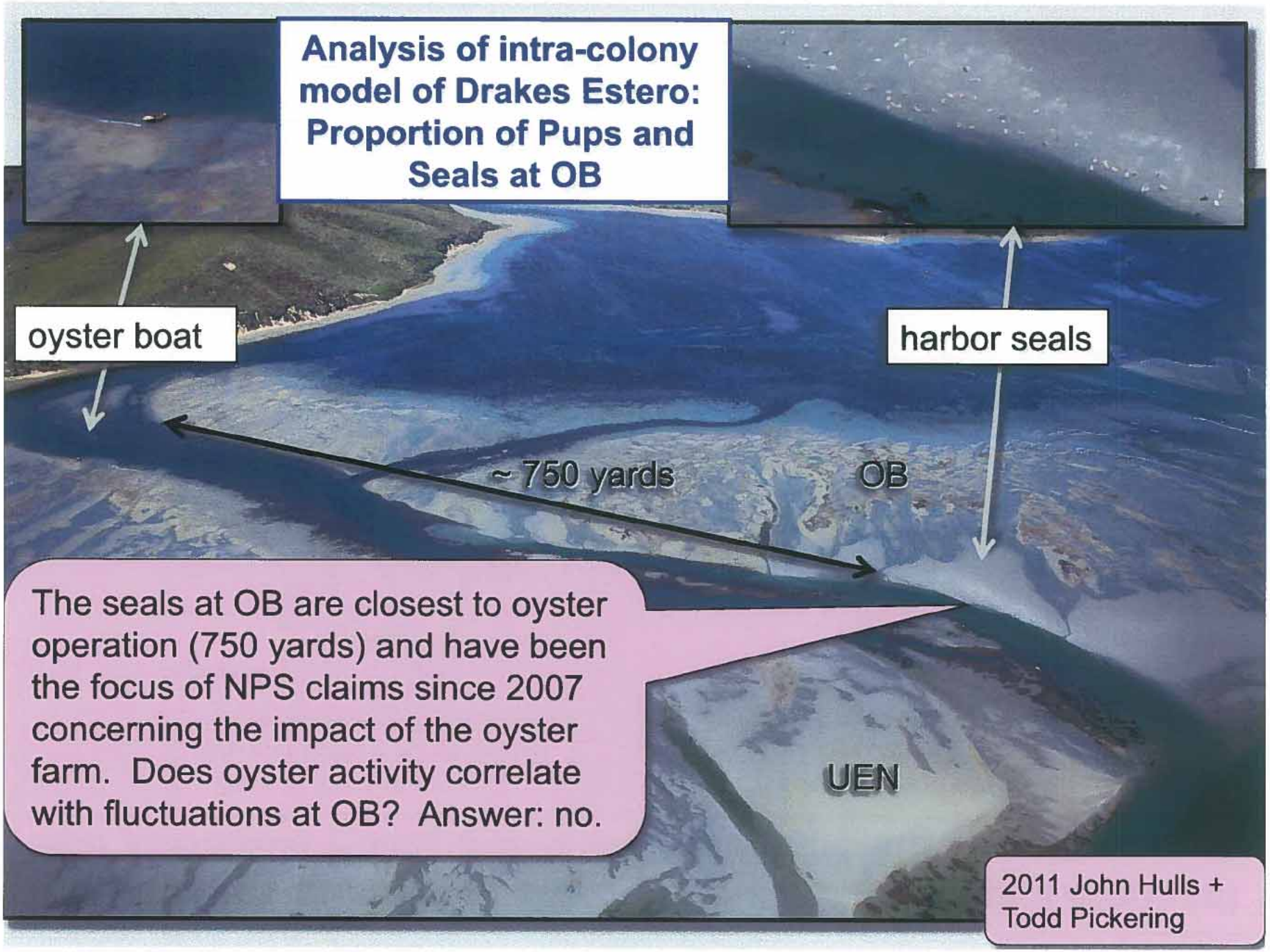
not significant

If the models represent a significant long-term pattern, then they should be significant with only 14 of the 15 years. **Becker's best models fail that test (-2003) whereas the superior models (e.g., DP pups + total regional seals) do not.**

If we test the models by eliminating 2003 (the rogue elephant seal at Double Point) and leave the remaining 14 years …



… then Becker's best model (involving OYST Hi/Low) is no longer statistically significant, whereas our best models are!


Analysis of intra-colony model of Drakes Estero: Proportion of Pups and Seals at OB
oyster boat
harbor seals
~ 750 yards
OB
The seals at OB are closest to oyster operation (750 yards) and have been the focus of NPS claims since 2007 concerning the impact of the oyster farm. Does oyster activity correlate with fluctuations at OB? Answer: no.
UEN
2011 John Hulls + Todd Pickering

Intra-Colony Models: Proportion Pups and Seals at subsite OB

notes	Dependent variable	Independent variables	P-value	Adj R^2
Top model	**OB pups**	**prop.pups.DP + total regional seals**	**0.002**	**0.645**
		prop.pups.DP	0.071	0.200
		OYST Hi/Low	0.088	0.172
		Total regional seals	0.136	0.116
	OB pups	Disturbance rate	0.941	-0.090
Top model	**prop.pups.OB**	**Total regional seals**	**0.001**	**0.583**
	prop.pups.OB	prop.pups.DP	0.087	0.173
	prop.pups.OB	OYST Hi/Low	0.187	0.075
	prop.pups.OB	Disturbance rate	0.754	-0.081
Top model	**OB seals**	**Total regional seals**	**0.002**	**0.572**
	OB seals	prop.pups.DP	0.137	0.116
	OB seals	OYST Hi/Low	0.186	0.076
	OB seals	Disturbance rate	0.717	-0.077

best models for pups at OB

models that are not significant

(1)Seals and pups at subsite OB, site closest to oyster boats, **do not correlate with OYST Hi/Low or disturbance rate**.

(2)Seals and pups at OB **do correlate with Mother Nature – total regional seals and Double Point pups** along coast.

Intra-Colony Models: Proportion Pups in Upper Estero (UEN, OB, UEF) Compared to Pups in Drakes Estero and Pups in Region

notes	model	P-value	Adj R^2
prop.pup.upper estero/ total Drakes Estero pups	**Double Point (DP) proportional pups (as a proportion over total regional pups)**	**0.00862**	**0.37900**
	Total regional seals	**0.01052**	**0.36117**
	Disturbance rate	0.58195	- 0.05115
	OYST Hi/Low	0.70276	- 0.06446
	OYST annual harvest	0.94747	- 0.07655
Prop.pup.upper estero/ total regional pups	**DP proportional pups (over t regional pups)**	**0.00032**	**0.61564**
	Total regional seals	**0.00121**	**0.53286**
	OYST Hi/Low	0.28304	0.01783
	Disturbance rate	0.63760	- 0.05799
	OYST annual harvest	0.59336	- 0.05266

best models for pups at Upper Estero

models that are not significant

(1)Seals and pups at subsites UEN, OB, & UEF (Upper Estero), **do not correlate with OYST Hi/Low or disturbance rate.**

(2)Seals and pups at UEN, OB, & UEF **do correlate with Mother Nature – total regional seals & Double Point pups.**

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades

Regional scale: NPS claimed oyster farm activity drives seals **out of Drakes Estero**

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades

Colony scale: NPS claimed oyster farm activity drives seals **out of Upper Estero**

Becker 2011: regional scale conclusion incorrect

analysis of NPS data: natural forces along coast drive harbor seals **INTO Drakes Estero**

increased total regional seals

seals at Double Point

rogue elephant seal in 2003

Becker 2011: colony scale conclusion incorrect

analysis of NPS data: natural forces along coast drive harbor seals **INTO Upper Estero**

Upper Estero

increased total regional seals

seals at Double Point

rogue elephant seal in 2003

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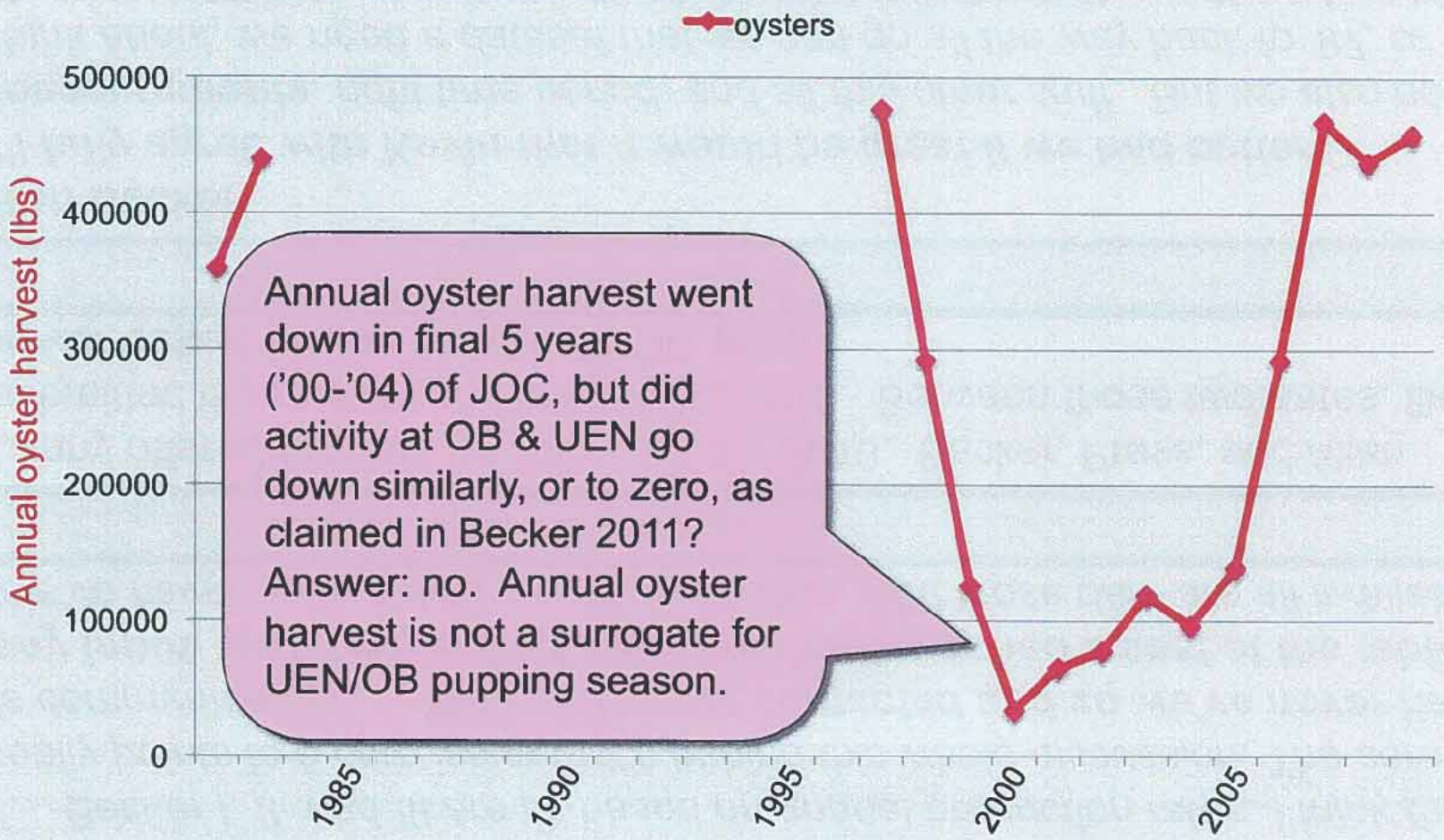
a. Annual oyster harvest is not surrogate for UEN/OB pupping season

Is annual oyster harvest a surrogate for oyster activity at OB/UEN during pupping season? A: No



annual oyster harvest

Quotes from MMC panel meeting, February 23, 2010

Kevin Lunny:
"… Becker I, II, and III are all based on annual production rates. I think this really points to a core issue that's behind this whole discussion. The core issue is communication. … ***We were never contacted and so we've never had any input, we've never had a part, we've never had a seat at the table.*** *We've never been asked a single question. And those data are all available."*

Lunny offered his data on February 23, 2010. Becker, Press, and Allen submitted their paper on October 14, 2010. Between those two dates, **Becker never asked Lunny for the DBOC data.**

Ben Becker:
"I fully agree with Kevin that it would be great if we had better measurements*, right time period, and all this other stuff. But we also need to think about, we need a dataset that we can go all the way back to '97, or '82 in the case of the new analysis, that is consistent.* ***Sometimes there's a trade-off between accuracy and consistency****."*

Annual oyster harvest is not a surrogate for oyster activity at UEN/OB during pupping season

year	Annual oyster harvest (lbs)	UEN/OB Mar-May oyster harvest	UEN/OB Mar-May boat harvest trips
2005	138958	8160	9
2006	291538	15184	33
2007	468000	1440	2
2008	438000	9080	16
2009	458000	22280	44

model	P-value	Adj R^2
UEN/OB Mar-May oyster harvest vs. UEN/OB Mar-May harvest boat trips	0.005	0.984
Annual oyster harvest vs. UEN/OB Mar-May boat harvest trips	0.650	- 0.317
Annual oyster harvest vs. UEN/OB Mar-May oyster harvest (lbs)	0.737	- 0.396

In April '07, DBOC stopped harvesting at UEN/OB until August (as a result of threats by Superintendent)

The data are clear – there is no relationship between annual oyster harvest vs. activity at UEN/OB during pupping season.

UEN/OB pupping season (Mar-May) harvest & harvest boat trip data have been collected by DBOC since 2005. The Marine Mammal Commission encouraged Becker in Feb 2010 to obtain these data, but he did not.

Analysis of NPS Becker 2011: major conclusions incorrect

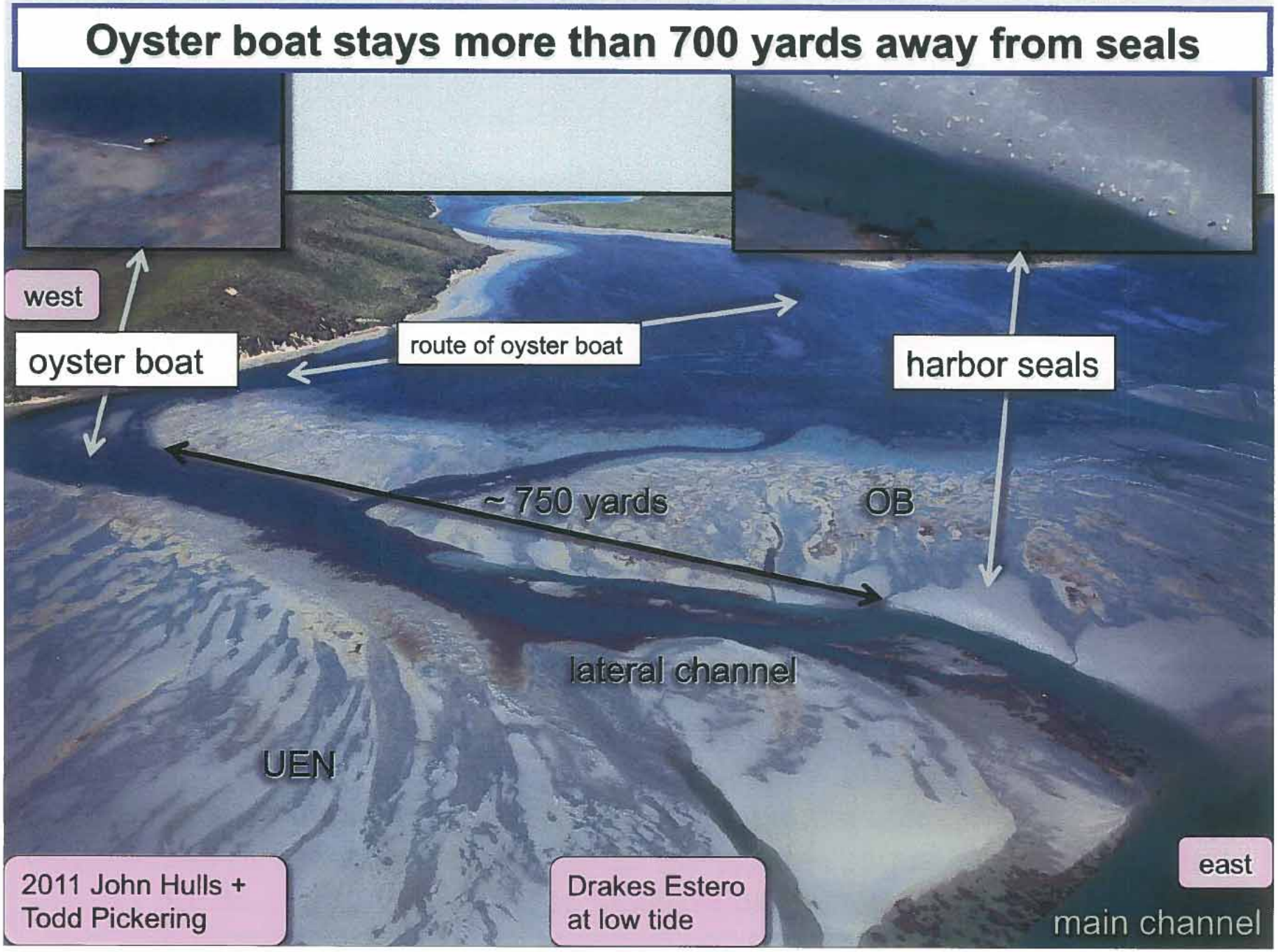
Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

6. Authors used incorrect seal maps, oyster maps, & inferences

NPS scientists never got correct data; misinterpreted aerial photos

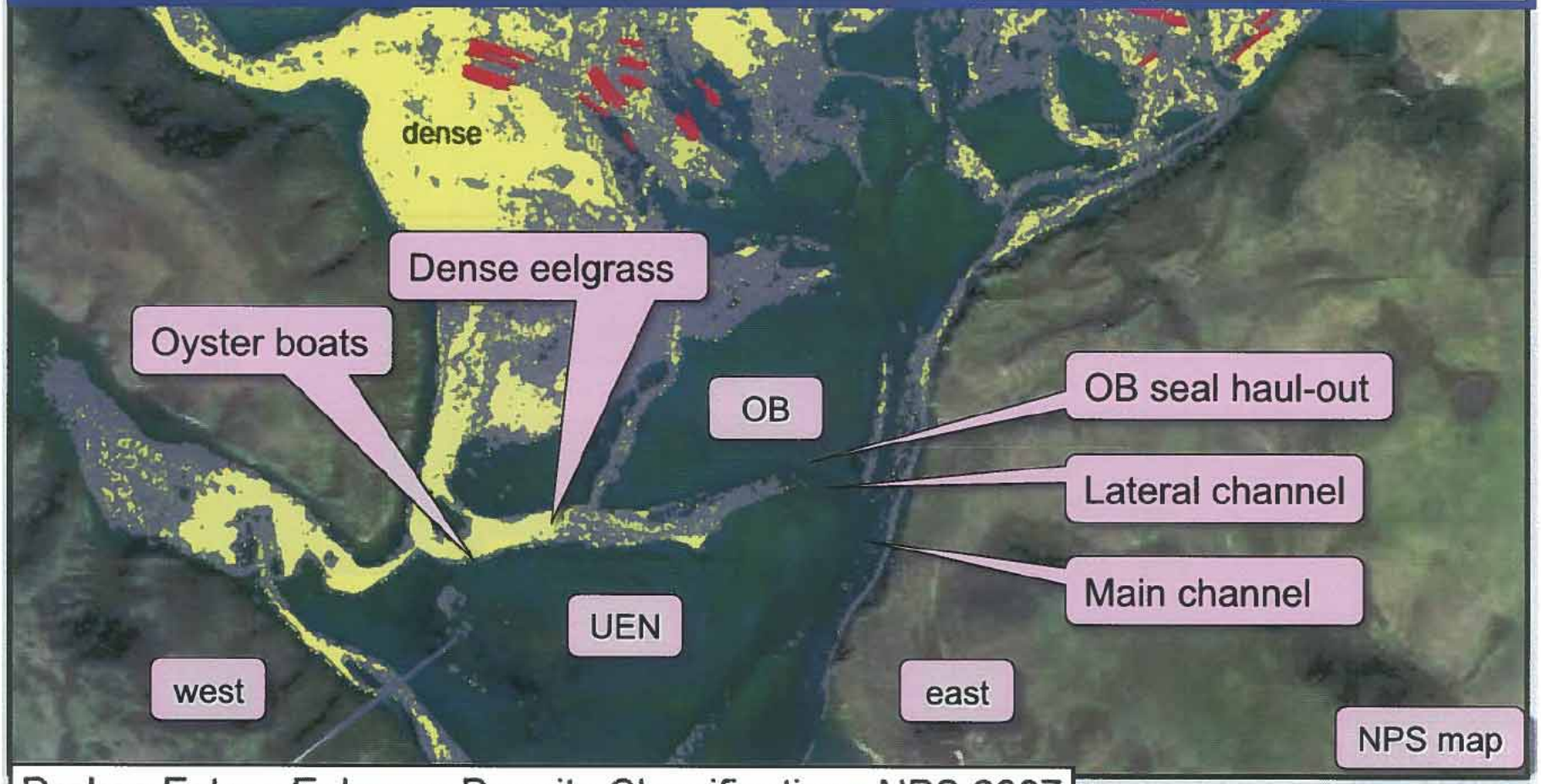
a. Annual oyster harvest is not surrogate for UEN/OB pupping season

b. Seal haul-out map is misleading: seals and oysters do not overlap


Oyster boat stays more than 700 yards away from seals
west
oyster boat
route of oyster boat
harbor seals
~ 750 yards
OB
lateral channel
UEN
2011 John Hulls + Todd Pickering
Drakes Estero at low tide
east
main channel

Kevin Lunny: *"… You'll look at the eelgrass maps and you'll see that in the past decade or so, eelgrass has filled in the lateral channel and we don't see the harbor seals hauling out along the lateral channel now."*

Sarah Allen: *"I concur with what Kevin's noted about changes to the lateral channel … I agree, there is eelgrass there ..."*



Drakes Estero Eelgrass Density Classifications NPS 2007

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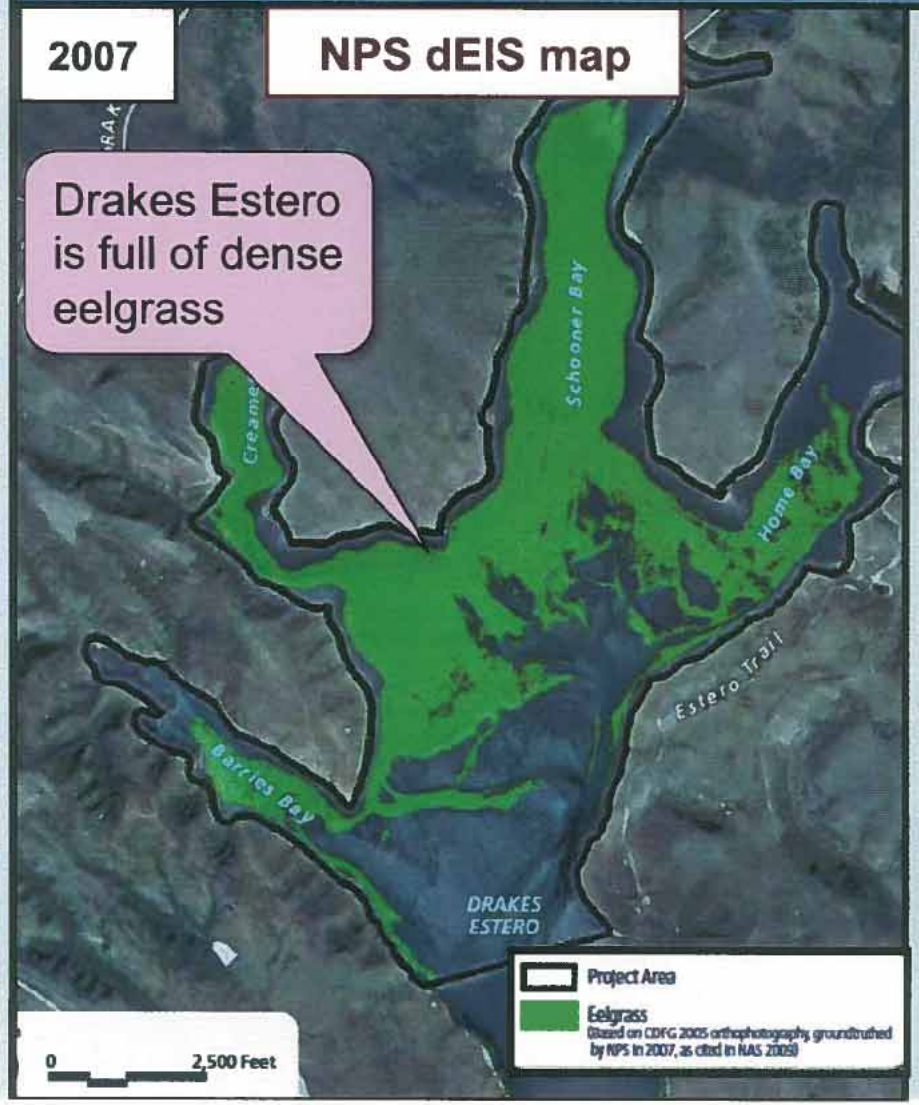

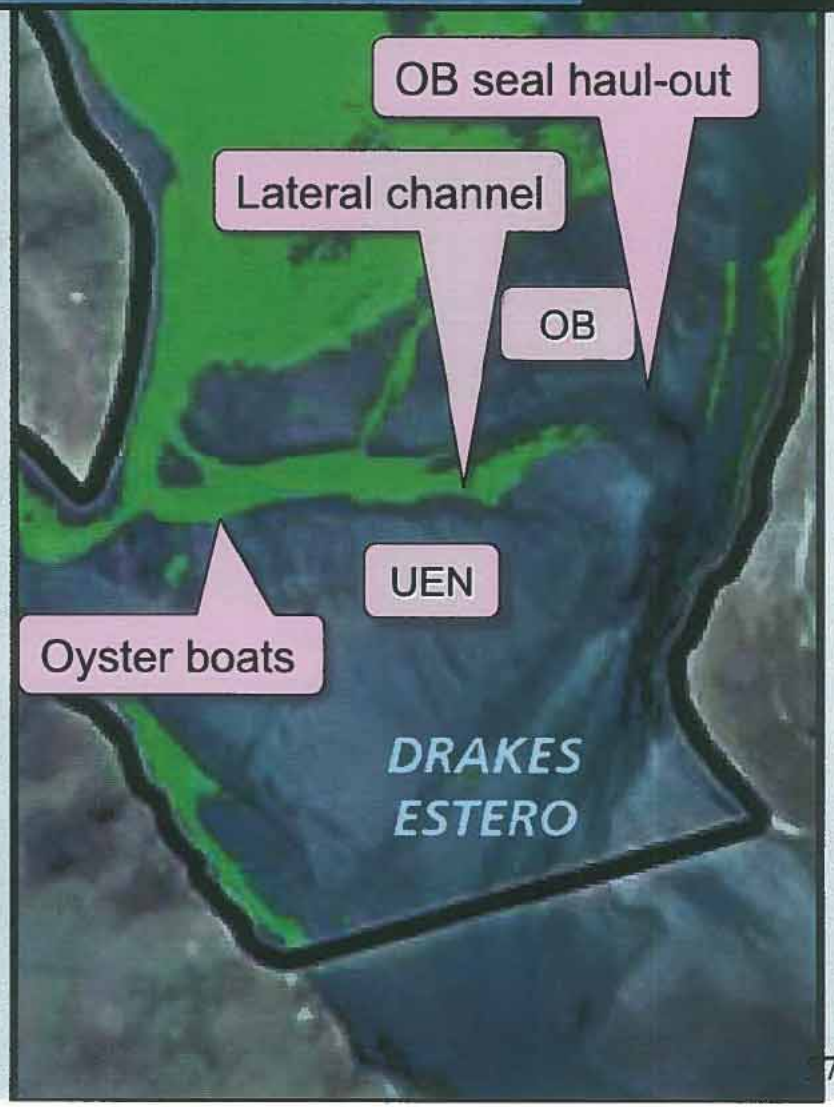

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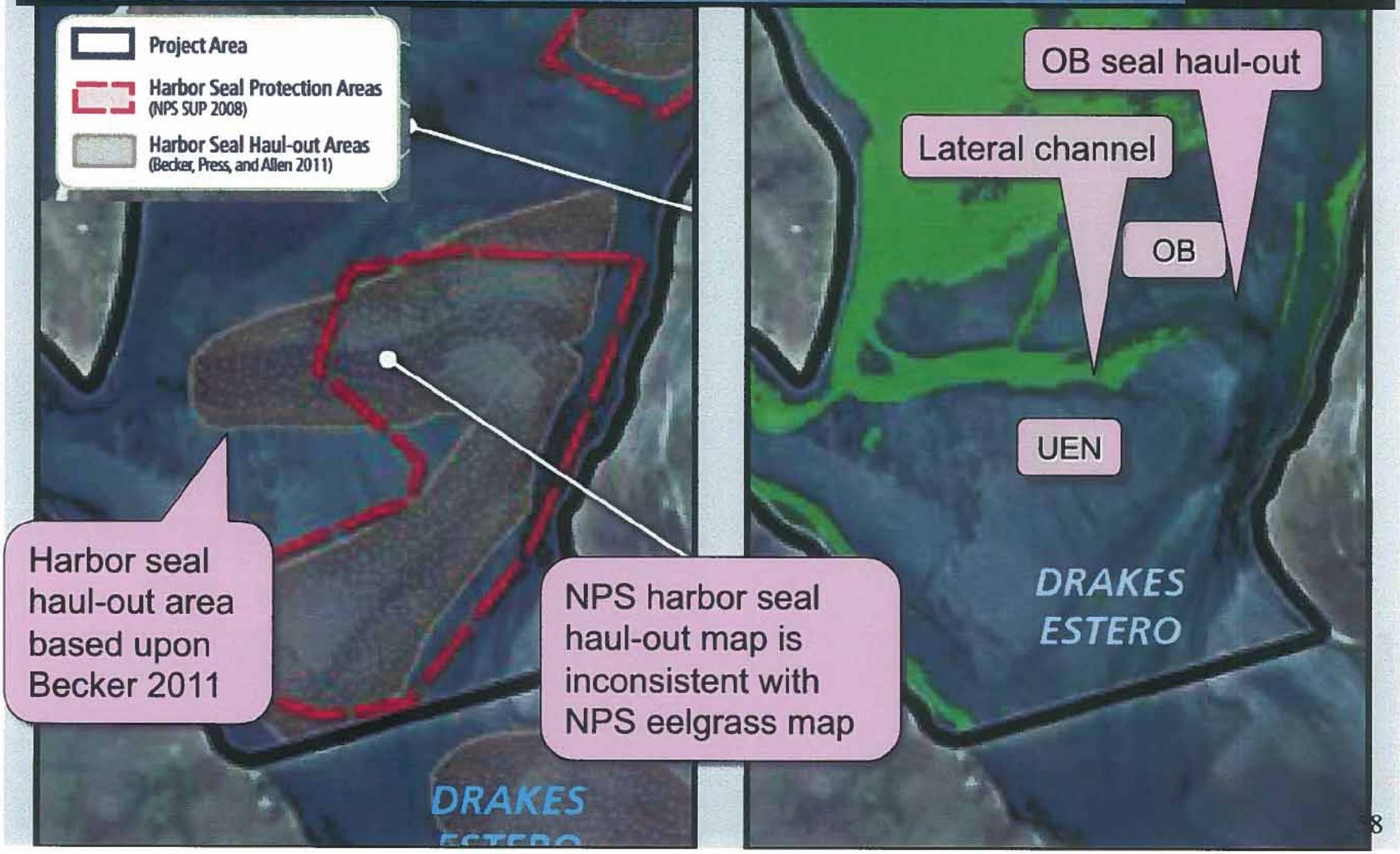
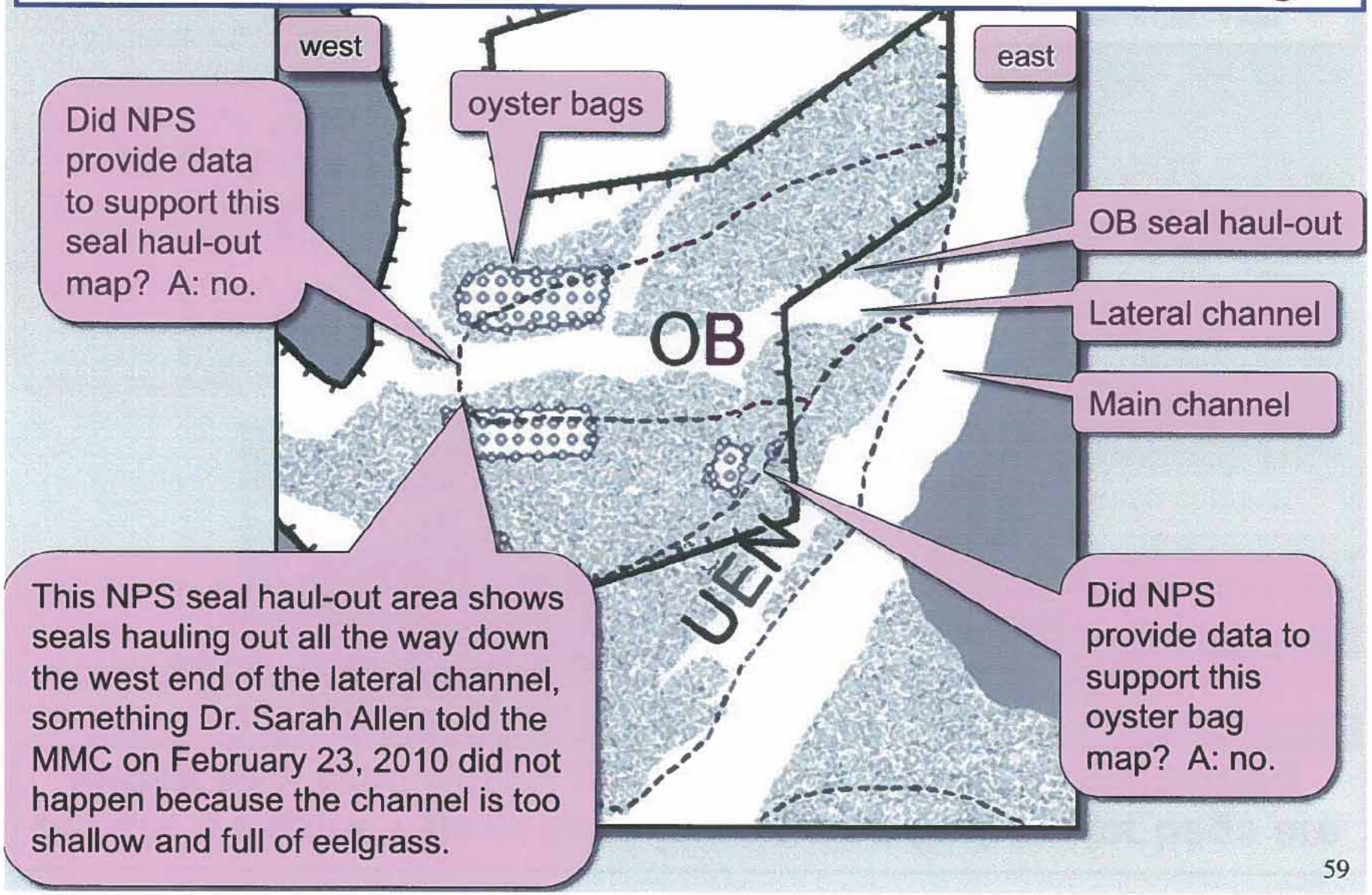
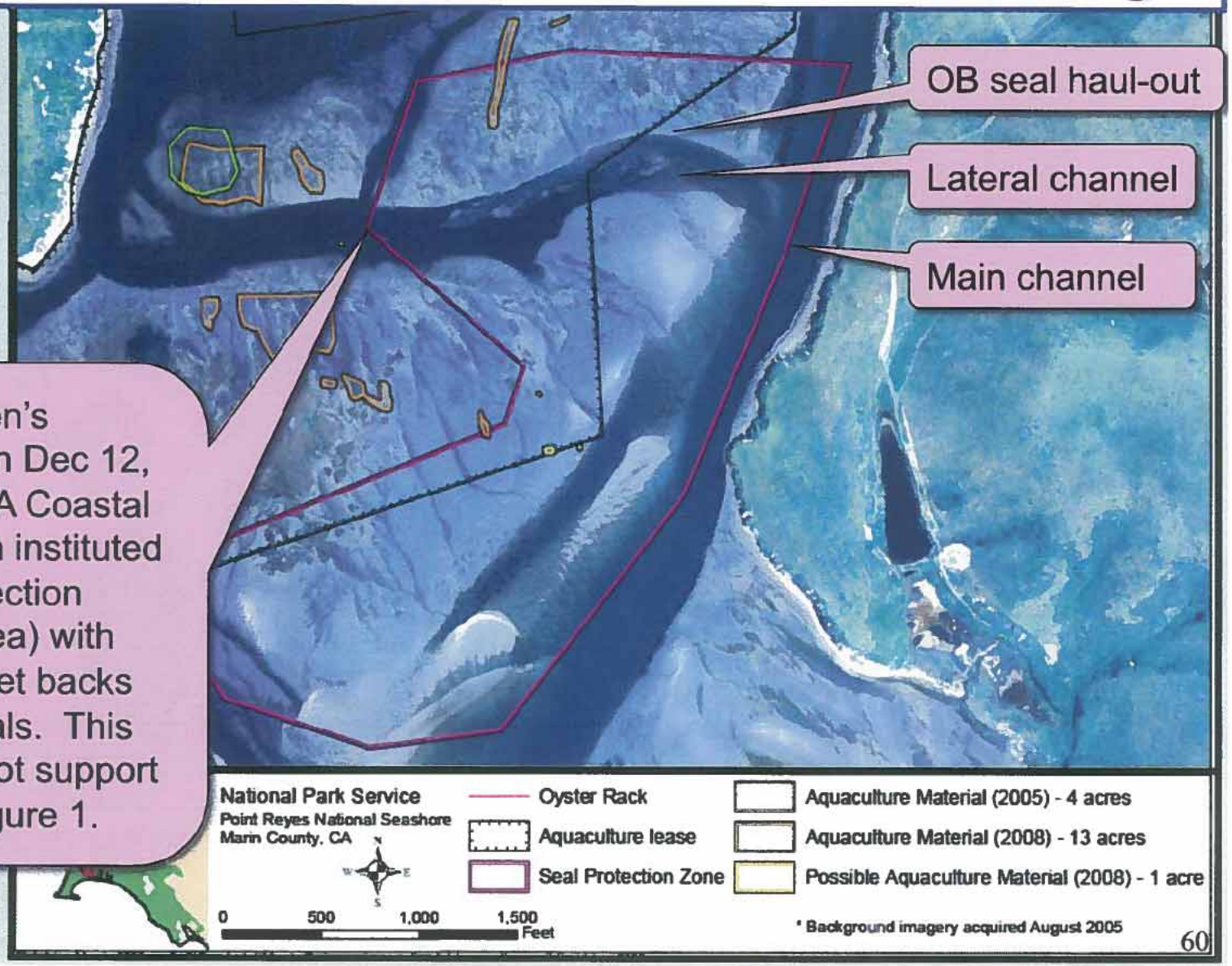
Drakes Bay Oyster Company Special Use Permit



Becker's Figure 1 gave false impression that oyster bags are within seal haul-outs – map is inaccurate and misleading

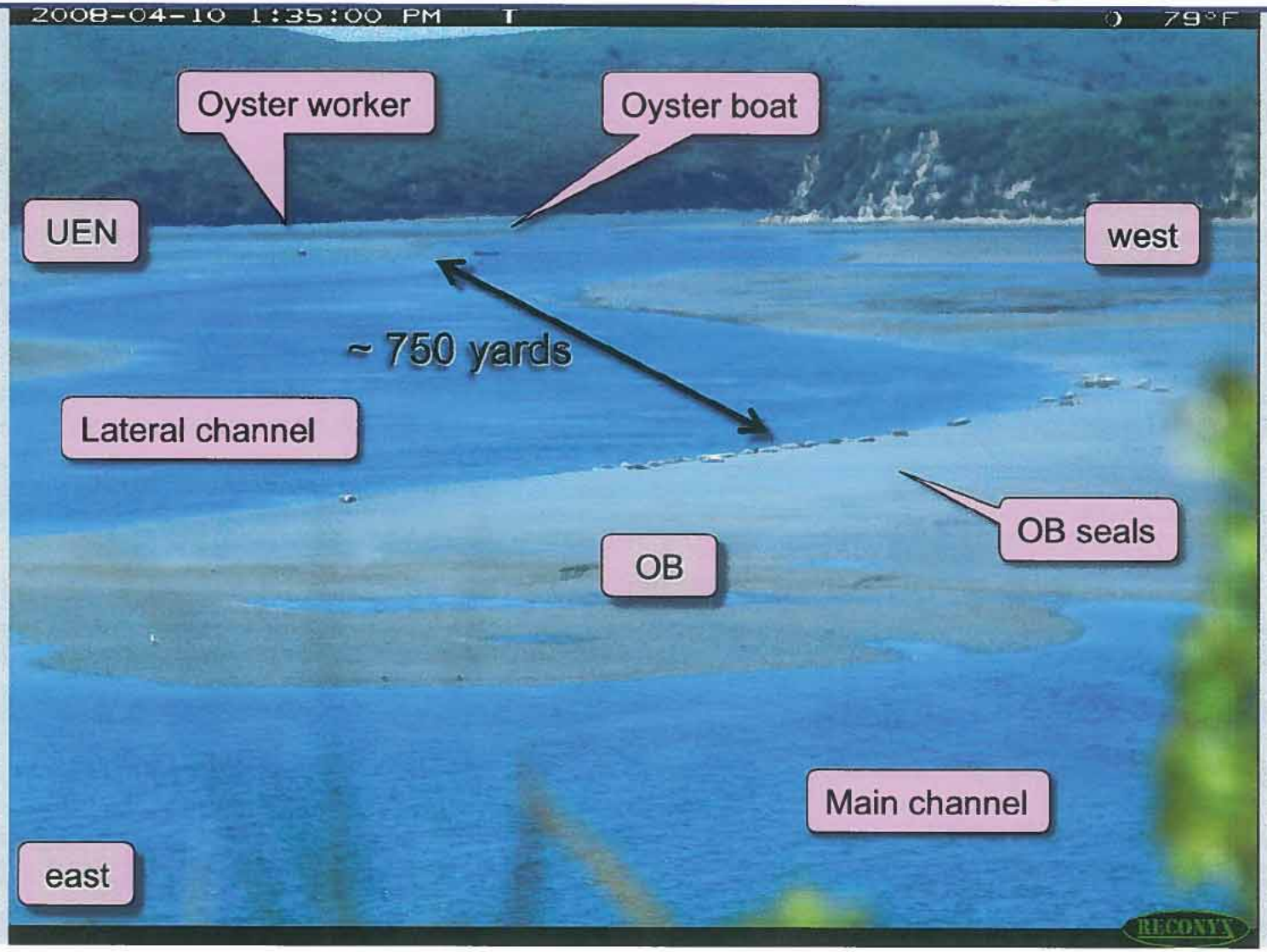


Becker's Figure 1 gave false impression that oyster bags are within seal haul-outs – map is inaccurate and misleading



With Dr. Allen's guidance, on Dec 12, 2007, the CA Coastal Commission instituted a Seal Protection Zone (or Area) with >300 yard set backs from the seals. This map does not support Becker's Figure 1.

281,000 photographs from NPS secret cameras ('07-'10) show OB seals at east end of lateral channel, and oyster boats and workers at west end, well over 600 yards away



Analysis of NPS Becker 2011: major conclusions incorrect

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

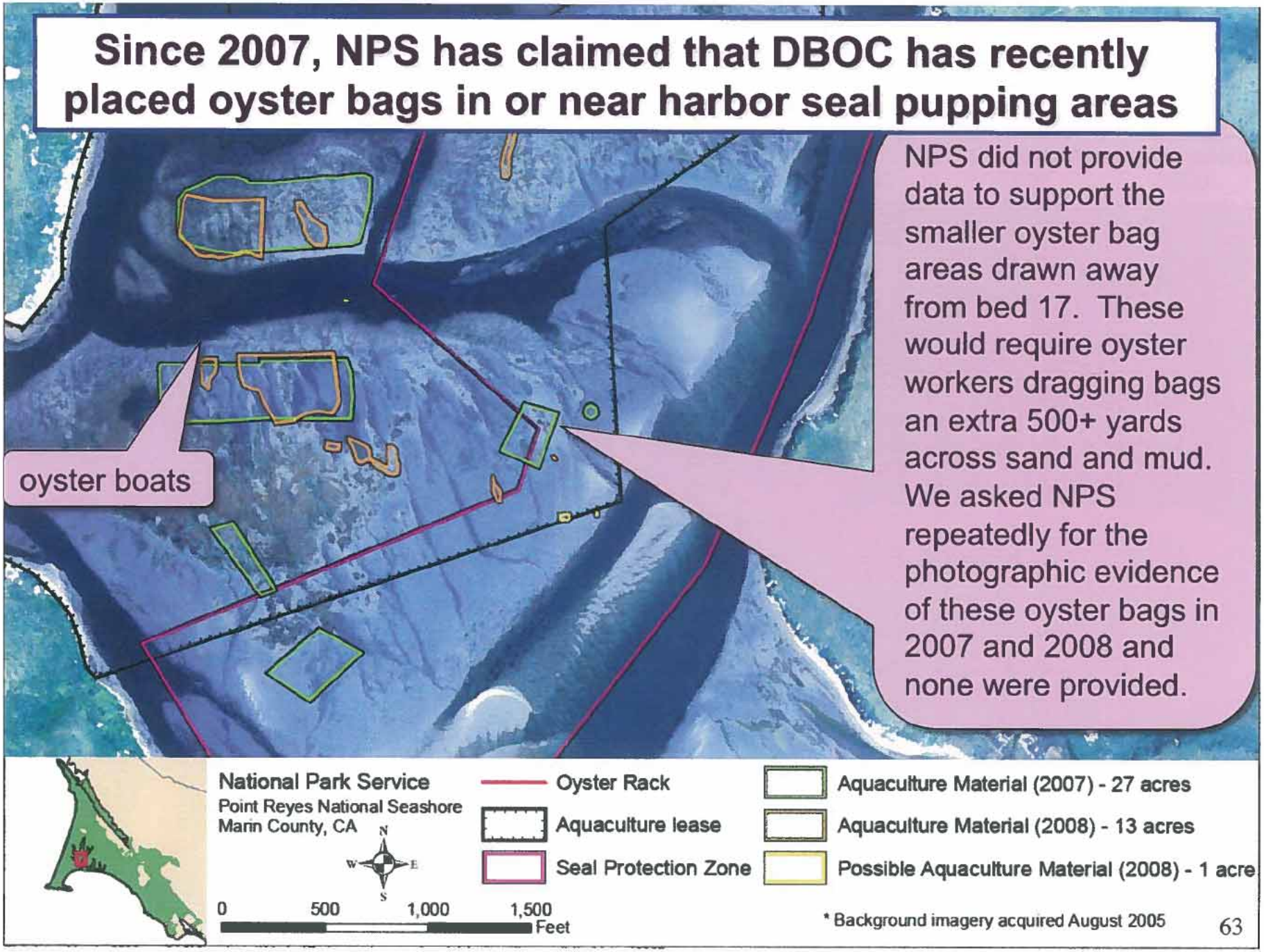
6. Authors used incorrect seal maps, oyster maps, & inferences
NPS scientists never got correct data; misinterpreted aerial photos

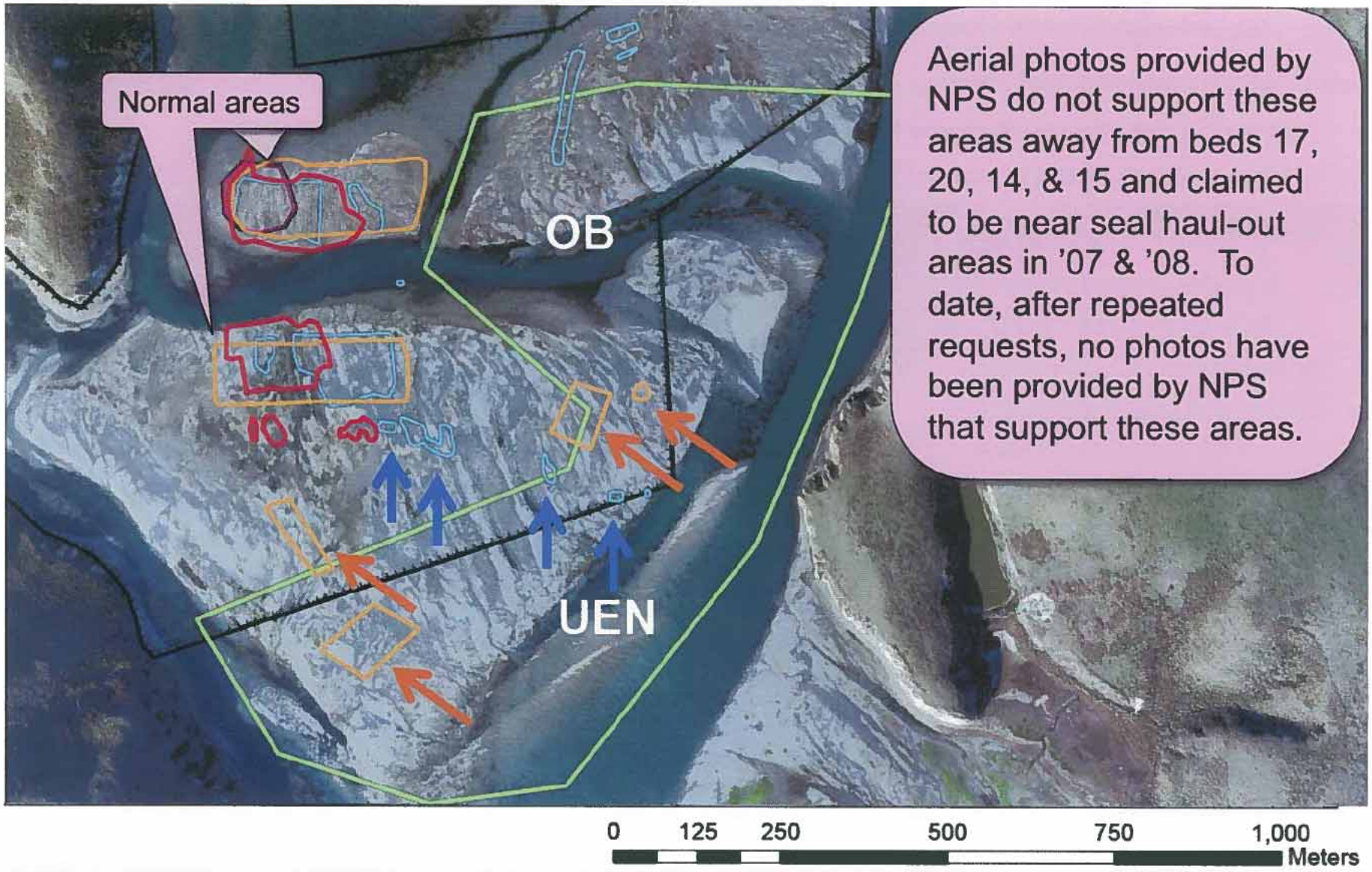
a. Annual oyster harvest is not surrogate for UEN/OB pupping season

b. Seal haul-out map is misleading: seals and oysters do not overlap

c. Claims and maps of oyster bags in pupping areas are incorrect

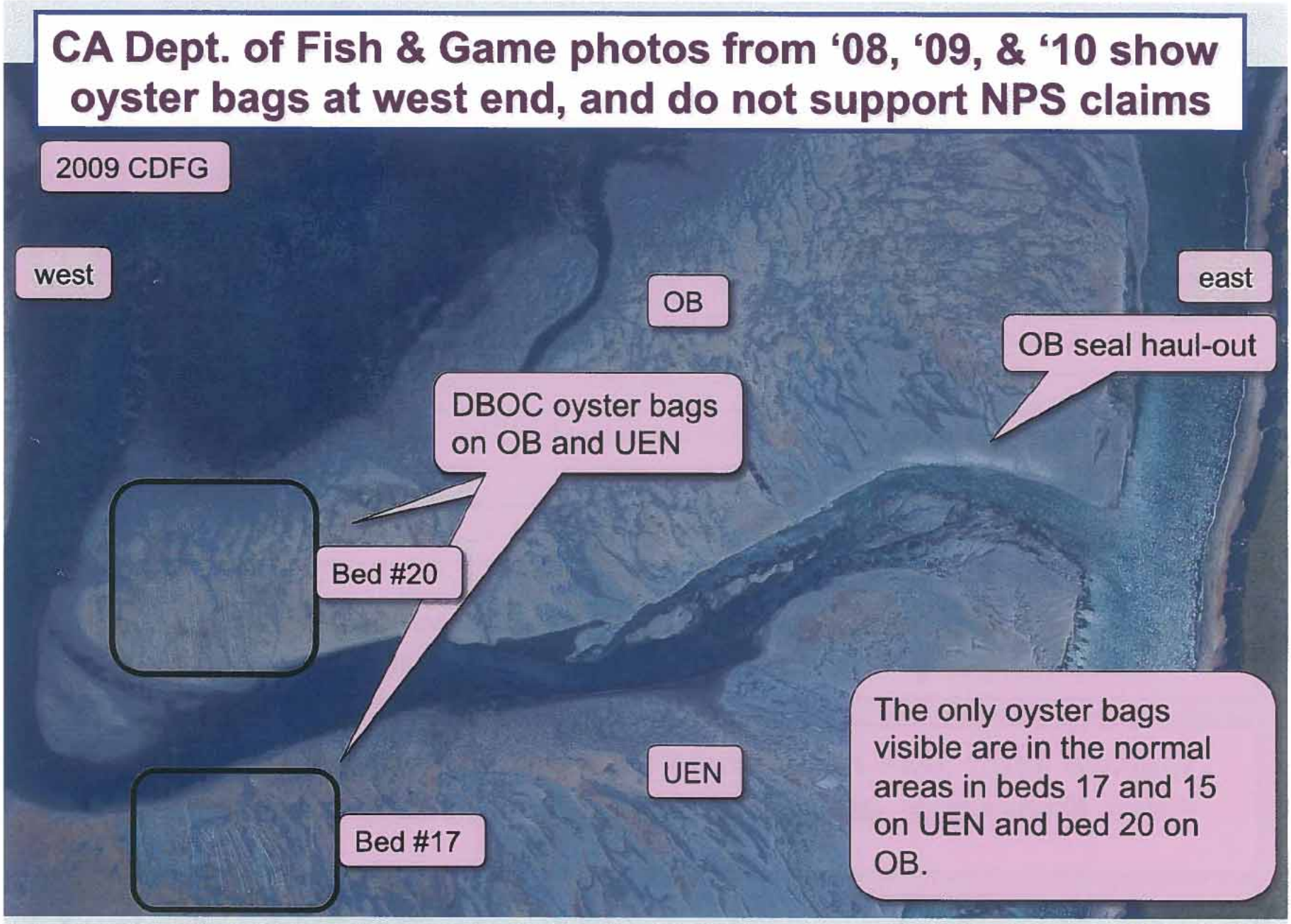
Since 2007, NPS has claimed that DBOC has recently placed oyster bags in or near harbor seal pupping areas





We made repeated requests of NPS all summer as part of the MMC process, asking for photos of oyster bags in or near harbor seal pupping areas. **NPS was unable to provide any photos that support the NPS claim.**

CA Dept. of Fish & Game photos from '08, '09, & '10 show oyster bags at west end, and do not support NPS claims



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c. Claims and maps of oyster bags in pupping areas are incorrect

d. Claims of zero oyster bags at OB/UEN from 2000-'04 are incorrect
CDPH records show JOC continued to harvest from UEN & OB

Becker 2011 claimed no oyster activity at UEN/OB in '00-'04

We asked NPS for all data (i.e. photographs & notebooks) supporting the numbers in this Figure.

What is the basis for Becker 2011 claim that JOC had no oyster activity at UEN/OB in 2000-2004?

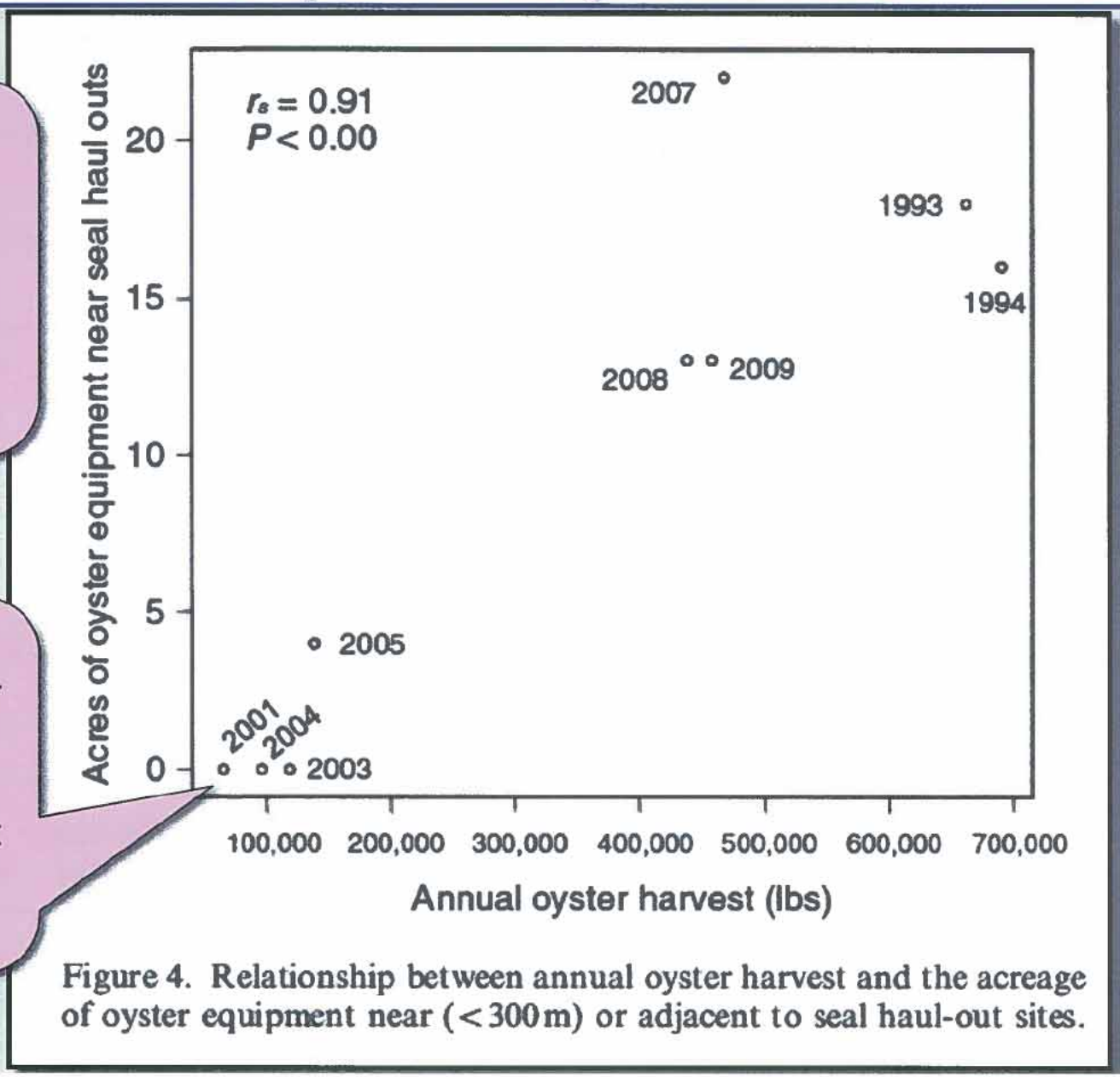


Figure 4. Relationship between annual oyster harvest and the acreage of oyster equipment near (<300 m) or adjacent to seal haul-out sites.

Becker 2011 made incorrect inferences in Table A1

Table A1.

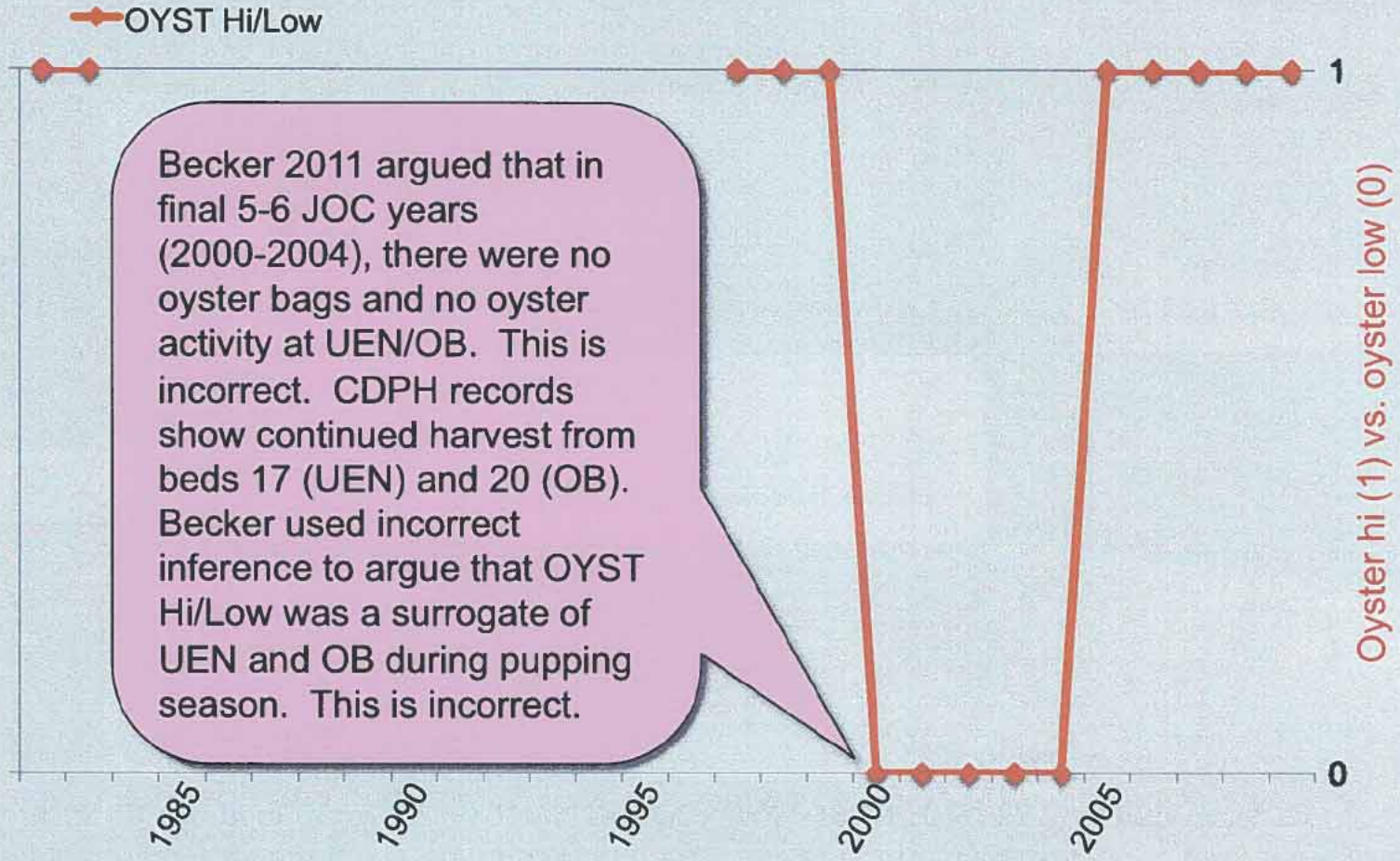
Year	Oyster harvest (lbs)	Inferred level of mariculture use of sandbars near seals	Source(s) of inference
1997	476,791	high	harvest data
1998	292,188	high	harvest data, higher than 2005
1999	125,749	modelled high & low	slightly higher than 2000-2004, declining
2000	34,094	low	lower than 2002-2004
2001	65,676	low	aerial image of absence of bags
2002	78,064	low	DTP, pers. obs, harvest data
2003	118,643	low	aerial image of absence of bags
2004	96,754	low	DTP, pers. obs, harvest data
2005	138,958	high	aerial image of bags, increasing harvest
2006	291,538	high	increasing harvest, bags in '05
2007	468,000	high	aerial image of bags
2008	438,000	high	aerial image of bags
2009	458,000	high	aerial image of bags

OYST Hi/Low is based upon this "inferred" level of activity at UEN/OB during pupping season

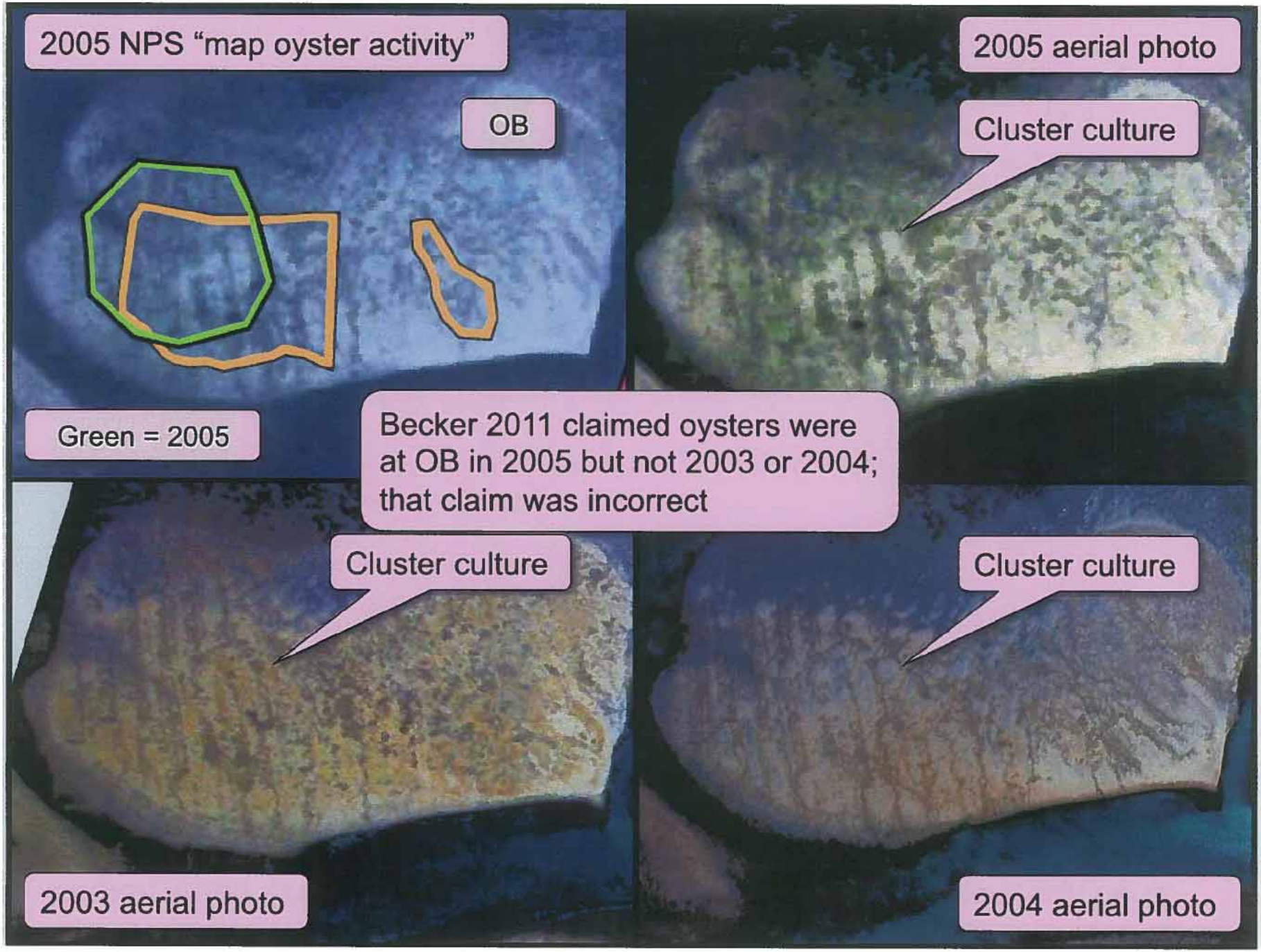
Becker's "inferences" for UEN/OB pupping season activity came from aerial photos, harvest data, and David Press observations

But Becker failed to obtain the right data from CDFG, CDPH, and former JOC employees and owners.

Becker used OYST Hi/Low categorical designation based upon NPS inferences as surrogate for activity at UEN/OB during pupping season



OYST Hi/Low categorical oyster activity


2005 NPS "map oyster activity"
OB
Green = 2005
2005 aerial photo
Cluster culture
Becker 2011 claimed oysters were at OB in 2005 but not 2003 or 2004; that claim was incorrect
Cluster culture
2003 aerial photo
Cluster culture
2004 aerial photo

Former Johnson's Oyster Company owner, manager, and foreman claim JOC harvested from OB & UEN from '00 to '04

April 21, 2011

To whom it may concern:

Before Drakes Bay Oyster Company began in 2005, every year since 1984 to the present, oyster bag culture was used on Bull Point, in areas 29 and 30 and on Berries Bar in harvest areas 14, 20 and 17.

Jorge Mata

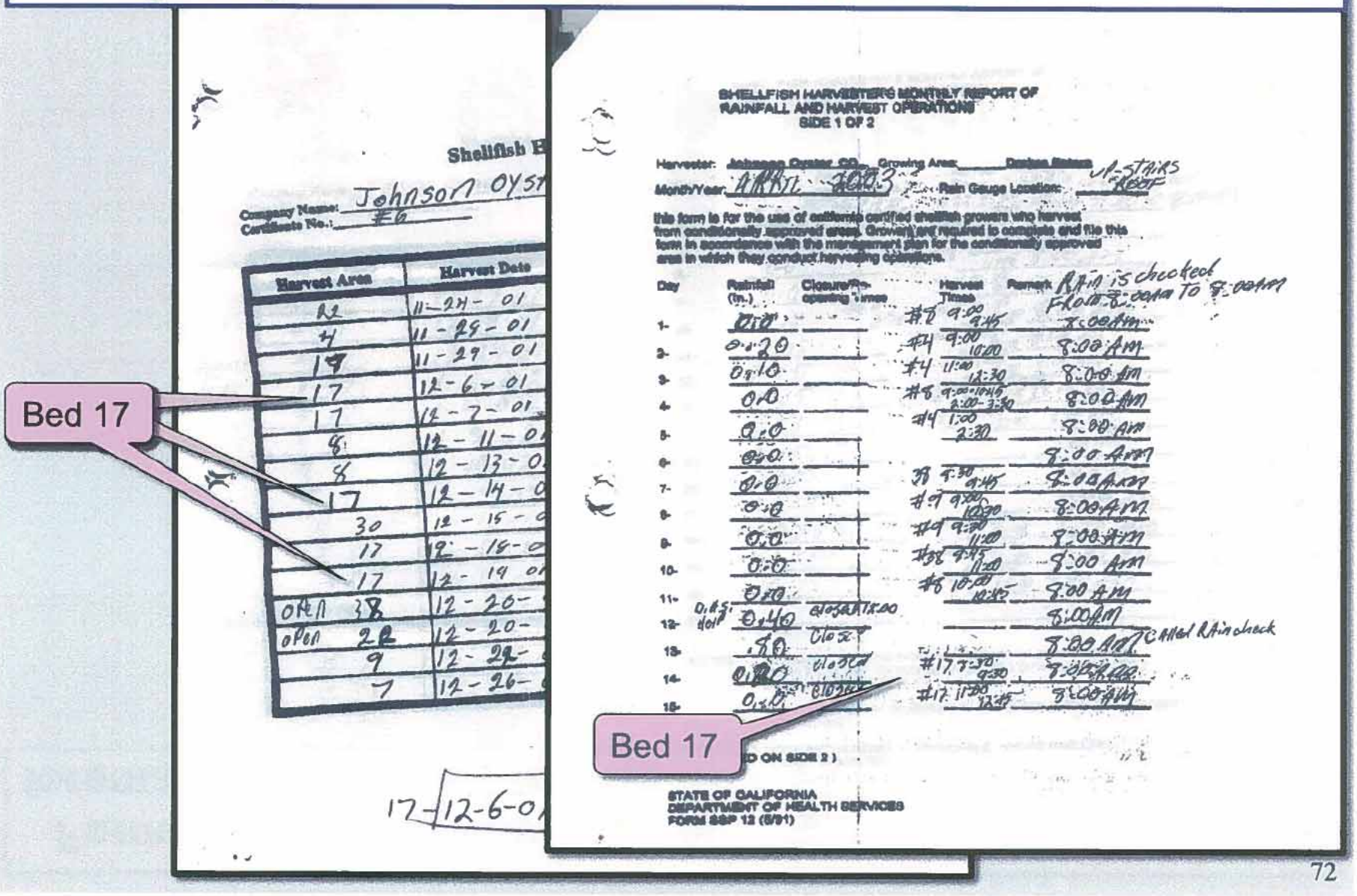
We received statements from three key people, all asserting that JOC continued to harvest oysters from bed #17 (UEN), bed #20 (OB), and neighboring beds throughout 2000-2004, even as overall production decreased. Bed #17 is the only place where JOC could harvest after rainfall (only place in CA where CDPH permits harvesting after rainfall).

(1) Jorge Mata, former JOC foreman and current DBOC foreman;

(2) Nellie Gamez, former JOC office manager who collected records;

(3) Mark Johnson, former JOC co-owner

California Dept. of Public Health records of oyster harvest during rainy season show harvest from bed #17 in '01 to '04



In contrast to Becker 2011, the years 2003, 2004, & 2005 were nearly identical in terms of oyster bags at UEN/OB

Becker 2011 claimed there were no oysters harvested at OB & UEN in last five JOC years (2000-2004), and DBOC increased activity in 2005. This was incorrect.

- **It is contradicted by the CDFG aerial photographs.**
- **It is contradicted by CDPH records.**
- **It is contradicted by JOC and DBOC employees and owners.**

Had Becker obtained documents and data from CDPH and CDFG, he would have learned that JOC harvested from UEN & OB in 2000-2004.

Had Becker talked to former JOC employees or owners, he would have learned that JOC harvested from UEN & OB in 2000-2004.

Had Becker talked to Lunny, as MMC recommended, he would have learned about the oyster culture systems seen in the photos.

Analysis of NPS Becker 2011: major conclusions incorrect

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

1. Authors do not have "over *three decades*" of continuous data
   13 years of data, 14 year gap; authors cherry picked '82 & '83

2. Analysis reveals no "*long-term spatial displacement*" out of Estero
   Rather short-term displacement of seals INTO Estero in 2003 & 2004

3. Rogue elephant seal at Double Point in 2003 killed ~ 40 harbor seals
   Displaced over 100 pups INTO Estero; took two years to recover

4. No "*evidence*" that oyster farm displaced seals out of Estero
   Becker's best models are driven by rogue elephant seal in 2003

5. Mother Nature leads to movements of seals into & out of Estero
   Best models are 1000 times more significant than Becker's models

6. Authors used incorrect seal maps, oyster maps, & inferences
   NPS scientists never got correct data; misinterpreted aerial photos

Draft Environmental Impact Statement
Drakes Bay Oyster Company Special Use Permit

NPS Science & Implications for the Oyster Farm EIS

by Dr. Corey Goodman

October 16, 2011

Dance Palace, Point Reyes Station, CA

Sponsored by:

Tomales Bay Association (TBA) and

Alliance for Local Sustainable Agriculture (ALSA)

Draft Environmental Impact Statement

Top 10 questions to ask NPS about the science in the EIS

1. **NAS Report**: Why doesn't the EIS follow the NAS conclusion of no major adverse impact, as Senator Feinstein legislatively instructed NPS to do? Why does NPS find just the opposite?
2. **"*Potential*" Impacts**: After a decade of scientific studies, and countless millions of taxpayer dollars, why is this EIS about future "*potential*" impacts and not actual data of impacts?
3. **Special-Status Species**. How come NPS concluded in 1998 that DBOC was not a threat to endangered species, whereas in 2011, the EIS says the opposite about the same species?
4. **Red-Legged Frogs**. If red-legged frogs can't live in salt water, why are they listed in this EIS as being a "*potential*" impact of DBOC? Does NPS have any evidence for a real impact?
5. **Eelgrass**. If the NAS said eelgrass has doubled in coverage since the early 1990s, and oysters help clarify the water, why does the EIS describe eelgrass as negatively impacted?

Draft Environmental Impact Statement

Top 10 questions to ask NPS about the science in the EIS

6. **Harbor Seals**. Concerning the harbor seal impacts we've been hearing about since 2007, what happened to earlier NPS claims about an 80% decline in seals & DBOC disturbances?
7. **NPS Secret Photos**. Given that NAS thought minute-to-minute photos would resolve the controversy, why does the EIS dismiss 281,000 photos showing no DBOC disturbances?
8. "***Displacement***" **of Seals**. NPS describes a long-term displacement of harbor seals **OUT** of the Estero, but don't the data show a short-term displacement of seals **INTO** Estero?
9. **Rogue Elephant Seal**. Wasn't the rogue elephant seal at Double Point in 2003 and not the oyster farm the cause of the short-term movement of seals **INTO** Estero in 2003 & 2004?
10. **Lack of NPS Data**. After many years of NPS claims of overwhelming harm to seals by DBOC, is the best NPS has to offer the hypothetical potential future impacts in the EIS?

November 6, 2011

From: Dr. Corey Goodman, Adjunct Professor, U.C. San Francisco, and
David Lewis, Director, U.C. Cooperative Extension Marin

To: Dr. Tim Ragen, Executive Director, Marine Mammal Commission

Re: Response to Dr. John Harwood's September 2, 2011 comments on Dr. Goodman's August 29, 2011 analyses of the Becker, Press, and Allen 2011 paper

Dear Dr. Ragen,

We write in response to your distribution on Friday November 4 of Dr. John Harwood's September 2 comments on Dr. Goodman's and Dr. Richard's analyses of the Becker, Press, and Allen 2011 paper: *"Evidence for long-term spatial displacement of breeding and pupping harbor seals by shellfish aquaculture over three decades."*

We are puzzled as to why you waited until the eve of submission of the draft MMC report to the MMC panel (two months and two days after it was submitted) to finally provided Dr. Harwood's September 2 comments to us. It is unfortunate we were:

- not given Dr. Harwood's comments sooner,
- not given more time to respond,
- not given the opportunity to discuss the science with Dr. Harwood,
- not given the opportunity to discuss the science with MMC panel members, and
- not given the opportunity to discuss the science with the NPS scientists, Dr. Harwood, and MMC panel in a public meeting (as recommended by the MMC).

We are also puzzled as to why you did not forward Mr. Lunny's seven questions from September 12 to Dr. Becker and request that he respond, since Lunny's questions are similar in many respects to Dr. Harwood's *"possible next steps"* and to the questions posed to the MMC by the Senate Commerce Appropriations Committee.

Consistent with Dr. Harwood's suggestion, we hope you asked Dr. Becker to run Harwood's and Goodman's proposed covariates, with & without 1982 and 1983, with & without 2003 and 2004, and with & without 2003. Please send us Dr. Becker's response.

What follows is our response to Dr. Harwood's thoughtful comments that are largely in agreement with our own. We wish that we had been given the opportunity to discuss the science with him directly. The MMC process has been unnecessarily restrictive, private, and enigmatic, and inconsistent with the goal to facilitate the free flow and open public exchange of scientific information. What is missing is open discussion.

There are four major conclusions, bolstered by new analysis since Goodman's report:

(1) The same conclusions are derived regardless of statistical method: we provide a head-to-head comparison of GLM using AIC vs. MLR using R squared analysis;

(2) The Becker 2011 statistics are driven by a rogue elephant seal at Double Point in 2003: when 2003 alone is eliminated, Becker's best models are no longer statistically significant whereas Goodman's best models are highly significant;

(3) What was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point;

(4) There is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture.

1. ***Dr Richard's review focuses on the statistical methods used by Becker et al (GLMMs etc). He concludes, correctly in my opinion, that these are appropriate for the kinds of data used in the analyses and that they appear to have been implemented correctly. He does not consider the appropriateness of any of the response variables and covariates used in the analyses.***

We agree that Dr. Becker's statistical methods were appropriate (we've never disputed this point). We also believe, as confirmed by statistics textbooks and our two expert consultants (statistics professors at Stanford and U.C. Davis) that there is no statistically right or wrong way of analyzing a set of independent variables, particularly given the relative simplicity (and small size –15 years at most) of this NPS dataset.

What Dr. Goodman's analysis demonstrated is that Multiple Linear Regression (MLR; using adjusted R squared test for model fit) is effective at analyzing the limited data set of 15 points (i.e., years) in the Becker 2011 paper. We find that MLR is as effective for this limited data as is the Becker 2011 use of Generalized Linear Model (GLM; using AIC criteria for model fit). Given the relative simplicity of the NPS data set used in Becker 2011, and on the advice of the Stanford consultant, Goodman selected multiple linear regression and focused on P-value and adjusted R squared.

There are indeed a number of other methods, including AIC and BIC as used in Becker 2011. But these are not the only possible methods. Each method has its own strengths and weaknesses in terms of how it deals with the number of variables and data points, and how it assigns penalties for these numbers. Thus, two faculty members who teach statistics to graduate students at Stanford and U.C. Davis thought Goodman's analysis was appropriate, thorough, and rigorous, and both agreed with its conclusions.

But we do not need to debate the relative merits of the two statistical methods. As Dr. Goodman wrote to Dr. Ragen when he first submitted his analysis on August 29, 2011, Mr. Lewis (Director, U.C. Cooperative Extension Marin, and the co-author of this response) independently reviewed Becker 2011 at the request of Marin County Supervisor Steve Kinsey, and independently came to the same conclusions as did Dr. Goodman. Whereas Goodman's multi-variate regression analysis used StatPlus (5.8 AnalystSoft Inc.), for Lewis' review, he used S-Plus (6.1 TIBCO Inc.) and STATA/IC 11.2 (StataCorp LP), the commercial code that is equivalent to R code as used in Becker 2011. The Lewis review and analysis included model replication using multi-variate and logistic regression, as well as general linear and linear mixed effects modeling.

The Lewis statistical review of NPS data agreed with the statistical modeling by Dr. Goodman. Lewis' analysis showed that there are predictor variables that more robustly and with much greater significance describe the variability in the proportion of pups in Drake's Estero than those presented by Dr. Becker. The better predictors included the total population of regional seals and number and proportion of pups at Double Point.

This head-to-head comparison is presented in response to Harwood's point #3 below. In our previous October 23 response to Richard's critique of Goodman's analysis, we did (as shown in #3 below) head-to-head comparisons of GLM using AIC vs. MLR using adjusted R squared analysis, and analysis of both Becker's best model and Goodman's best model (using both statistical methods) when only 2003 (the rogue elephant seal year) is eliminated and all other fourteen years (including 1982 & 1983) remain. Both methods gave the same result: Becker's best models were no longer statistically significant, whereas Goodman's best models remained highly significant.

While Becker's statistical methods were appropriate, we find that he did not apply them appropriately, at times using the wrong variable (concerning Double Point), and at times switching variables without explanation (again, involving Double Point).

Dr. Goodman provided his detailed statistical analyses to the MMC on August 29, 2011. Thus, the MMC has all of the P-values for each individual regression variable.

Dr. Goodman only included variables in his models for which each individual variable was statistically significant. On page 45 (part 1), Dr. Goodman tested whether adding OYST Hi/Low to any of his five best models led to a meaningful improvement in the adjusted R squared. In each case, the answer was no. And in each case, Dr. Goodman gave the P-value for the OYST Hi/Low variable and showed that it was not significant.

The P-values for the individual variables in Dr. Goodman's top three models are:

	P-values
Goodman's Model #1:	0.00001
DP pups	0.00005
Total regional seals	0.00014
92 protocols	0.01579
Goodman's Model #2:	0.00003
DP pups	0.00035
Total regional seals	0.00004
Goodman's Model #3:	0.00002
Proportion of pups at Double Point	0.00002

If we conduct the same analysis of the Becker 2011 paper, we find that not all of Becker's best models pass the test. Becker's second best model (OYST Hi/Low + DP seals + proportion of seals at subsite A) included as its third part of the model (subsite A) a variable that was statistically not significant, which is why adding the 3rd variable lowered the ranking. In fact, adding that 3rd variable also dropped the 2nd variable (DP seals) to just below significant (see below).

	P-values
Becker's Model #1:	0.01474
OYST Hi/ Low	0.00842
DP seals	0.03463
Becker's Model #2:	0.00813
OYSt Hi/Low	0.00403
DP seals	0.05043
Proportion of seals at subsite A	0.06319

In summary, Dr. Goodman provided the detailed results for each model to the MMC on August 29, 2001. As requested by Dr. Ragen on November 5, that information will be provided again. We find that whereas Goodman only provided models for which each individual variable was statistically significant, that was not the case with Dr. Becker. Becker's 2nd model contains variables that are not statistically significant. Moreover, within Becker's class of models, better models exist. On June 16, in response to a request from Dr. Ragen, Becker provided an analysis of what he claimed was his best model, but what was in fact a different, better model, because he, for unknown reasons, switched the Double Point variable from total seals to pups. This should have been a tipoff (see below) that Becker underestimated the impact of the rogue elephant seal at Double Point. Double Point was the key, but Becker did not realize it.

2. ***Dr Goodman and I agree that there are problems with the covariates used in the regional level analyses of Becker et al., in particular the way in which changes at Double Point are accounted for and the inclusion of survey results from 1982 and 1983. Dr Goodman has rerun these analyses using different covariates and a different analytical approach (simple multiple regression, as far as I can tell). He also provides more detailed information about the impact of the "rogue" elephant seal at Double Point in 2003, which suggest that its impact was greater than described in Becker et al (they simply describe it as "aggressive", not lethal!), and compelling arguments why the data points from 1982 and 1983 are not strictly comparable with those in the rest of the time series.***

We agree that the arguments are compelling that 1982 and 1983 should be eliminated.

We agree that Becker underestimated the impact of the rogue elephant seal at Double Point in 2003. The information used by Goodman came from an NPS May 2007 publication co-authored by one of the NPS scientists who co-authored Becker 2011.

It is important to note that in parallel to Dr. Goodman's analysis using MLR, Mr. Lewis ran the same covariates with GLM using AIC and reached the same conclusions. As shown in response #3 below, we have used both statistical methods to analyze the impact of eliminating 2003 alone on both Dr. Goodman's and Dr. Becker's best models.

The authors of Becker 2011 underestimated the influence of the rogue elephant seal at Double Point in 2003 because they did not test it correctly in their models, and thus failed to develop best-fit models using Double Point. Had Becker simply looked at the proportion of pups at Double Point as a single variable, they would have produced a model that is three orders of magnitude better than their best model.

The major driving force in the movement of the harbor seals during pupping season is the behavior of pups and their mothers. Becker 2011 included only total seals at Double Point (DP) in Table 3 for the AIC analysis. For reasons unclear, this variable switched to DP pups in the Bayesian analysis in Table 5. Becker was internally inconsistent.

Dr. Becker switched the variable from DP seals to DP pups on June 16 when he ran a specific test for Dr. Ragen. This Becker error altered the outcome of his test. The statistical significance of that variable went up by at least an order of magnitude by switching from DP seals to DP pups, and produced a model (OYST Hi/Low + DP pups) in which the P-value went to 0.003 from 0.147 for the best model in his paper (OYST Hi/Low + DP seals). Thus, by the test that Becker produced for Dr. Ragen, it is clear that Becker 2011 did not include the best models. Moreover, it is clear that the variable [DP pups] is more significant as a variable than DP seals. Becker had underestimated the impact of events at Double Point on the proportion of pups in Drakes Estero.

The authors of Becker 2011 never looked at the proportion of pups at Double Point, even though using the proportion as a measure was what they based their analysis on for Drakes Estero, and also for subsite A. The method they applied to Drakes Estero and subsite A they did not apply to Double Point. That too was an error in their underestimation of the impact of the rogue elephant seal at Double Point in 2003.

The best model in Becker 2011 was OYST Hi/Low + DP seals. That model was weaker than OYST Hi/Low + DP pups, the model Becker used in his June 16 response to Ragen. And all of the models including OYST Hi/Low failed the test of eliminating 2003 (see below). When DP pups, or proportion of pups at DP, are looked at on their own, or combined with total regional seals, one winds up with models that are three orders of magnitude more significant than Becker's best model, and are robust to the test of eliminating 2003.

3. ***I think the statistical approach adopted by Becker et al is more robust than that used by Dr Goodman, so I suggest you ask [Becker] to rerun his regional level analyses for pups (as I have pointed out, I don't think the total count data are independently informative) using either the covariates proposed by me or those proposed by Dr Goodman, with and without the 1982 and 1983 values. If, as I suspect, this confirms Dr Goodman results, then I think the only valid conclusion is that there is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture.***

We disagree that any one statistical method is more robust given the relatively small dataset used for this analysis (15 years at most). Nevertheless, there is no need to debate the relative merits of the different approaches, since we have done parallel analysis and find both give the same results, as reported to Dr. Ragen on October 23.

What has been conspicuously absent since Dr. Goodman submitted his analysis of Becker 2011 on August 29, is any public presentation by either Dr. Becker or Dr. Richard of what happens when they re-run Dr. Becker's analysis and add Dr. Goodman's five best models (i.e., covariates), as well as those variables proposed by Dr. Harwood. Surely we would have heard by now if Dr. Goodman's analysis was wrong when re-run using the statistical approach adopted by Dr. Becker. But we have heard no such claim, and have seen no such analysis. This would be a simple task, and yet over two months later, neither Dr. Becker nor Dr. Richard has presented such an analysis.

In response to the criticism that GLM using AIC analysis might be more robust than MLR using R squared analysis, parallel AIC analysis is now provided (as submitted to Dr. Ragen on October 23). We find that the unique influence of 2003 is clear regardless of what method is used (MLR vs. GLM).

The Oyster Hi/Low variable used in Becker et al (2011) relies for its significance on the values for year 2003 rather than the other 14 years, and that one single year drives the significance of Becker's best models. When this value (2003) is removed from Becker's best models, the Becker 2011 models are no longer statistically significant. Conversely, under the same test of model robustness and significance, Goodman's best models remain significant and describe a greater amount of variability in the proportion of pups in Drake's Estero than does Becker's best model with those values included.

Below is a comparison of Dr. Goodman's best model vs. Dr. Becker's best model using both multiple linear regression (MLR, as done by Dr. Goodman) and generalized linear model (GLM, as done by Mr. Lewis), both with and without 2003.

The conclusion from the analysis below is clear. Although both Dr. Goodman's and Dr. Becker's best models are statistically significant, Dr. Goodman's model are three orders of magnitude more significant – a thousand-fold more significant -- and robust to the elimination of 2003, which Becker's are not. When 2003 alone is eliminated and the remaining fourteen years analyzed, both analytical methods (MLR and GLM) show that Goodman's best model remains highly statistically significant, including all of its variables, whereas Becker's best model is no longer statistically significant (nor are its individual variables). This analysis hopefully ends any controversy about the method of statistical analysis deployed.

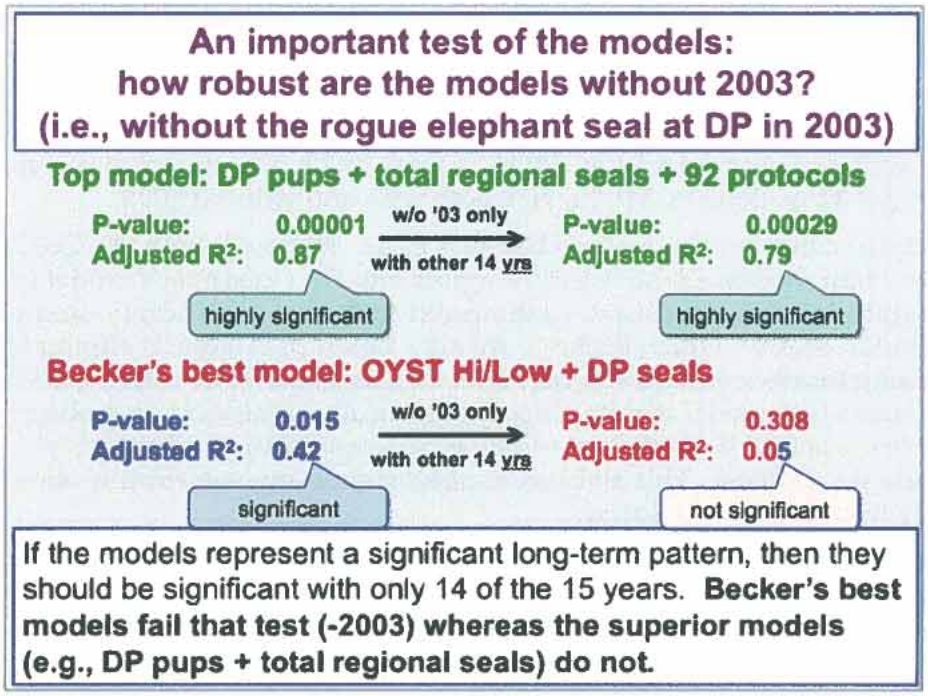
In summary, we find that both statistical methods give the same answer when comparing the models: Goodman's top models are valid and far superior to those in Becker 2011, regardless of whether one analyzes them using MLR vs. GLM. Our analysis shows that GLM using AIC vs. MLR using adjusted R squared derived the same major conclusion. The Becker 2011 top models depend for their significance upon a single event in 2003 (the rogue elephant seal at Double Point), and are no longer

significant when 2003 is eliminated, whereas Goodman's top models do not depend upon 2003. The unique influence of 2003 is clear regardless of what method is used – what was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point.

Significant = green; not significant = red

ANALYSIS WITH 2003	Multiple Linear Regression P-values	Generalized Linear Model P-values
Goodman's Top Model:	0.00001	
DP pups	0.00005	< 0.0001
Total regional seals	0.00014	0.0002
92 protocols	0.01579	0.0127
Becker's Top Model:	0.01474	
OYST Hi/Low	0.00842	0.011
Double Point seals	0.03463	0.0463

ANALYSIS WITHOUT 2003	Multiple Linear Regression P-values	Generalized Linear Model P-values
Goodman's Top Model:	0.00029	
DP pups	0.00229	0.0024
Total regional seals	0.00080	0.0008
92 protocols	0.02054	0.0163
Becker's Top Model:	0.87444	
OYST Hi/Low	0.68948	0.1581
Double Point seals	0.91052	0.4774



4. ***Dr Goodman is also unimpressed by the results of the intra-colony analysis, mainly because he does not think oyster harvest is a good proxy for disturbance associated with the operation of the oyster farm. I'm not qualified to comment on this, but the magnitude of the effect documented by Becker et al is small and I think even this is an over-estimate. It's hard to see how it would have any measurable effect on the viability of the Drakes Estero colony.***

We agree. There are two reasons why Dr. Goodman was unimpressed by Becker's intra-colony analysis. First, indeed, as shown in Dr. Goodman's analysis, neither annual oyster harvest nor the categorical OYST Hi/Low designation are good proxies for oyster activity at sandbars UEN and OB during pupping season (March-May). Dr. Harwood appears to agree with Dr. Goodman's reasoning and analysis on this point.

Second, Dr. Goodman tested Becker's colony scale analysis directly by doing the statistics using other covariates. While much of Dr. Goodman's analysis was focused on the Becker 2011 regional scale, three pages (pages 55-57, part 1) were devoted to the Becker 2011 colony scale analysis. Some supplementary analysis is provided below.

On page 57 (part 1), Dr. Goodman analyzed the pups in the Upper Estero (i.e., OB, UEN, and UEF) as both a proportion of total Drakes Estero pups (top five rows) and as a proportion of total regional pups (bottom five rows). Goodman's analysis showed that both the proportion of pups at Double Point and total regional seals were statistically significant (P-values of 0.009 and 0.011 respectively; adjusted R squared of 0.38 and 0.36 respectively). In contrast, disturbance rate, OYST Hi/ Low, and OYST annual harvest were not significant, having P-values ranging from 0.58 to 0.94 and all having negative values for adjusted R squared (and thus effectively zero).

On page 56 (part 1), Dr. Goodman went a step further in his colony analysis and addressed the potential movements of the pups at OB, the site closest to the oyster boats and workers (i.e., 750 yards away). Starting at the top of page 56, Goodman analyzed the total number of pups at OB; next he analyzed the proportion of pups at OB. Here too, Goodman's analysis showed that total regional seals and the proportion of pups at Double Point were the two independent variables that showed statistical significance, whereas OYST Hi/Low and disturbance rate were not statistically significant. It should be noted that Goodman previously provided the Marine Mammal Commission on August 29 with the files and data on the bottom of page 56 (part 1) that are covered up by the text, namely, the same analysis focused on the total seals at OB. That analysis gives rise to the same conclusions as the pups at OB.

However, the Goodman analysis on the bottom of page 56 of pups at OB measured proportion compared to total regional pups, not Drakes Estero pups. For completeness, here we include the rest of that analysis that was not included in the Goodman analysis submitted to the MMC on August 29, 2011. We measured the proportion of pups at OB compared to total Drakes Estero pups. The outcome of this analysis was the same as when we compared pups at OB as a proportion of total regional pups.

The only statistically significant independent variable was total regional seals (P-value = 0.00478; adjusted R squared = 0.4873). Among the independent variables that were not statistically significant were OYST Hi/Low (P-value = 0.30875; adjusted R squared = 0.01144), disturbance rate (P-value = 0.6049; adjusted R squared = - 0.06348), and proportion of pups at Double Point (P-value = 0.21447; adjusted R squared = 0.05776). Thus, whether measured as a proportion of total pups in Drakes Estero or of total regional pups, the pups at OB are correlated with total regional seals (i.e., the total regional population size) and not with oyster activity or disturbance rate.

In summary, Dr. Goodman analyzed the Becker 2011 conclusion that oyster activity led

to a spatial displacement of seals away from the Upper Estero in Drakes Estero. Goodman's analysis showed that, regardless of whether one focused on the pups and seals at OB alone, or at all three Upper Estero haul-out sites (OB, UEN, UEF), the answer was the same. The movement of pups and seals relative to Upper Estero haul-out sites correlates with the total regional seal population, and in some cases also with events at Double Point (along the coast outside Drakes Estero), but it does not correlate with either oyster activity (OYST Hi/Low) or disturbance rate. Thus, the Becker 2011 colony scale analysis was incomplete and stopped short in variable screening and selection. The resulting conclusions from the colony scale analysis were incorrect.

Concluding comments

We found Dr. Harwood's four comments, and his "*possible next steps*," to be thoughtful and very much in agreement with our own thinking. We regret that NPS rejected an open process and Dr. Ragen never let us directly discuss the science with Dr. Harwood and the NPS scientists. All parties would have benefitted from a scholarly conversation. There is still time, of course, to get us all together. We would welcome such an open discussion as mandated by the Marine Mammal Protection Act.

Dr. Harwood's proposed experiments – asking Becker to re-run his analysis using both Dr. Harwood's and Dr. Goodman's proposed covariates – both with and without 1982/1983 and 2003/2004 (and we would now add 2003 alone) – are precisely what Kevin Lunny asked on September 12, and similar to what the Senate Appropriations Committee requested. To our knowledge, these requests have never been forwarded to Dr. Becker. [If they have, please send us the MMC request and Dr. Becker's experimental results.]

It is clear that Becker should not have used the data from 1982 and 1983. It is equally clear that Becker's models involving oyster activity relied entirely for their statistical significance on the year 2003, and the major increase in the proportion of pups in Drakes Estero in 2003 resulted from a single rogue elephant seal at Double Point.

We find that both statistical methods (GLM using AIC vs. MLR using adjusted R squared) give the same answer when comparing the models: Goodman's top models are valid and far superior to those in Becker 2011, regardless of whether one analyzes them using MLR vs. GLM. The Becker 2011 top models depend for their significance upon a single event in 2003 (the rogue elephant seal at Double Point), and are no longer significant when 2003 is eliminated, whereas Goodman's top models do not depend upon 2003. The unique influence of 2003 is clear regardless of what method is used – what was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point.

Dr. Harwood wisely wrote:

> *"… I suggest you ask [Becker] to rerun his regional level analyses for pups … using either the covariates proposed by me or those proposed by Dr Goodman, with and without the 1982 and 1983 values. If, as I suspect, this confirms Dr Goodman results, then I think the only valid conclusion is that there is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture."*

Becker's best models are not statistically significant when 2003 is eliminated, whereas Goodman's best models are highly statistically significant. As Harwood surmised, *"… the only valid conclusion is that there is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture."*

Timeline of MMC Analysis of Becker, Press, and Allen 2011 paper

April 2011: NPS scientists Dr. Ben Becker, Mr. David Press, and Dr. Sarah Allen published a peer-reviewed paper (herein called Becker 2011), titled *"Evidence for long-term spatial displacement of breeding and pupping harbor seals by shellfish aquaculture over three decades."*

July 28, 2011: Dr. Ragen initiated a formal review process of the NPS Becker 2011 paper, and invited Drs. Harwood, Goodman, and Richard to review the paper. By the middle of August, all of the NPS data and codes received were distributed to the reviewers. The reviewers were asked to submit their reviews within two weeks. Dr. Goodman was assisted by Mr. David Lewis, the co-author here, and two other statistical consultants, one a professor at Stanford and the other a professor at U.C. Davis.

August 29, 2011: The reviews by Drs. Harwood, Goodman, and Richard were submitted to the MMC. Dr. Ragen told Dr. Goodman that the MMC would request that all parties including NPS respond to the other reviews within 48 hours, and then the MMC would schedule a MMC-sponsored public meeting to review the Becker 2011 paper.

August 30, 2011: NPS informed the MMC that they would not respond to the reviews, and further, NPS also refused to participate in an MMC-sponsored public meeting to review Becker 2011.

August 31, 2011: Dr. Goodman wrote to Dr. Harwood, noting that the similarities in their two reviews, and asking to arrange a phone call to discuss the science and statistics. Dr. Harwood responded:

> *"I agree that we do seem to have identified some similar issues with the analysis in Becker et al. However, I think we should wait until Tim Ragen has decided on "the next steps for completing this review and the Commission's report" (as he mentioned in his most recent e-mail) before we compare notes. Once Tim has sorted that out, I'd be happy to talk."*

September 1, 2011: By phone, Dr. Ragen confirmed to Dr. Goodman that he wanted to hold off for a while on having Drs. Goodman and Harwood discuss the Becker paper. He assured Dr. Goodman that he would include him in the review process and would come back with questions concerning his analysis, or requests for further analysis.

September 2, 2011: Dr. Harwood sent Dr. Ragen an email (see below) with his comments on both Dr. Goodman's and Dr. Richard's analyses. Dr. Harwood raised some thoughtful issues and suggested *"possible next steps."* Dr. Ragen did not share Dr. Harwood's comments with Dr. Goodman until November 4, 2011.

September 12, 2011: Mr. Lewis and Dr. Ragen spoke briefly by telephone but did not discuss specifics of science, statistical methods, data, or conclusions. Dr. Ragen told Mr.

Lewis that if he had any questions, he would contact him.

September 12, 2011: PRNS Superintendent Cicely Muldoon had previously told Mr. Lunny and Dr. Goodman by email that NPS would not respond to Dr. Goodman's questions or analysis of the Becker 2011 paper, but NPS would continue to respond to questions from Dr. Ragen and MMC. Thus, on September 12, Mr. Lunny sent a list of seven questions to Dr. Ragen and requested that Dr. Ragen forward these questions to NPS Dr. Becker. To our knowledge, Dr. Ragen has not sent the questions to Dr. Becker.

Superintendent Muldoon wrote to Mr. Lunny on August 31:

> *"The NPS is looking at all three of the reviews of the statistical analysis that Tim sent to the group yesterday, as I expect all parties involved are. Just as he did during the review period, Ben [Becker] will continue to answer any remaining questions about the analysis that Tim asks as he works towards finalizing the Commission's report."*

On September 12, Mr. Lunny sent Dr. Ragen the following questions and asked Ragen to please submit them to Dr. Becker. As of this past week, over seven weeks after Lunny's questions were submitted to Ragen, Ragen had not submitted them to Becker, even though Ragen told Weiman that he would file his report with his panel by November 6.

1) *I have reviewed the materials made available by NPS for the Statistical review. I was not able to locate the data cited and used in NPS-Becker 2011 for the years 1982 and 1983, 22 and 23 years before the Lunny family purchased DBOC. If the data was provided, please advise where it can be located. If it wasn't provided, why not? And if it was not provided, please provide the data from its original source.*
2) *Is your OYST independent variable on its own, when run against the proportion of pups in Drakes Estero, still statistically significant when you exclude the years 1982 and 1983? When you exclude 2003 and 2004? Or when you exclude all four years? Is this a robust model that predicts the variation in the proportion of pups at Drakes Estero?*
3) *Is your best model (OYST and Double Point seal counts), when run against the proportion of pups in Drakes Estero, still statistically significant when you exclude the years 1982 and 1983? When you exclude 2003 and 2004? Or when you exclude all four years? Do you still believe that your best model is robust in that it best predicts the variation in the proportion of pups at Drakes Estero?*
4) *Do you agree or disagree with the conclusion that there was no long-term spatial displacement of pups out of Drakes Estero, but rather a short-term transient spatial displacement of pups into Drakes Estero in 2003 and 2004? Do you agree or disagree that the marauding elephant seal at Double Point accounts for most of this spatial displacement shown in your paper, and that the oyster farm was not involved?*
5) *Did you run total regional seals against the proportion of pups in Drakes Estero? If not, why not? Did you run the proportion of pups at Double Point against the proportion of pups at Drakes Estero? If not, why not? Are these models better or worse than your best model? How many different ways did you analyze the impact of the events at Double Point on the seals in Drakes Estero? On Table 3 you look at total seal count, whereas on Table 5 you look at pups. Did you run many possible models involving pups and seals at Double Point?*
6) *Would you please replicate Dr. Goodman's top six models and let us know if you agree or disagree that they are far superior to your best model in terms of both the adjusted R squared and the P-value. In light of Dr. Goodman's and Dr. Harwood's reports, please provide us with a corrected ranking of best models.*
7) *In light of these findings, do you stand by the title of your paper or would you revise it, and if so, how would you word it today?*

We are puzzled as to why these questions were never forwarded to Dr. Becker – why

MMC did not insist that Dr. Becker run these models under these conditions -- since they in large part echo the same *"possible next steps"* outlined in Dr. Harwood's September 2, 2011 email to Dr. Ragen, and the requests made by the Senate Appropriations Committee.

October 7, 2011: Five and one half weeks after the original reviews were submitted, Dr. Ragen distributed critiques of Dr. Goodman's and Dr. Harwood's analyses received the previous day from Mr. Gordon Bennett and Dr. Dominique Richard. Mr. Bennett included in his critique two formal allegations of scientific misconduct against Dr. Goodman and Mr. Lunny. The only reason we knew about these documents was because an earlier mid-September version had been released to the local media.

October 12, 2011: Dr. Goodman and Mr. Lunny wrote to Dr. Ragen, provided facts to show each allegation was baseless, and asked Dr. Ragen to quickly reject the allegations. One of the allegations was simple to resolve: either Dr. Goodman did or did not doctor (i.e., *"photoshop"*) a 1992 map in his analysis of Becker 2011. Dr. Goodman provided Dr. Ragen with the map used in his presentation, the map found in the 1992 oyster farm protocols from the MMC web site, and showed they were identical. To this date, Dr. Ragen has never responded, neither acknowledging receipt of the response, indicating the process and timeline, nor making a decision on the allegations.

October 23, 2011: Dr. Goodman and Mr. Lewis responded to the thirteen issues raised by Dr. Richard on October 6 concerning Dr. Goodman's analysis of Becker 2011. Each point was answered, some with additional data and analysis, including head-to-head comparisons of GLM using AIC vs. MLR using adjusted R squared analysis, and analysis of both Dr. Becker's best model and Dr. Goodman's best model (using both statistical methods) when only 2003 (the rogue elephant seal) is eliminated and all other fourteen years (including 1982 and 1983) remain (Goodman's and Lewis' response is enclosed here). Both methods gave the same result: Becker's best models were no longer statistically significant when 2003 was eliminated, whereas Dr. Goodman's best models remained highly statistically significant.

October 24, 2011: Mr. Lewis contacted Dr. Ragen, said he was traveling, but offered to talk by phone about his analysis of Becker 2011, and his and Dr. Goodman's response to Dr. Richard's critique. Dr. Ragen responded that they could wait until the following week to talk.

November 1, 2011: Mr. Lewis contacted Dr. Ragen again, offering to *"discuss the science and statistic issues and questions you and the MMC may have."* Dr. Ragen did not respond.

November 1, 2011: Dr. Ragen indicated to Mr. Weiman by phone that he planned to submit his draft MMC report to the MMC panel by Sunday November 6. Moreover, Dr. Ragen indicated that he planned to contact Dr. Goodman on the following day with questions concerning his analysis of Becker 2011.

November 4, 2011: Dr. Ragen sent to Mr. Weiman (and not Dr. Goodman) the email

from Dr. Harwood on September 2 including his comments on Dr. Goodman's and Dr. Richard's analyses of Becker 2011. Two months and two days after Dr. Harwood submitted his comments on Dr. Goodman's analysis to Dr. Ragen (and suggested "*possible next steps*"), and just two days before Dr. Ragen planned on submitting his draft MMC report to the MMC panel, Dr. Ragen finally shared Dr. Harwood's September 2 comments with Mr. Weiman on November 4, presumably assuming he would then share them with Dr. Goodman. Dr. Ragen still had not allowed Dr. Harwood and Dr. Goodman to discuss the science and statistics. And Dr. Ragen, to our knowledge, still had not forwarded Mr. Lunny's questions to Dr. Becker, questions that paralleled the "*possible next steps*" raised by Dr. Harwood in his September 2, 2011 letter to Dr. Ragen.

November 5, 2011: Dr. Ragen wrote to Dr. Goodman and Mr. Lewis and asked for the detailed results of each model run by Dr. Goodman (including coefficients, P values, and confidence intervals for each variable). Dr. Goodman had provided all of those detailed results to Dr. Ragen on August 29, 2011. However, Dr. Goodman and Mr. Lewis have since run both Dr. Goodman's models and Dr. Becker's models with and without 2003 alone (thus retaining the other fourteen years). All of these detailed results – including the ones used for the August 29 analysis (as previously provided) and the ones used for the October 23 response analysis – were sent to Dr. Ragen separately on November 6.

October 23, 2011

From: Dr. Corey Goodman, Adjunct Professor, U.C. San Francisco, and
David Lewis, Director, U.C. Cooperative Extension Marin

To: Dr. Tim Ragen, Executive Director, Marine Mammal Commission

Re: Response to Dr. Dominique Richard's October 4, 2011 review of Dr. Goodman's August 29, 2011 analysis of the Becker, Press, and Allen 2011 paper

Dear Dr. Ragen,

We write in response to your distribution on Friday October 7 of the Gordon Bennett (SOS), Neal Desai (NPCA), and Dr. Dominique Richard reviews of Dr. Goodman's analysis of the Becker, Press, and Allen 2011 paper. In April 2011, NPS scientists Dr. Ben Becker, Mr. David Press, and Dr. Sarah Allen published a paper (herein called Becker 2011), titled *"Evidence for long-term spatial displacement of breeding and pupping harbor seals by shellfish aquaculture over three decades."*

On July 28, 2011, you initiated a formal review process of the NPS Becker 2011 paper, and invited Drs. Harwood, Goodman, and Richard to review the paper. By the middle of August, all of the NPS data and codes received had been distributed to the reviewers. The reviewers were asked to submit their reviews within two weeks. Dr. Goodman solicited help from Mr. Lewis, the co-author here, and two other statistical consultants, one from Stanford and the other from U.C. Davis (names available to MMC upon request). The reviews were submitted to the MMC on August 29, 2011.

On August 30, 2011, NPS refused the MMC request that they respond to the reviews, and refused to participate in an MMC-sponsored public meeting to review Becker 2011. On October 7, 2011, five and one half weeks after the reviews were submitted, Dr. Ragen distributed rebuttals of Dr. Goodman's and Dr. Harwood's analysis received the previous day from Mr. Gordon Bennett and Dr. Dominique Richard. The response that follows is a point-by-point response to Dr. Richard's review of Dr. Goodman's analysis.

The review by Mr. Bennett contained defamatory language, including allegations that Kevin Lunny and Dr. Goodman violated the MMC Scientific Integrity Policy. Dr. Goodman has responded separately to Bennett's baseless allegations. Much of Bennett's reviews are comments about maps and data that should have come directly from the NPS scientists, not from Bennett. If the NPS scientists wish to respond to Dr. Goodman's analysis, we welcome their rebuttal, and will reply accordingly.

Dr. Richard raised thirteen separate issues. In our review, we respond to each issue in a scientific and scholarly fashion. The deployment of GLM using AIC vs. MLR using adjusted R squared is compared – the different statistical methods derive the same conclusions. We further analyze Becker's best models, and present further analysis that when only 2003 is eliminated, Becker's best models are no longer statistically significant whereas Goodman's best models are highly significant. Many other issues are discussed. We hope we have satisfactorily responded to all of Richard's 13 critiques.

We would be happy to provide further clarification. Please don't hesitate to contact us if you have questions. And please let us know if any additional criticisms are raised so that we can have sufficient time to respond before you issue your report.

MMC Review of NPS Becker, Press, and Allen 2011 paper:

MMC-Invited Response to Dr. Richard's critique of Dr. Goodman's MMC-Invited August 29, 2011 analysis by Dr. Corey Goodman and Mr. David Lewis, October 22, 2011

In April 2011, NPS scientists Dr. Ben Becker, Mr. David Press, and Dr. Sarah Allen published a paper (herein called Becker 2011), titled "*Evidence for long-term spatial displacement of breeding and pupping harbor seals by shellfish aquaculture over three decades.*"

The NPS Becker 2011 paper considered the impact of the oyster farm on the harbor seals in Drakes Estero harbor seals at two different levels. At the regional scale, Becker 2011 concluded that 7% of pups and 5% of total seals were spatially displaced OUT of drakes Estero due to increased oyster activity. At the colony scale, Becker 2011 concluded that 8% of seals were spatially displaced AWAY FROM the Upper Estero haul-out sites within Drakes Estero due to increased oyster activity.

On July 28, 2011, Dr. Tim Ragen, Executive Director, Marine Mammal Commission, initiated a formal review process of the Becker 2011 paper, and invited Drs. Harwood, Goodman, and Richard to review the paper. By the middle of August, all of the NPS data and codes received had been distributed to the reviewers. The reviewers were asked to submit their reviews within two weeks. The reviews were submitted to the MMC on August 29, 2011.

On August 30, 2011, the NPS refused to respond to the reviews, and refused to participate in an MMC-sponsored public meeting to review the NPS Becker 2011 paper.

On October 7, 2011, five and one half weeks after the reviews were submitted, Dr. Ragen distributed rebuttals of Dr. Goodman's and Dr. Harwood's analysis of the NPS Becker 2011 paper received the previous day from Mr. Gordon Bennett and Dr. Dominique Richard. The response that follows here is a response to Dr. Richard's review of Dr. Goodman's analysis. This response has been co-authored by Dr. Corey Goodman, elected member, National Academy of Sciences, and by Mr. David Lewis, Director, University of California, Cooperative Extension Marin.

SUMMARY OF RESPONSE TO DR. RICHARD'S CRITIQUE

1. GOODMAN DID NOT CHALLENGE THE COLONY SCALE ANALYSIS:

Incorrect. In contrast to Dr. Richard's assertion that Dr. Goodman did not " … *even bother to challenge the Becker's (intra)colony scale analysis*", in fact Dr. Goodman did indeed analyze the Becker 2011 conclusion that oyster activity led to a spatial displacement of seals away from the Upper Estero in Drakes Estero. The Goodman analysis suggested (i) that the Becker 2011 colony scale analysis was incomplete and appeared to have stopped short in variable screening and selection, and (ii) the resulting conclusions derived from the colony scale analysis were incorrect.

2. **GOODMAN'S FOCUS ON THE REGIONAL SCALE ANALYSIS EXPLOITED *"TRIVIALITY"* TO FOOL THE *"STATISTICALLY UNEDUCATED"*:**

Puzzling. In contrast to Dr. Richard's claim that the regional scale analysis was trivial (something he never wrote when originally reviewing Becker 2011), we continue to believe that the movement of harbor seals into and out of Drakes Estero is important and must be considered within the context of the regional population. Moreover, Becker, Press, and Allen considered the regional scale analysis to be of great importance, since this analysis drove one of the two major conclusions in their paper, and was featured in more than half of their tables, figures, and text.

3. **GOODMAN IGNORED ALL OF BECKER'S ANALYSIS EXCEPT TABLE 3:**

Incorrect. In contrast to Dr. Richard's claim that Dr. Goodman had not reviewed any of the Becker 2011 analysis except Table 3, the August 29 report submitted by Dr. Goodman contained an analysis of five of the six tables and five of the six figures.

4. **GOODMAN'S REMOVAL OF 2003/2004 AND/OR 1982/1983 DATA FROM ANALYSIS WAS ARBITRARY AND BASED UPON *"A-PRIORI BIAS"*:**

Incorrect. In contrast to Dr. Richard's claim that Dr. Goodman's removal of certain years from the analysis (1982 and 1983, or 2003 and 2004) was arbitrary and inappropriate, we find that this was biologically highly relevant and the appropriate way to test the robustness of the models. The 1982 and 1983 data were prior to the 1992 and 1996 major management changes. In 2003, a rogue elephant seal killed ~40 harbor seals at Double Point and chased ~300 harbor seals INTO Drakes Estero. When 2003 is eliminated from the analysis and the other fourteen years retained (including 1982 and 1983), the Becker 2011 best models fail the test. In contrast, Goodman's best models all pass and remain highly statistically significant.

5. **GOODMAN FOCUSED ON BECKER'S OYST HI/LOW MODEL, BUT THAT MODEL IS ONLY *"MILDLY WORTH CONSIDERING"*:**

Incorrect. Dr. Richard's claim that Dr. Goodman focused only on the OYST Hi/Low model was incorrect. Goodman tested the Becker 2011 best models (page 46, part 1).

6. **GOODMAN DID NOT PROVIDE *"THE LEVEL OF SIGNIFICANCE OF REGRESSION COEFFICIENTS"* FOR VARIABLES IN HIS BEST MODELS:**

Incorrect. In contrast to Dr. Richard claim that Dr. Goodman had not provided the significance levels of the individual independent variables within his models, in fact Dr. Goodman had provided all of that analysis to the MMC on August 29, 2001. Had Richard applied this same logic to Becker 2011, he would have eliminated the second model in the Becker 2011 paper (OYST Hi/Low + DP seals + subsite A), the very model that Richard highlights in another section of his review, because the subsite A variable

was not statistically significant.

7. GOODMAN CLAIMED HIS MODELS WERE A THOUSAND-FOLD IMPROVEMENT OVER BECKER'S, BUT THIS IS *"VERY MISLEADING"*:

Nonsensical. In contrast to Dr. Richard's claim that Dr. Goodman was misleading to suggest that models that are a thousand-fold more statistically significant might be more relevant, we find that Dr. Goodman's best model (with a P-value of 0.00001) is more biologically relevant and passes certain critical tests compared to the Becker 2011 best model (with a P-value of 0.015). The thousand-fold difference in statistical significant is relevant and not of *"infinitesimal"* importance as Richard suggested.

8. GOODMAN'S BEST MODELS CAN BE REDUCED TO A *"TAUTOLOGY WHERE THE PROPORTION OF PUPS IN DRAKES"* EXPLAINS ITSELF.

Incorrect. In contrast to Dr. Richard's claim that Dr. Goodman's best models were all logically flawed, we find that Goodman's models are logically consistent with the biology and avoided the circular logic trap that Richard set up. Dr. Richard did not analyze Dr. Goodman's best models. Rather, Richard set up a straw man argument, establishing a knowingly flawed model, then showing its tautological flaw, and finally declaring (without analysis) that all of Goodman's models were the same, when they were not.

9. GOODMAN'S BEST MODELS, ONCE *"STATISTICALLY NONSENSICAL ARGUMENTS"* ARE STRIPPED AWAY, *"ALL INCLUDE OYSTER HARVEST"*:

Incorrect. In contrast to Dr. Richard's claim that Dr. Goodman's remaining models all include oyster harvest, we find that Dr. Goodman's best models do not include oyster harvest. Dr. Richard ignored, for example, the fact that Dr. Goodman's third best model used a single variable – proportion of pups at Double Point – that did not include OYST Hi/Low, and yet was nearly three orders of magnitude more significant than the Becker 2011 best models. Dr. Richard provided no argument as to why this model was logically flawed.

10. GOODMAN RELIED ON R SQUARED ANALYSIS BUT SHOULD HAVE USED AIC ANALYSIS AS IN BECKER 2011:

Incorrect. In contrast to Dr. Richard's criticism that Dr. Goodman should have used AIC analysis (with the implied suggestion that the analysis would have been different than Dr. Goodman's MLR analysis), we find that both statistical methods give the same answer when comparing the models: Goodman's top models are valid and far superior to those in Becker 2011, regardless of whether one analyzes them using MLR vs. GLM. The unique influence of 2003 is clear regardless of what method is used (MLR vs. GLM) – what was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point.

11. GOODMAN'S *"CONTEST OF THE NPS ACREAGE DATA"* IS FLAWED:

Incorrect. In contrast to Dr. Richard's claim that Dr. Goodman's analysis of the oyster acreage data was flawed, we find that Dr. Richard missed the point completely of what Dr. Goodman showed in his analysis. Goodman's major point was that Figure 4 and Table A1 were misleading and incorrect, and thus led to the incorrect categorical OYST Hi/Low model. Oysters were harvested by JOC from OB and UEN from 2000-2004, and then again by DBOC in 2005. Nothing changed from 2004 to 2005 in terms of oyster activity on sandbars UEN and OB. Thus, the OYST Hi/Low model is invalid.

12. RICHARD CLAIMS THAT BECKER RECOGNIZED THE *"INFLUENCE OF DOUBLE POINT"* BUT FOUND THIS SINGLE COVARIATE WAS *"INSUFFICIENT"* TO EXPLAIN THE CHANGES AT DRAKES ESTERO:

Incorrect. In contrast to Dr. Richard's claim that the Becker 2011 paper had recognized the influence of Double Point but properly dismissed it as a single covariate, we find that the Becker 2011 paper considered the wrong variable -- Double Point seals rather than DP pups or proportion of DP pups – and thus underestimated the importance of this variable. In fact, Becker 2011 completely missed that the variable "proportion of pups at Double Point" on its own gives rise to a model that is nearly three orders of magnitude more significant than Becker's best models, and remains significant when 2003 is eliminated, in contrast to Becker's best models.

13. RICHARD'S FINAL CONCLUSION THAT GOODMAN'S ANALYSIS *"FAILS TO DEMONSTRATE THAT OYSTER HARVEST HAS NO EFFECT"*:

Illogical. In contrast to Dr. Richard's claim that Dr. Goodman failed to show the oyster harm had no impact on the harbor seals, we find that Dr. Goodman fulfilled his purpose of showing that the Becker 2011 conclusion was incorrect – namely, that NPS had no *evidence* to show a long-term spatial displacement of the harbor seals out of Drakes Estero caused by the oyster farm. Dr. Richard fails to demonstrate that the central argument of Dr. Goodman's analysis of Becker 2011 is incorrect. The short-term spatial displacement of harbor seals INTO Drakes Estero in 2003 and partly in 2004 was caused by a rogue elephant seal at Double Point. The statistical analysis of that relationship is undisputed by Dr. Richard.

14. SUMMARY: WHAT IS NOT FOUND IN DR. RICHARD'S CRITIQUE:

What is NOT found in Dr. Richard's critique is highly significant. Nowhere do you find Richard doing what he claimed to do in his original one and one half page review of Becker 2011 -- namely, repeat and test the analysis using Becker's methods. Nowhere do you find Dr. Richard testing Dr. Goodman's models by GLM using AIC. Nowhere do you find him comparing GLM using AIC vs. MLR using adjusted R squared. Nowhere do you find him testing the models without 2003 alone. Nowhere do you find him using the same analysis to look back at Becker 2011, such as asking to see if each independent variable is itself statistically significant.

EPILOGUE

Dr. Richard critique is precisely why the MMC should have proceeded – and should now proceed -- with its original review proposal. The NPS scientists (Dr. Becker, Mr. Press, and Dr. Allen) and not Dr. Richard should be directed to respond in writing to the August 29, 2011 analyses by Dr. Goodman, Dr. Harwood, and Dr. Richard, and also to Dr. Richard's critique of Dr. Goodman's analysis. Then the MMC should proceed with its public meeting as initially proposed on August 29.

Three National Park Service scientists published a paper that claims to provide evidence for long-term spatial displacement of harbor seals and pups out of Drakes Estero by increased oyster farm activity. The three NPS scientists should be asked to respond to the critiques of their published paper.

Instead, on August 30, 2011, the NPS refused explicit requests to respond to the MMC-sponsored reviews and refused to participate in an MMC-sponsored public meeting to discuss the NPS paper. These actions of the NPS are outside the norms of scientific review and outside of the guidelines set by the Department of the Interior in its new Scientific Integrity Policy. The NPS scientists have an obligation to respond to the criticism of Becker 2011, and if they find that their paper contains errors, to correct and update the paper, or retract it if its two main conclusions are flawed. This responsibility is more pronounced given the role of Becker 2011 in the draft EIS. For example, the DOI Scientific Integrity Policy (1/28/11) states:

> *"I will welcome constructive criticism of my scientific and scholarly activities and will be responsive to their peer review."*

The MMC should (1) request that NPS provide a written response to the reviews by Dr. Goodman, Dr. Harwood, and Dr. Richard; and (2) schedule a public meeting in West Marin to review the reviews and MMC findings concerning the Becker, Press, and Allen 2011 paper.

DETAILED RESPONSE TO DR. RICHARD'S CRITIQUE

1. GOODMAN DID NOT CHALLENGE THE COLONY SCALE ANALYSIS:

"Dr. Goodman does not even bother to challenge the Becker's (intra)colony scale analysis"

Incorrect. The Becker, Press, and Allen paper (herein called Becker 2011), titled *"Evidence for long-term spatial displacement of breeding and pupping harbor seals by shellfish aquaculture over three decades,"* considered Drakes Estero harbor seals at two different scales. The regional scale analysis considered the relationship of the total regional population of harbor seals in Drakes Estero and across the Point Reyes National Seashore neighboring coastal sites. The colony scale analysis considered the relationship of the Drakes Estero subset of the population and in particular the eight different haul-out sites within Drakes Estero.

The Becker 2011 paper came to two major conclusions. At the regional scale, Becker 2011 concluded that 7% of pups and 5% of total seals were spatially displaced OUT of drakes Estero due to increased oyster activity. At the colony scale, Becker 2011 concluded that 8% of seals were spatially displaced AWAY FROM the Upper Estero haul-out sites within Drakes Estero due to increased oyster activity.

Dr. Richard claimed that Dr. Goodman only challenged the Becker 2011 regional scale analysis, and did not challenge the colony scale analysis. This is incorrect. While much of Dr. Goodman's analysis was focused on the Becker 2011 regional scale, three pages (pages 55-57, part 1) were devoted to the Becker 2011 colony scale analysis. Moreover, most of the individual files from this analysis were provided to the Marine Mammal Commission on August 29, 2011 (some additional analysis is provided here).

On page 57 (part 1), Dr. Goodman analyzed the pups in the Upper Estero (i.e., OB, UEN, and UEF) as both a proportion of total Drakes Estero pups (top five rows) and as a proportion of total regional pups (bottom five rows). Goodman's analysis showed that both the **proportion of pups at Double Point and total regional seals were statistically significant** (P-values of 0.009 and 0.011 respectively; adjusted R squared of 0.38 and 0.36 respectively). In contrast, **disturbance rate, OYST Hi/ Low, and OYST annual harvest were not significant**, having P-values ranging from 0.58 to 0.94 and all having negative values for adjusted R squared (and thus effectively zero).

On page 56 (part 1), Dr. Goodman went a step further in his colony analysis and addressed the potential movements of the pups at OB, the site closest to the oyster boats and workers (i.e., 750 yards away). Starting at the top of page 56, Goodman analyzed the total number of pups at OB; next he analyzed the proportion of pups at OB. Here too, Goodman's analysis showed that total regional seals and the proportion of pups at Double Point were the two independent variables that showed statistical significance, whereas OYST Hi/Low and disturbance rate were not statistically significant. It should be noted that Goodman previously provided the Marine Mammal Commission with the files and data on the bottom of page 56 (part 1) that are covered up by the text, namely, the same analysis focused on the total seals at OB. That analysis gives rise to the same conclusions as the pups at OB.

However, the Goodman analysis on the bottom of page 56 of pups at OB measured proportion compared to total regional pups, not Drakes Estero pups. For completeness,

here we include the rest of that analysis that was not included in the Goodman analysis submitted to the MMC on August 29, 2011. We measured the proportion of pups at OB compared to total Drakes Estero pups. The outcome of this analysis was the same as when we compared pups at OB as a proportion of total regional pups.

The only **statistically significant** independent variable was **total regional seals** (P-value = 0.00478; adjusted R squared = 0.4873). Among the independent variables that were **not statistically significant** were **OYST Hi/Low** (P-value = 0.30875; adjusted R squared = 0.01144), **disturbance rate** (P-value = 0.6049; adjusted R squared = - 0.06348), and **proportion of pups at Double Point** (P-value = 0.21447; adjusted R squared = 0.05776). Thus, whether measured as a proportion of total pups in Drakes Estero or of total regional pups, the pups at OB are correlated with total regional seals (i.e., the total regional population size) and not with oyster activity or disturbance rate.

In summary, in contrast to Dr. Richard's assertion that Dr. Goodman did not " ... *even bother to challenge the Becker's (intra)colony scale analysis*", in fact Dr. Goodman did indeed analyze the Becker 2011 conclusion that oyster activity led to a spatial displacement of seals away from the Upper Estero in Drakes Estero. Goodman's analysis showed that, regardless of whether one focused on the pups and seals at OB alone, or at all three Upper Estero haul-out sites (OB, UEN, UEF), the answer was the same. The movement of pups and seals relative to Upper Estero haul-out sites correlates with the total regional seal population, and in some cases also with events at Double Point, but it does not correlate with either oyster activity (OYST Hi/Low) or disturbance rate. Thus, the Goodman analysis suggested (i) that the Becker 2011 colony scale analysis was incomplete and appeared to have stopped short in variable screening and selection, and (ii) the resulting conclusions derived from the colony scale analysis were incorrect. This will be discussed more below.

2. **GOODMAN'S FOCUS ON THE REGIONAL SCALE ANALYSIS EXPLOITED *"TRIVIALITY"* TO FOOL THE *"STATISTICALLY UNEDUCATED"*:**

> *"Instead, Dr. Goodman attempts to circumvent this "inconvenient truth" by attacking Becker's regional scale analysis. Any expansion from localized impacts to regional impacts and then to worldwide impacts will, by definition, show increasingly more diffuse impacts. Dr. Goodman attempts to exploit this triviality (by attacking Becker's regional analysis) may be a prelude to discrediting Becker's (intra)colony analysis. However, Dr. Goodman's attempt will fool only the statistically uneducated because Becker's analyses are statistically separate and Dr. Goodman's hammer is made of glass because it has no statistical or logical integrity."*

Puzzling. When we set aside Dr. Richard's use of language in this section of his review, we found it difficult to understand. After all, the Becker 2011 regional scale analysis led to one of his two major conclusions, namely that increased oyster activity had led to a 7% spatial displacement of pups out of Drakes Estero. That is one of the two major findings of spatial-displacement in the Becker 2011 paper.

We presume that Dr. Richard's comment that Dr. Goodman had attempted "*to circumvent this inconvenient truth*" is in reference to his claim that Goodman had not reviewed Dr. Becker's colony scale analysis. As described in point #1 above, Richard was incorrect and Goodman had indeed analyzed Becker's colony scale.

We are puzzled by Dr. Richard's claim that Dr. Goodman had been *"attacking"* Dr. Becker's regional scale analysis in his August 29 review. To analyze, test, and ultimately find that someone's conclusions are incorrect is how science is reviewed. That is normal. Scientific reviews are generally scholarly critiques and not simple advocacy pieces. To characterize Goodman's review as an *"attack"* is a false assertion. We were unable to find a single instance in Dr. Richard's review in which he documented a single *"attack"* by Dr. Goodman in his August 29, 2011 analysis.

We are equally puzzled by Dr. Richard's assertion that the regional scale analysis was trivial, and that Dr. Goodman was attempting to *"exploit this triviality"* to bamboozle the *"statistically uneducated."* Neither Dr. Becker nor Dr. Goodman were seeking *"worldwide impacts,"* but rather were seeking to examine the population dynamics among a regional harbor seal population in their choice of coastal sites (most notably Double Point) vs. Drakes Estero for the safety of their pups. This is a single population. In Becker 2011, the authors defined the movement of the Drakes Estero harbor seals within the PRNS population and thus the importance of the regional scale analysis when they wrote:

"Seals are thought to transit between Double Point and Drakes Estero ..."

It strikes us as odd that Dr. Richard would defend the Becker 2011 paper by calling trivial one of its two major conclusions. After all, Dr. Becker's regional scale analysis that took up more than half of the Becker 2011 tables, figures, and text. We read this section as saying that Dr. Richard thinks it is meaningless to look at spatial displacement of pups and seals into and out of Drakes Estero relative to the regional population. Richard's concerns, as presented to the MMC, are inexplicable. As Dr. Becker and his colleagues described, there is a significant relationship between the seals in Drakes Estero and other PRNS coastal sites. This relationship is particularly strong between Double Point and Drakes Estero, the two major haul-out areas for mothers and pups. From the perspective of how much of the variation in the dependent variable is accounted for by the independent variables, the movements of seals are much better understood at the regional scale as compared to the colony scale. Clearly, the events in 2003 at Double Point and the total regional population are the major factors.

Finally, we would be remiss if we did not note that we find Dr. Richard's use of language to be unbecoming for a scientific review. His choice of words – *"exploit this triviality," "attacking," "fool only the statistically uneducated," "Dr. Goodman's hammer is made of glass"* – have no place in such a MMC scientific review process.

In summary, in contrast to Dr. Richard's claim that the regional scale analysis was trivial (something he never wrote when originally reviewing Becker 2011), we continue to believe that the movement of harbor seals into and out of Drakes Estero is important and must be considered within the context of the regional population. We find the regional scale analysis to be key to the Becker 2011 paper. Moreover, Becker, Press, and Allen considered the regional scale analysis to be of great importance, since this analysis drove one of the two major conclusions in their paper, and was featured in more than half of their tables, figures, and text.

3. GOODMAN IGNORED ALL OF BECKER'S ANALYSIS EXCEPT TABLE 3:

"Dr. Goodman ignores all Becker analysis except for those summarized in Table 3 ..."

Incorrect. The NPS Becker 2011 paper included six tables and six figures. Dr.

Goodman's analysis included reference and criticism of five of the six tables (including Table A1 in the appendix) and five of the six figures. Dr. Goodman did not review Figure 5 or Table 5, although his analysis of Table 4 equally pertains to table 5 in terms of model ranking and effect size (see pages 49-50 of part 1). This was an odd criticism on Dr. Richard's part, since most of Dr. Becker's figures are reproduced or replicated in Dr. Goodman's analysis:

Figure 1 on pages 11-12 of part 1 and pages 15-16, 21, and 55 of part 2;
Figure 2 on pages 13, 20, and 22 of part 1;
Figure 3 on pages 14, 15, and 31 of part 1;
Figure 4 on page 24, 35, and 55 of part 2;
Figure 6 on page 33 of part 1;
Table 1 and Table 2 on pages 55-57 of part 1;
Table 3 on pages 32, 40, 41, and 51 of part 1;
Table 4 on page 49 of part 1; and
Table A1 on pages 36-38 and 56 of part 2.

In summary, in contrast to Dr. Richard's claim that Dr. Goodman had not reviewed any of the Becker 2011 analysis except Table 3, the August 29 report submitted by Dr. Goodman contained an analysis of five of the six tables and five of the six figures.

4. **GOODMAN'S REMOVAL OF 2003/2004 AND/OR 1982/1983 DATA FROM ANALYSIS WAS ARBITRARY AND BASED UPON "*A-PRIORI BIAS*":**

"Dr. Goodman first considers how the proportion of pups in Drakes Estero varies as a function of the High/Low {1,0} level of oyster harvest and rationalizes, without statistical basis, his removing extreme data points of this dataset which significantly reduce the significance of the relationship. Thus, he is able to claim that the size of the oyster harvest has no effect on seal geographical distribution."

"Armed with this "visually" (but not statistically) based evidence, he concludes that the 2003 and 2004 data points are uniquely determined by the rogue elephant seal at Double point and should therefore be removed. To conclude his argument he then also suggests, that the 1983-1984 data points should also be removed because they were not under the seal protection protocols JOC entered in 1992 (in our related letter on Dr. Harwood's review, SOS contests Dr. Goodman's rationale for removal of these years). Dr. Goodman then conducted another regression without the "non-typical" 1983, 1984, 2003, and 2004 data yielding a coefficient of determination of 0 with a significance $p < 0.9824$ or ABSOLUTELY NO relation between oyster harvest High/Low and the proportion of pups in the Estero. However it is worth noting that in wildlife biology, there is almost never a "typical" year and that post hoc rationales can almost always be constructed to include or exclude data in order to achieve a desired result. Moreover, Dr. Goodman's resulting model described above was evaluated in Becker (2011); it is in position 5 in Table 3 showing the same statistics that Dr. Goodman calculated."

"So, on the face of it Dr. Goodman agrees with Becker (2011) but the post hoc removal of the data he elects to do on a non-statistical basis ("visual evidence" from graphs of time series and reference to protocols that we argue elsewhere should not have had any effect on seal population) exhibits the appearance of an a-priori bias to ignore the complexity of the problem in order to vindicate DBOC regardless of evidence derived from the data."

Incorrect. Dr. Richard claimed here that it is inappropriate to test a statistical model by looking at whether certain discrete events, or a "*large change in management*" as Becker

and colleagues wrote in 2009, are driving a relationship. In contrast, we believe this is an excellent way to test whether a model represents a truly robust, long-term correlation. This is the method of testing first proposed to Dr. Goodman by our Stanford consultant, and then independently proposed by our U.C. Davis consultant (names provided to the MMC but not publicly released). The test of Becker's and Goodman's best models by eliminating 2003 (or 2003 and 2004) was suggested by both statistical consultants as the best way to test the robustness of the models. We are puzzled at how Dr. Richard can declare such a test off-limits. We note that Richard proposed no alternative as to how to test the models.

In fact, it was the Stanford statistician who first looked at the regression analysis of OYST Hi/Low (page 34, Part 1) and noted that eleven of the years were flat (including all of the DBOC years 2005-2009), and that the entire correlation was driven by four years: 2003 and 2004 on the low oyster activity side, and 1982 and 1983 on the high side (not 1983 and 1984 as stated by Dr. Richard). He asked Dr. Goodman: what was special about those four years? A critical scientist naturally would ask whether there is something special about those years (a single event, for example, or a change in management) that might illuminate what is driving (or leveraging) the correlation. We've gone back and discussed this with our Stanford and UC Davis consultants, and all four of us are puzzled as how Dr. Richard can dismiss this major analytical tool.

Dr. Richard misrepresented the tests done in Dr. Goodman's analysis: Dr. Richard wrote as if the only test performed by Dr. Goodman was the elimination of all four years (1982, 1983, 2003, and 2004) to show that the OYST Hi/Low variable was not statistically significant. This was not accurate. This was one of many tests as shown from pages 34 to 39 (part 1). Goodman also eliminated 1982 and 1983 alone. He also eliminated 1982 and 1983 and adjusted 2003 and 2004 for the rogue elephant seal. Most important, and ignored by Richard, Goodman eliminated 2003 and 2004 alone (and left 1982 and 1983 intact). The OYST Hi/Low model was not statistically significant in any of these tests. Just to put this issue to rest, we have now done this same analysis by eliminating only 2003 and retaining the other 14 years. Without this one year (2003), the OYST Hi/Low model is no longer statistically significant (see data below).

Elimination of 1982 and 1983. Dr. Richard failed to justify his reason for dismissing Dr. Goodman's elimination of 1982 and 1983. Goodman's reasoning was simple:

- 1982 and 1983 pre-date a major management change -- the 1992 inter-agency Federal-State oyster farm protocols; and
- 1982 and 1983 pre-date a second major management change – the 1996 kayak ban during pupping season.

Prior to 1992, oyster boats could get within ten yards of the seals and pups. After the 1992 protocols, the oyster boats stay over 700 yards away from the seals and pups. This seems to us – and other conservation biologists and marine mammal experts with whom we have discussed these data – as a major management change.

The banning of kayaks during pupping season also seems important, especially given the impact of kayaks as shown by Marcus Koenen and Dr. Sarah Allen in their May 2007 NPS publication (page 24, part 1). It was the NPS that pointed out the relationship of kayak use vs. restriction on the number of pups in Drakes Estero. And it was the NPS detailed logs of the secret photographs from 2008 and 2009 that pointed out that

the only disturbances (i.e., flushing into the water) observed in the 281,000 photos were six occurrences in which kayaks (which should not have been on the estero) got within around 75 yards of the seals and caused 50-100% of the seals to flush into the water.

In his 2009 paper (Becker, Press, and Allen, Marine Mammal Science), Dr. Becker and his colleagues wrote the following (see page 35, part 1 of Goodman's analysis):

> *"The 2008 pupping season presented an opportunity to investigate the immediate effect of a change in oyster operations. ...For this reason, it is not appropriate to include the 2008 data in the models because of this large change in management."*

Dr. Becker later corrected his Marine Mammal Science journal paper and noted that he had made a mistake and there was no major management change in 2008. Nevertheless, his reasoning was correct. We have simply followed the Becker 2009 logic (page 35, part 1) and eliminated 1982 and 1983 because of the *"large change in management."* Dr. Richard ignored this without explanation.

Also keep in mind that in addition to the large change in management (the 1992 and 1996 protocol changes), the 1982 and 1983 data have other serious issues:

- 1982 and 1983 data are followed by a 14-year gap;
- the NPS database begins with the 1997 data;
- the NPS previously denied the existence of any data prior to 1997 in both a FOIA response to Dr. Goodman and in testimony to the Inspector General;
- the 1982 and 1983 data come from Dr. Allen's personal notebooks (that we have never seen) from over a decade before she was an NPS employee; and
- the 1982 and 1983 data were collected with no documented NPS protocols and with only minimal collection dates (and thus no way of knowing if data were collected on the actual annual peak).

For those reasons alone, the 1982 and 1983 data should be eliminated from this analysis. Add on top of that the 1992 and 1996 major management changes, and it is clear that 1982 and 1983 should be eliminated in the statistical analysis. Nevertheless, as shown below, all one need do is eliminate 2003 on its own and Becker's OYST Hi/Low model, and his best multivariate model (OYST Hi/Low + DP seals) is no longer significant.

Elimination of 2003 and 2004, or of 2003 alone. It is difficult to understand Dr. Richard's reasoning for dismissing Dr. Goodman's claim that the major proportional increase in seals and pups in Drakes Estero in 2003 (with a residual effect in 2004) was based on a single rogue elephant seal at Double Point in 2003. This wasn't Dr. Goodman's wild speculation. Rather, it came from published NPS data and statements. According to Koenen and Allen 2007 (page 24; part 1), in 2003, a single elephant seal killed ~40 harbor seals and disturbed others. According to Becker, Press, and Allen 2011 (page 23; part 1), *"...in 2003 an aggressive elephant seal probably displaced numerous harbor seals from Double Point to Drakes Estero."*

Becker and colleagues recognized this same issue (the importance of 2003 and Double Point), but failed to properly build it into his models. Becker 2011 put Double Point (DP) seals into their models, but not DP pups or proportion of pups at DP. That was a crucial mistake of the Becker 2011 paper.

Elephant seals and harbor seals compete for haul-out space along the PRNS coast – sites with available beaches protected from predators by cliffs. Double Point is a prime site shared by both species, and in such circumstances, the elephant seals are dominant. A single rogue elephant seal at Double Point in 2003 killed ~40 harbor seals. We previously calculated that this single elephant seal chased away ~600 harbor seals, of which around 50% (~300) entered Drakes Estero, and the other 50% distributed to other PRNS sites. The changes at Double Point were shown on page 25, and the movements of seals statistically analyzed on page 26.

There was a transient decrease in harbor seals at Double Point in 2003 that only partially recovered in 2004 (page 28). This decrease at Double Point was driven by a single "marauding" elephant seal. Around 50% of these seals moved into Drakes Estero. Thus, the spatial displacement involving Drakes Estero was short-term and not long-term, and it involved a movement **INTO** Drakes Estero and **not OUT** of Drakes Estero.

Dr. Richard provides no reason to disregard this relationship and to dismiss testing the models by eliminating 2003 and 2004, or 2003 alone. If a model reveals a true long-term relationship, then eliminating one or two years should not disrupt it. However, if a model is based on a single event, then eliminating that single event will render the model of no significance. That is precisely what Dr. Goodman found for Becker's models that included OYST Hi/Low. That is the key test that both the Stanford and UC Davis consultants asked Dr. Goodman to conduct. In contrast, none of Dr. Goodman's best models lost their significance when 2003 was eliminated.

In his August 29, 2011 report, Dr. Goodman only showed analysis with the elimination of 2003 and 2004. Here we include same analysis with only the removal of 2003 (thus retaining 14 of 15 years, including 1982 and 1983). Becker's best models are no longer statistically significant, whereas Goodman's best models (based upon total regional seals and Double Point pups) are highly significant.

Elimination of 2003 from Becker's OYST Hi/Low: If we eliminate only this one year (2003) from the Becker 2011 OYST Hi/Low model, we derive a P-value of 0.17 and an adjusted R squared of 0.08. Thus, this model is not statistically significant if 2003 is eliminated and the other 14 years retained (including 1982, 1983, and 2004).

Elimination of 2003 from Becker's best model (OYST Hi/Low + DP seals): If we eliminate only this one year (2003) from the Becker 2011 best model (OYST Hi/Low + DP seals), we derive a P-value of 0.31 and an adjusted R squared of 0.05. Thus this model is not statistically significant if 2003 is eliminated and the other 14 years retained.

Elimination of 2003 from Dr. Goodman's best model (DP pups + total regional seals + 92 protocols): If we eliminate only this one year (2003) from Goodman's best model (DP pups + total regional seals + 92 protocols), we derive a P-value of 0.0003 and an adjusted R squared of 0.79. Thus this model is highly statistically significant if 2003 is eliminated and the other 14 years retained. This is a key test of the models. The Becker 2011 best model fails the test. Goodman's best models all pass the test.

In summary, in contrast to Dr. Richard's claim that Dr. Goodman's removal of certain years from the analysis (1982 and 1983, or 2003 and 2004) was arbitrary and inappropriate, we find that this was biologically highly relevant and the appropriate

way to test the robustness of the models. The 1982 and 1983 data were prior to the 1992 and 1996 major management changes. In 2003, a rogue elephant seal killed ~40 harbor seals at Double Point and chased ~300 harbor seals INTO Drakes Estero. When 2003 is eliminated from the analysis and the other fourteen years retained (including 1982 and 1983), the Becker 2011 best models fail the test. In fact, all models including the OYST Hi/Low variable fail the test. In contrast, Goodman's best models all pass and remain highly statistically significant.

5. **GOODMAN FOCUSED ON BECKER'S OYST HI/LOW MODEL, BUT THAT MODEL IS ONLY *"MILDLY WORTH CONSIDERING"*:**

> *"Second, this model is 3.3 points away from the minimum QAICc which makes it a model only mildly worth considering. Indeed "As a rule of thumb, models having their AIC within 1–2 of the minimum have substantial support and should receive consideration in making inferences. Models having their AIC within about 4–7 of the minimum have considerably less support" Burnham & Anderson (2002, 446). "*

Incorrect. Dr. Richard asserted that Dr. Goodman focused entirely on Becker's OYST Hi/Low model. That is incorrect. Richard missed or perhaps did not understand the analytical approach taken by Goodman to test the models. We agree that OYST Hi/Low on its own is only *"mildly worth considering"* because it is only mildly statistical significant (P = 0.047). We note that while this incorrect categorical representation of oyster activity was just barely statistically significant, the actual annual oyster harvest data was not. Goodman did spend considerable time analyzing and better understanding what years leveraged OYST Hi/Low since it formed the backbone of all of the Becker 2011 best models. Once Goodman understood how OYST Hi/Low was being driven by the rogue elephant seal at Double Point in 2003, he was then able to analyze and test Becker's other models that used this variable. Becker's best model was OYST Hi/Low + DP seals. On page 46 (part 1), Goodman showed that elimination of 2003 and 2004 rendered this model of no statistical significance (P = 0.87 and adjusted R squared = 0). As mentioned above, we have now tested this same model – Becker's best – by eliminating ONLY 2003 and come up with the same finding (P = 0.31 and adjusted R squared = 0.05).

In summary, Dr. Richard's claim that Dr. Goodman focused only on the OYST Hi/Low model was incorrect. Goodman tested the Becker 2011 best models (page 46, part 1).

6. **GOODMAN DID NOT PROVIDE *"THE LEVEL OF SIGNIFICANCE OF REGRESSION COEFFICIENTS"* FOR VARIABLES IN HIS BEST MODELS:**

> *"Comparing the best model proposed by Dr. Goodman to the best model published by NPS does indeed shows a thousand fold increase in significance level; however, this is like comparing apples to bricks. Closer scrutiny in analyzing these better models shows significant logical flaws in Dr. Goodman's reasoning as well as significant flaws in Dr. Goodman's statistical techniques. First, he only considers the coefficient of determination and its level of significance without reporting the level of significance of the regression coefficients, which are specific to each variable."*

Incorrect. Dr. Goodman provided all of his individual statistical analyses to Dr. Tim Ragen, Executive Director, Marine Mammal Commission, on August 29, 2011. The

MMC has all of the P-values for each individual regression variable. Had Dr. Goodman listed all of these P-values in his report, it would have increased the length of Dr. Goodman's report even further.

Moreover, Dr. Goodman ONLY included variables in his models for which each individual variable was statistically significant. On page 45, Dr. Goodman tested whether adding OYST Hi/Low to any of the five best models led to a meaningful improvement in the adjusted R squared. In each case, the answer was no. And in each case, Dr. Goodman gave the P-value for the OYST Hi/Low variable and showed that it was not statistically significant.

Just to set the record straight, the P-values for the individual variables in Dr. Goodman's top three models are:

	P-values
Goodman's Model #1:	0.00001
DP pups	0.00005
Total regional seals	0.00014
92 protocols	0.01579
Goodman's Model #2:	0.00003
DP pups	0.00035
Total regional seals	0.00004
Goodman's Model #3:	0.00002
Proportion of pups at Double Point	0.00002

Surprisingly, Dr. Richard never made this same request of Dr. Becker in his one and one half page critique of Becker 2011. Why didn't he ask the same questions of Becker that he did of Goodman? Had Richard examined the significance of the individual variables in Becker's best models, he would have discovered that Becker's second best model (OYST Hi/Low + DP seals + proportion of seals at subsite A) included as its third part of the model (subsite A) a variable that was statistically not significant, which is why adding the 3rd variable lowered the ranking. In fact, adding that 3rd variable also dropped the 2nd variable (DP seals) to just below significant (see below).

	P-values
Becker's Model #1:	0.01474
OYST Hi/ Low	0.00842
DP seals	0.03463
Becker's Model #2:	0.00813
OYSt Hi/Low	0.00403
DP seals	0.05043
Proportion of seals at subsite A	0.06319

In summary, in contrast to Dr. Richard claim that Dr. Goodman had not provided the significance levels of the individual independent variables within his models, in fact Dr. Goodman had provided all of that analysis to the MMC on August 29, 2001. We note a double standard. Richard failed to apply this same logic to his analysis of the Becker 2011 paper. Had Richard applied this same logic to Becker 2011, he would

have eliminated the second model in the Becker 2011 paper (OYST Hi/Low + DP seals + subsite A), the very model that Richard highlights in another section of his review, because the subsite A variable was not statistically significant.

7. **GOODMAN CLAIMED HIS MODELS WERE A THOUSAND-FOLD IMPROVEMENT OVER BECKER'S, BUT THIS IS *"VERY MISLEADING"*:**

> *"Second, his assessment of a thousand-fold improvement is very misleading. Indeed, since this level represents the probability that the results found are only due to chance and since Becker's top model shows a level of significance that is already quite low, a 1000-fold difference represents an infinitesimal change in significance."*

Nonsensical. We are perplexed at how Dr. Richard can make such an argument that it is *"very misleading"* to consider models as ranking higher that have P-values that are 1000-fold higher (from Becker's best at 0.015 to Goodman's best at 0.00001) and adjusted R squared values that are double (from Becker's best at 0.42 to Goodman's best at 0.87). Moreover, Becker's best model is no longer statistically significant if 2003 alone is eliminated (P = 0.31) whereas Goodman's best model is (P = 0.0003).

Dr. Richard writes: *"... since Becker's top model shows a level of significance that is already quite low, a 1000-fold difference represents an infinitesimal change in significance."* We are perplexed by Richard's statement. Becker's OYST Hi/Low model is just barely significant (P = 0.047) and his best model (with the addition of Double Point seals) is a bit better (P = 0.015). In the context of the tests for robustness in which Becker's models fail and Goodman's models pass, to argue that a change from P = 0.015 to P = 0.00001 is *"infinitesimal"* is simply wrong.

In summary, in contrast to Dr. Richard's claim that Dr. Goodman was misleading to suggest that models that are a thousand-fold more statistically significant might be more relevant, we find that Dr. Goodman's best model (with a P-value of 0.00001) is more biologically relevant and passes certain critical tests compared to the Becker 2011 best model (with a P-value of 0.015). The thousand-fold difference in statistical significant is relevant and not of *"infinitesimal"* importance as Richard suggested.

8. **GOODMAN'S BEST MODELS CAN BE REDUCED TO A *"TAUTOLOGY WHERE THE PROPORTION OF PUPS IN DRAKES"* EXPLAINS ITSELF.**

> *"Third, taking Dr. Goodman's second model (proportion of pups at Drakes as a function of DP pups and total regional seals) as an example, we could build a equivalent model with the explicit components of the total regional seals (i.e., regional seals = adult in Drakes + Adult not in Drakes + Pups in Drakes + Pups not in Drakes). This model has an even better coefficient of determination (0.9279) with and a higher significance level (p < 0.0000000042286). However when considering the significance level of the individual covariate, we find that only the variable "pup in Drakes" and "pup not in Drakes", which are also part of the dependent variable, are statistically significant. Not disclosing this important fact allows Dr. Goodman to run a logically-flawed regression that looks good but is totally devoid of meaning. The other five top models and a few others that Dr. Goodman claims are better than the best of Becker (2011) suffer from a similar flaw (i.e., implicitly introducing the dependent variable as a covariate). In summary, all of Dr. Goodman's better models reduce to a tautology where the proportion of pups in Drakes explains the proportion of pups in Drakes. The brick of a tautological argument will, by*

definition, always be heavier than the apple of the best-reasoned argument. Stripping away the statistically nonsensical arguments, the rest of Dr. Goodman's better models all include oyster harvest as a significant covariate and thus support Becker 2011. In short, Dr. Goodman's own analyses confirm the opposite of what he claims."

Incorrect. As in other sections of Dr. Richard's review, we need to set aside Dr. Richard's use of language in this section, and focus on his scientific arguments. When we do so, we find Dr. Richard's arguments to be circular, difficult to understand, and inconsistent with the variables used in the Becker 2011 paper where he found no fault. Becker tested *"Regional pup count,"* but when Goodman tested *"total regional seals,"* it was called a *"tautology"* by Richard. Becker tested total seals at Double Point (*"DP"*), but when Goodman tested pups at Double Point, or proportion of pups at Double Point, Richard dismissed them as *"logically-flawed."* Interestingly, Becker used the same variable (pups at Double Point) in a reply to Dr. Ragen on June 16, 2011 (see below).

Dr. Goodman's biological logic was as follows. Goodman tested whether the proportion of pups in Drakes Estero went up as the total regional seal population went up. That is a very reasonable starting question: what happened to the population? Haul-out sites along the coast are limiting (i.e., beaches with cliffs to protect the pups from predation). The harbor seals compete for those sites with bigger, more aggressive elephant seals. Thus it is quite reasonable to ask whether, as the total regional population goes up, if more mothers with their pups enter into Drakes Estero, a more distant haul-out site where the elephant seals do not go. To call this biologically meaningful question a *"tautology"* reveals a lack of understanding about the biology of the harbor seals and elephant seals along the PRNS coast.

What Dr. Goodman found is striking: as the total regional population of seals goes up, an increasing proportion of mothers and pups enter into Drakes Estero. This makes biological sense, is statistically a very strong correlation, and is robust even when 2003 is eliminated from the analysis. The same goes for the proportion of pups at Double Point. Double Point and Drakes Estero represent around 59% of regional pups. As the proportion of pups goes down at Double Point, it goes up at Drakes Estero. As elephant seals chase the harbor seals away from Double Point, about 50% of them go into Drakes Estero. This strong correlation is robust even when 2003 is eliminated.

Dr. Richard does not actually analyze any of Dr. Goodman's models. Rather, he sets up a straw man. He breaks down total regional seals to its four components, but by doing so, he takes away the biological issue of the total regional population, and instead brings in a series of population subsets, each with their own dynamics, and indeed starts matching Drakes Estero pups against Drakes Estero pups as one of the independent variables. In other words, Richard established a straw man tautology, then claimed it to be a tautology, and then claimed that ALL of Goodman's best models were based on similar *"logically-flawed"* arguments. Goodman's 3rd best model relies on only one independent variable – the proportion of pups at Double Point. Richard says nothing about that independent variable, and indeed it is no different in logic than Becker's use of Double Point seals (*"DP"*). And yet the model using proportion of pups at Double Point is 1000-fold more statistically significant than Becker's best model.

Dr. Richard tried to argue around the fact that Dr. Goodman used the same classes of variables as did Dr. Becker, but Dr. Goodman simply picked the correct models (e.g., Double Point pups rather than Double Point seals). Interestingly, Becker did use

Double Point pups, but not in his paper. When Dr. Ragen asked him to run the OYST Hi/Low model and switch 2005 from high to low, Becker wrote back on June 16, 2001, and said he had run the same model as his best model from his paper (with the switch in 2005), but he had not. He substituted "Pups at Double Point" for "Seals at Double Point." What was the consequence? This was the only time Becker provided what Richard requested in #6 above, namely, the P-values of the individual variables.

The new model Becker ran for Ragen was superior to the models in his paper because he switched from seals at Double Point to pups at Double Point. The pup.dp variable had a P-value of 0.00292 compared to OYST Hi/Low that had a P-value of 0.01423. This was a strong indication that better models could be derived from focusing on different measures of what was going on with pups (and their mothers) at Double Point (rather than total seals), and what was going on with the total regional population.

In summary, in contrast to Dr. Richard's claim that Dr. Goodman's best models were all logically flawed, we find that Goodman's models are logically consistent with the biology and avoided the circular logic trap that Richard set up. Dr. Richard did not analyze Dr. Goodman's best models. Rather, Richard set up a straw man argument, establishing a knowingly flawed model, then showing its tautological flaw, and finally declaring (without analysis) that all of Goodman's models were the same, when they were not.

9. **GOODMAN'S BEST MODELS, ONCE *"STATISTICALLY NONSENSICAL ARGUMENTS"* ARE STRIPPED AWAY, *"ALL INCLUDE OYSTER HARVEST"*:**

> *"The brick of a tautological argument will, by definition, always be heavier than the apple of the best-reasoned argument. Stripping away the statistically nonsensical arguments, the rest of Dr. Goodman's better models all include oyster harvest as a significant covariate and thus support Becker 2011. In short, Dr. Goodman's own analyses confirm the opposite of what he claims."*

Incorrect. Dr. Richard makes a sweeping statement that is inaccurate. All of Dr. Goodman's top models are reasonable. None of Goodman's models contain the "*tautology*" that Richard established in his straw man model; Goodman avoided all such models. Some of Goodman's best models use "total regional seals" just as Becker 2011 used "regional pup count." Some of Goodman's best models use either "proportion of pups at Double Point" or "pups at Double Point" just as Becker 2011 used "Double Point seals" and "Double point pups." And one of Goodman's models that was better than Becker's was the very model (Double Point pups and OYST Hi/Low) that Becker included, inadvertently, in his letter to Dr. Ragen on June 16 when he said he was repeating his best model. That better model has a P-value of 0.00330 and an adjusted R squared of 0.54992. The only problem is that, like other models involving OYST Hi/Low, it is sensitive to the elimination of 2003. Whereas Goodman's five best models are all robust to the elimination of 2003, none of the models involving OYST Hi/Low remain statistically significant when 2003 is eliminated (in this case of OYST Hi/Low + DP pups, without 2003, the P = 0.08904).

One key test in Dr. Goodman's analysis that Dr. Richard failed to acknowledge was the addition of OYST Hi/Low to all of Dr. Goodman's best models. At the suggestion of the Stanford statistician, Goodman asked whether any of his best models improved when OYST Hi/Low was included as an additional independent variable. The answer

was no, as shown on page 45 (part 1). Richard asked (see #6 above) for the P-values for the individual independent variables in each regression analysis. That is precisely what Goodman reported on page 45 with the addition of OYST Hi/Low. The bottom line is that the OYST Hi/Low variable was NOT statistically significant when added to any of Goodman's top models, and it failed to significantly decrease the overall P-value or increase the adjusted R squared of the model. Thus, in contrast to what was reported in Becker 2011, OYST Hi/Low did not have a significant impact on the proportion of pups in Drakes Estero.

In summary, in contrast to Dr. Richard's claim that Dr. Goodman's remaining models all include oyster harvest, we find that Dr. Goodman's best models do not include oyster harvest. Dr. Richard ignored, for example, the fact that Dr. Goodman's third best model used a single variable – proportion of pups at Double Point – that did not include OYST Hi/Low, and yet was nearly three orders of magnitude more significant than the Becker 2011 best models. Dr. Richard provided no argument as to why this model was logically flawed.

10. **GOODMAN RELIED ON R SQUARED ANALYSIS BUT SHOULD HAVE USED AIC ANALYSIS AS IN BECKER 2011:**

> *"Note also that even if Dr. Goodman had proposed good models (i.e. that did not introduce a dependent variable as a covariant), the R2 technique that he chooses remains a blunt instrument more appropriate for simple linear regression models. In contrast the Akaike Information Criteria (AIC) and its derivative (QAICc) used in Becker 2011 uses the "principle of parsimony" to trade off the maximum value of the likelihood function with the number of variables included in the model so as to provide a more robust solution (high likelihood, few variables) to complex multivariate models such as are commonly found in analyses of wildlife responses. In effect, using R2 instead of AIC as a performance metric would slightly change the order of the selected models but, more importantly, it would also lack a precise way to eliminate models not worth of consideration. Given the known limitations of R2 and the prevalent use of AIC in wildlife analyses, it is surprising that Dr. Goodman did not extend his statistical analysis past R2 to AIC."*

Incorrect. In response to this criticism, parallel AIC analysis is now provided. According to statistics experts and textbooks, there is no statistically right or wrong way of analyzing a set of independent variables. What Dr. Goodman's analysis demonstrated is that Multiple Linear Regression (MLR; using adjusted R squared test for model fit) is effective at analyzing the limited data set of 15 points (i.e., years) in the Becker 2011 paper. We find that MLR is as effective for this limited data as is the Becker 2011 use of Generalized Linear Modeling (GLM; using AIC criteria for model fit).

As one statistics textbook writes:

> *"The problem of determining the "best" subset of independent variables in multiple linear regression has long been of interest to applied statisticians, and it continues to receive considerable attention in recent statistical literature"*

We have consulted with a statistics professor at Stanford University and a conservation biology professor and statistician at U.C. Davis (names available to MMC), and both agree – there is no "right" way of variable selection and model building. Given the

relative simplicity of the NPS data set used in Becker 2011, and on the advice of the Stanford consultant, Goodman selected multiple linear regression and focused on P-value and adjusted R squared. There are indeed a number of other methods, including AIC and BIC as used in Becker 2011. But these are not the only possible methods. Each method has its own strengths and weaknesses in terms of how it deals with the number of variables and data points, and how it adds penalties for these numbers. Thus, two faculty who teach statistics to graduate students at Stanford and U.C. Davis respectively thought Goodman's analysis was appropriate, thorough, rigorous, and well done. Both agreed with Goodman's conclusions.

In terms of the approach taken by Dr. Goodman to test the models by eliminating 2003, one textbook writes:

> *"Identify outliers and influential points – maybe exclude them at least temporarily."*
>
> *"The principle of Occam's Razor states that among several plausible explanations for a phenomenon, the simplest is best. Applied to regression analysis, this implies that the smallest model that fits the data is best."*

Those were the principles our Stanford and U.C. Davis consultants used when guiding Dr. Goodman's analysis. In summary, GLM with Akaike information criterion (AIC) is a very good method, just as is Bayesian with the Bayesian information criterion (BIC), but they are not the only methods (there are several other choices), and it is not clear that this data set requires more than simple linear regression analysis to derive the major conclusions in terms of models and influential years. **The unique influence of 2003 is clear regardless of what method is used (MLR vs. GLM) – what was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point.**

What surprised us was that Dr. Richard, in making this criticism, did not analyze Dr. Goodman's best models using AIC. Richard previously claimed that he replicated all of Dr. Becker's analysis using AIC. If so, it would have been a simple task to add Goodman's five best models to the mix and determine the ranking and significance.

As mentioned when Dr. Goodman first submitted his analysis on August 29, 2011, Mr. Lewis (Director, U.C. Cooperative Extension Marin, and the co-author of this response) independently reviewed Becker 2011 at the request of Marin County Supervisor Steve Kinsey, and independently came to the same conclusions as did Dr. Goodman. Whereas Goodman's multi-variate regression analysis used StatPlus (5.8 AnalystSoft Inc.), for Lewis' review, he used S-Plus (6.1 TIBCO Inc.) and STATA/IC 11.2 (StataCorp LP), the commercial code that is equivalent to R code as used in Becker 2011. The Lewis review and analysis included Arcsine transformation of the response variable, proportion of Drake's Estero pups, to account for normal distribution of proportion data. It also included model replication using multi-variate and logistic regression, as well as general linear and linear mixed effects modeling.

The Lewis statistical review of the NPS data agreed with the statistical modeling presented by Dr. Goodman. In agreement with Goodman's analysis, Lewis' analysis showed that there are predictor variables that more robustly and with much greater significance describe the variability in the proportion of pups in Drake's Estero than those presented in Becker et al (2011). The better predictors included the population of

regional seals and the number and proportion of seals and pups at Double Point. Models using these variable have a more profound influence on the proportion of pups in Drake's Estero than do the models in Becker et al (2011) that rely on Oyster Hi/Low.

Additionally, the Oyster Hi/Low variable used in Becker et al (2011) relies for its significance on the values for year 2003 rather than the other 14 years, and that one year drives the significance of Becker's best models. When this value (2003) is removed from Becker's best models, the Becker 2011 models are no longer statistically significant. Conversely, under the same test of model robustness and significance, the best models presented by Dr. Goodman remain significant and still describe a greater amount of the variability in the proportion of pups in Drake's Estero than does Becker's best model with those values included.

Below is a comparison of Dr. Goodman's best model vs. Dr. Becker's best model using both multiple linear regression (as done by Dr. Goodman) and generalized linear model (as done by Mr. Lewis), both with and without 2003.

The conclusion from the analysis below is clear. When we include all fifteen years, both Dr. Goodman's and Dr. Becker's best models are statistically significant, as are the individual variables within them, but Dr. Goodman's model and variables are several orders of magnitude more significant – a thousand-fold more significant. When 2003 alone is eliminated and the remaining fourteen years analyzed, both analytical methods (MLR and GLM) show that Goodman's best model remains highly statistically significant, including all of its variables, whereas Becker's best model is no longer statistically significant (nor are its individual variables). **This analysis hopefully ends any controversy about the method of statistical analysis deployed.**

Significant = green; not significant = red

ANALYSIS WITH 2003	Multiple Linear Regression P-values	Generalized Linear Model P-values
Goodman's Top Model:	0.00001	
DP pups	0.00005	< 0.0001
Total regional seals	0.00014	0.0002
92 protocols	0.01579	0.0127
Becker's Top Model:	0.01474	
OYST Hi/Low	0.00842	0.011
Double Point seals	0.03463	0.0463

ANALYSIS WITHOUT 2003	Multiple Linear Regression P-values	Generalized Linear Model P-values
Goodman's Top Model:	0.00029	
DP pups	0.00229	0.0024
Total regional seals	0.00080	0.0008
92 protocols	0.02054	0.0163
Becker's Top Model:	0.87444	
OYST Hi/Low	0.68948	0.1581
Double Point seals	0.91052	0.4774

Dr. Richard wrote that:

> *"... using R2 instead of AIC as a performance metric would slightly change the order of the selected models but, more importantly, it would also lack a precise way to eliminate models not worth of consideration."*

But Dr. Richard failed to make such a comparison, and thus failed to show the inadequacy of adjusted R squared. Richard failed to show that Goodman's use of adjusted R squared came up with a significantly different order of selected models. Goodman's top models are still far superior to Dr. Becker's; slight differences in order are not important when one set of models are three orders of magnitude more significant than the others. Richard failed to show that adjusted R squared did not eliminate models that AIC would have eliminated.

In summary, in contrast to Dr. Richard's criticism that Dr. Goodman should have used AIC analysis (with the implied suggestion that the analysis would have been different than Dr. Goodman's MLR analysis), we find that both statistical methods give the same answer when comparing the models: Goodman's top models are valid and far superior to those in Becker 2011, regardless of whether one analyzes them using MLR vs. GLM. Our analysis shows that GLM using AIC vs. MLR using adjusted R squared derived the same major conclusion. The Becker 2011 top models depend for their significance upon a single event in 2003 (the rogue elephant seal at Double Point), and are no longer significant when 2003 is eliminated, whereas Goodman's top models do not depend upon 2003. Thus, Dr. Richard's assertion that Dr. Goodman used the wrong method of analysis – and by inference thus derived the wrong conclusions – is incorrect. The unique influence of 2003 is clear regardless of what method is used (MLR vs. GLM) – what was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point.

11. **GOODMAN'S *"CONTEST OF THE NPS ACREAGE DATA"* IS FLAWED:**

> *"To secure his flawed argument, Dr. Goodman questions the relationship between oyster harvest and acreage used for oyster growing displayed on Figure 4. He specifically targets the 2005 and the 2007 acreage that he considers overestimated. However if both these acreages are reduced in half the value of the coefficient of correlation between acreage and oyster harvest actually increases (i.e., there is better correlation) and its significance level decreases (i.e., more significant correlation). It is only when the 2007 acreage alone is reduced to 15% of its original value that the correlation begins to degrade to a possible coefficient of correlation of 0.84 ($p<0.0229$) when the 2007 acreage is ignored vs. 0.91 ($p<0.003$) as reported in Becker (2011). In fact and in contradiction to Dr. Goodman's attempts, the best way to reduce the value and the significance of the correlation would be to INCREASE the 2007 acreage."*

Incorrect. Dr. Richard misunderstood the data and arguments presented by Dr. Goodman. Richard claimed that Goodman specifically targeted *"the 2005 and 2007 acreage that he considers overestimated."* That is a misrepresentation. Goodman did consider 2007 overestimated (at 22 acres) compared to the Brown and Becker March 2007 Trip Report (at 10 acres). Goodman, it should be noted, considered 2005 underestimated, not overestimated. Richard misrepresented Goodman's point here.

Goodman made the point that Dr. Becker and colleagues only measured the oyster cluster cultures on OB that they could see in the aerial photos, and completely missed the oyster bag cultures on UEN.

Thus, Richard's argument about the number of acres in 2007 failed to address the central issue raised by Goodman. What IS important is the number of acres in 2000-2004 that drives the categorical OYST Hi/Low variable. Richard completely ignored that issue and instead did an irrelevant analysis of 2007 numbers.

Dr. Richard failed to grasp Dr. Goodman's main point. On Figure 4, Table A1, and throughout the text, Dr. Becker and colleagues assumed that there were zero oyster bags on OB and UEN from 2000-2004. Goodman showed that was incorrect. The CDFG aerial photos showed the same oyster cluster cultures on OB in 2003 and 2004 as in 2005. The statements from the former Johnson's Oyster Company workers, including the former co-owner, office manager, and foreman, all claimed that oysters were harvested from OB and UEN throughout those years. And finally, the CDPH records show oyster getting harvest from bed #17 on UEN during those years.

In summary, in contrast to Dr. Richard's claim that Dr. Goodman's analysis of the oyster acreage data was flawed, we find that Dr. Richard missed the point completely of what Dr. Goodman showed in his analysis. Goodman's major point was that Figure 4 and Table A1 were misleading and incorrect, and thus led to the incorrect categorical OYST Hi/Low model. Oysters were harvested by JOC from OB and UEN from 2000-2004, and then again by DBOC in 2005. Nothing changed from 2004 to 2005 in terms of oyster activity on sandbars UEN and OB. Thus, the OYST Hi/Low model is invalid.

12. **RICHARD CLAIMS THAT BECKER RECOGNIZED THE *"INFLUENCE OF DOUBLE POINT"* BUT FOUND THIS SINGLE COVARIATE WAS *"INSUFFICIENT"* TO EXPLAIN THE CHANGES AT DRAKES ESTERO:**

> *"Dr. Goodman appears to exhibit a strong bias, given that his review of Becker (2011) seemingly fails to find any redeeming quality to any analysis NPS provided. It was not for lack of opportunities since, for the record, Becker (2011) does recognize the influence of Double Point (particularly in the 2003 season) but the statistics of this single covariate is insufficient to explain the change in the proportion of pup in Drakes; it further shows that it is only with the addition of oyster harvest and the max number of seals on sandbar "A" that one can obtain a significant and robust model."*

Incorrect. The authors of Becker 2011 did recognize the influence of the rogue elephant seal at Double Point in 2003, but they did not test it correctly in their modeling, and failed to develop best-fit models using Double Point. Had the authors of Becker 2011 simply looked at the proportion of pups at Double Point as a single variable, they would have produced a model that is three orders of magnitude better than their best as presented in Becker 2011.

The major driving force in the movement of the harbor seals during pupping season is the behavior of pups and their mothers. Becker 2011 included only total seals at Double Point in Table 3 for the AIC analysis. For reasons unclear, this variable switches to Double Point pups in the Bayesian (BIC) analysis in Table 5.

Dr. Becker inadvertently switched the variable from DP seals to DP pups on June 16 when he ran a specific test for Dr. Ragen. The statistical significance of that variable went up by at least an order of magnitude by switching from DP seals to DP pups, and produced a model (OYST Hi/Low + DP pups) in which the P-value went to 0.003 from 0.147 for the best model in his paper (OYST Hi/Low + DP seals). Thus, by the very test that Becker produced for Dr. Ragen, it is clear that Becker 2011 did not include the best models. Moreover, it is clear that DP pups is more significant as a variable than DP seals.

The authors of Becker 2011 never looked at the proportion of pups at Double Point, even though using the proportion was what they based their analysis on for Drakes Estero, and also for subsite A. The method they applied to Drakes Estero and subsite A they did not apply to Double Point.

Finally, Dr. Richard is wrong when he stated "*... it further shows that it is only with the addition of oyster harvest and the max number of seals on sandbar "A" that one can obtain a significant and robust model.*" Dr. Richard needs to follow his own advice and look at the statistical significant of the individual independent variables. The model he quotes is Becker's 2nd best model, not his best, and the inclusion of sandbar A drove down the significance because that variable was not significant.

The best model in Becker 2011 was OYST Hi/Low + DP seals. That model was weaker than OYST Hi/Low + DP pups. And all of the models including OYST Hi/Low failed the test of eliminating 2003. When DP pups, or proportion of pups at DP, are looked at on their own, or combined with total regional seals, one winds up with models that are three orders of magnitude more significant than Becker's best model, and are robust to the test of eliminating 2003.

In summary, in contrast to Dr. Richard's claim that the Becker 2011 paper had recognized the influence of Double Point but properly dismissed it as a single covariate, we find that the Becker 2011 paper considered the wrong variable -- Double Point seals rather than DP pups or proportion of DP pups – and thus underestimated the importance of this variable. In fact, Becker 2011 completely missed that the variable "proportion of pups at Double Point" on its own gives rise to a model that is nearly three orders of magnitude more significant than Becker's best models, and remains significant when 2003 is eliminated, in contrast to Becker's best models.

13. **RICHARD'S FINAL CONCLUSION THAT GOODMAN'S ANALYSIS *"FAILS TO DEMONSTRATE THAT OYSTER HARVEST HAS NO EFFECT"*:**

> *"In our view, Dr. Goodman fails to demonstrate that oyster harvest has no effect on the proportion of pups in Drakes Estero and cannot provide any statistically robust or logically reasonable alternative explanation for the changes observed in the data."*

Illogical. It was not Dr. Goodman's responsibility to show that oyster harvest has no effect on the proportion of pups at Drakes Estero. Such a statement appears to be designed to misdirect the MMC review process. Rather, it was the responsibility of the three authors of Becker 2011 to show ***evidence*** that oyster harvest leads to a long-term spatial displacement of pups and their mothers out of Drakes Estero. The authors failed to demonstrate what their title claimed. In fact, they do not have over three decades of

data. They do not have evidence for a long-term spatial displacement OUT of Drakes Estero.

Rather, the NPS authors do have ***evidence*** for a short-term spatial displacement in 2003 (and partly in 2004) **INTO** Drakes Estero – the exact opposite of the Becker 2011 major conclusion. The cause for that spatial displacement appears to be a single rogue elephant seal at Double Point in 2003 that killed ~40 harbor seals and chased ~600 harbor seals off of Double Point, with nearly 50% of them entering into Drakes Estero.

Dr. Richard wrote:

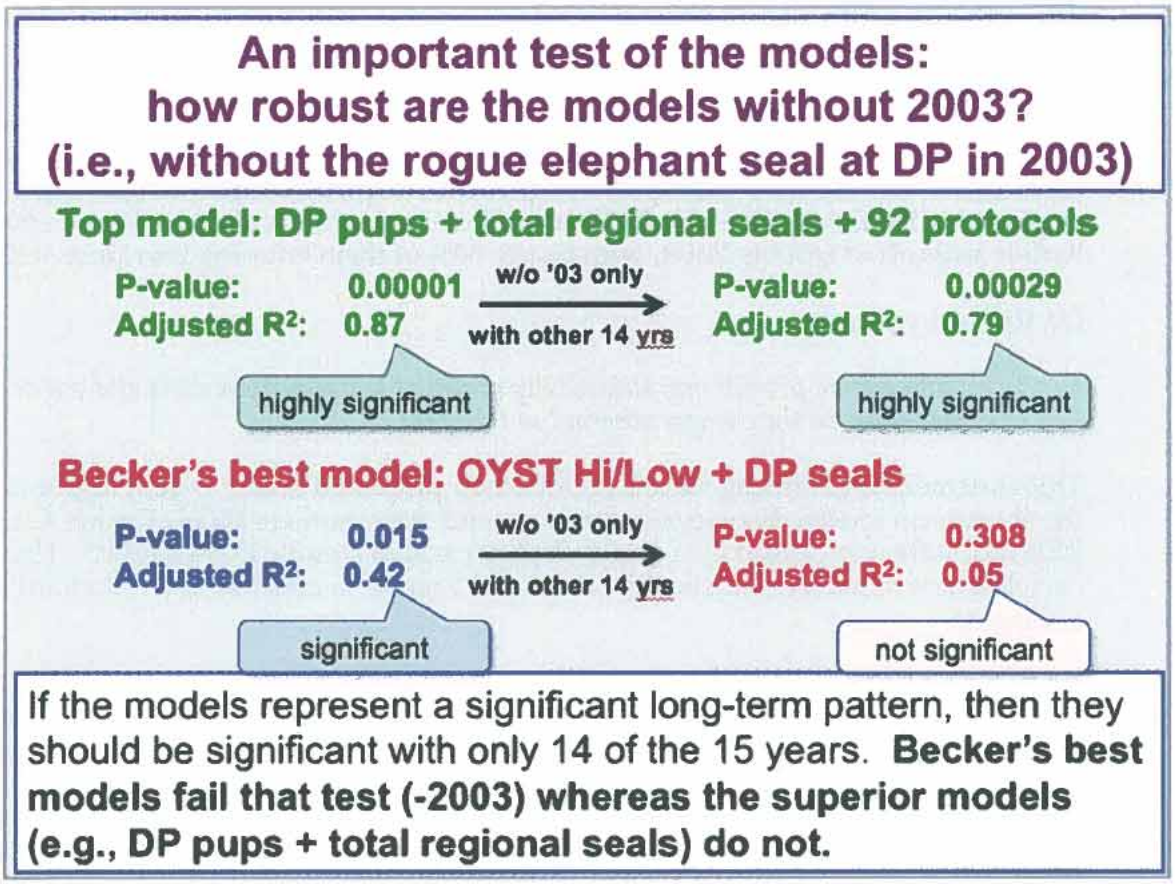
> *"...and cannot provide any statistically robust or logically reasonable alternative explanation for the changes observed in the data."*

This statement is confusing since Dr. Goodman presented a very cogent argument that the short-term spatial displacement of pups and their mothers **INTO** Drakes Estero in 2003 and 2004 was caused by a rogue elephant seal at Double Point in 2003. That correlation was indeed statistically robust and logical, in contrast to Dr. Richard's statement.

In summary, in contrast to Dr. Richard's claim that Dr. Goodman failed to show the oyster harm had no impact on the harbor seals, we find that Dr. Goodman fulfilled his purpose of showing that the Becker 2011 conclusion was incorrect – namely, that NPS had no *evidence* to show a long-term spatial displacement of the harbor seals out of Drakes Estero caused by the oyster farm. Dr. Richard fails to demonstrate that the central argument of Dr. Goodman's analysis of Becker 2011 is incorrect. The short-term spatial displacement of harbor seals INTO Drakes Estero in 2003 and partly in 2004 was caused by a rogue elephant seal at Double Point. The statistical analysis of that relationship is undisputed by Dr. Richard.

14. SUMMARY: WHAT IS NOT FOUND IN DR. RICHARD'S CRITIQUE:

What is NOT found in Dr. Richard's critique is highly significant. Nowhere do you find Richard doing what he claimed to do in his original one and one half page review of Becker 2011 -- namely, repeat and test the analysis using Becker's methods. Nowhere do you find Dr. Richard testing Dr. Goodman's models by GLM using AIC. Nowhere do you find him comparing GLM using AIC vs. MLR using adjusted R squared. Nowhere do you find him testing the models without 2003 alone. Nowhere do you find him using the same analysis to look back at Becker 2011, such as asking to see if each independent variable is itself statistically significant.


An important test of the models:
how robust are the models without 2003?
(i.e., without the rogue elephant seal at DP in 2003)
Top model: DP pups + total regional seals + 92 protocols
P-value: 0.00001
Adjusted R²: 0.87
w/o '03 only
with other 14 yrs
P-value: 0.00029
Adjusted R²: 0.79
highly significant
highly significant
Becker's best model: OYST Hi/Low + DP seals
P-value: 0.015
Adjusted R²: 0.42
w/o '03 only
with other 14 yrs
P-value: 0.308
Adjusted R²: 0.05
significant
not significant
If the models represent a significant long-term pattern, then they should be significant with only 14 of the 15 years. Becker's best models fail that test (-2003) whereas the superior models (e.g., DP pups + total regional seals) do not.

November 28, 2011

From: Dr. Corey Goodman, elected member, National Academy of Sciences, and
David Lewis, Director, U.C. Cooperative Extension Marin County

To: Steve Kinsey, Supervisor, Marin County Board of Supervisors

Re: II. Marine Mammal Commission Drakes Estero Report rejection of Goodman's models in response to NPS correlation in Becker 2011 paper

Dear Supervisor Kinsey,

You asked us to examine the NPS science concerning the oyster farm in Drakes Estero, with particular reference to the potential impact of the oyster farm on the harbor seals. In April of this year, NPS scientists published a new paper (Becker, Press, and Allen, 2011; herein called Becker 2011) using statistical analysis to provide evidence for long-term spatial displacement of harbor seals and their pups caused by the oyster farm.

Over the past few months, we worked to understand and analyze the NPS Becker 2011 paper. As reported earlier, we concluded that the NPS assertion of long-term spatial displacement of harbor seals out of Drakes Estero attributed to oyster farm activity was incorrect. Our review of NPS data indicated that a short-term spatial displacement of harbor seals *into* Drakes Estero had occurred, caused by a rogue elephant seal at Double Point in 2003 (documented by NPS). Superimposed on this stochastic (random) event was a second influence – the ebb and flow of the total regional seal population, peaking in the 2002-2004 period. We showed that NPS incorrectly ascribed to the oyster farm the movement of harbor seals – movements that were *into* Drakes Estero -- caused by natural forces along the coast.

In Goodman and Lewis Report I, *Marin Mammal Commission Drakes Estero Report acceptance of NPS correlation of harbor seals with oyster activity in Becker 2011 paper*, we reported that the Marine Mammal Commission made a series of errors in accepting the NPS correlation of harbors seals with oyster activity.

In brief, the NPS data are so thin (as acknowledged by MMC), and so highly leveraged (i.e., unduly influenced) by a stochastic (random) event in 2003, that they cannot possibly be used to conclude any correlation with oyster farm activity.

In this second analysis of the MMC Report – Goodman and Lewis Report II -- we focus on a second key conclusion: the MMC rejected Dr. Goodman's models that led to better correlations with the harbor seals in Drakes Estero than do the NPS models.

How did the MMC and we come to such different conclusions? Here we describe that the MMC failed to discuss this issue with either Dr. Goodman or Mr. Lewis, failed to make or recommend minor modifications to Goodman's models, and failed to consider the biological significance of Goodman's models.

In brief, the MMC mistakenly rejected a class of models based upon the harbor seals at Double Point and the total regional harbor seal population, even though graphs of the NPS data strongly suggest the validity of these models. In fact, three of the MMC panel members (Drs. Sean Hayes, Steven Jeffries, and Brian Kingzett; see Appendix F to MMC Report) recommended just such models involving the total regional population dynamics in their individual panel member reports.

Dr. Sean Hayes (National Marine Fisheries Service, Southwest Fisheries Science Center) wrote (Appendix F, MMC Report):

> *"Given the size of the Drakes Estero population (Becker et al. 2010) it is likely to respond to whatever large scale dynamics influence the California stock. … there were some results suggesting Drakes Estero population dynamic correlated with the regional population dynamic and all were declining somewhat during the period of increased mariculture activity."*

Dr. Steven Jeffries (Washington Department of Fisheries and Wildlife) wrote (Appendix F, MMC Report):

> *"I would like to see a new analysis by an applied biometrician with additional covariants used including: … overall population trends for the California harbor seal stock, California sea lions and elephants seals …"*

This issue of the impact of the overall population trend pre-dates the MMC panel meeting in February 2010 and goes back to the National Academy of Sciences panel meeting in September 2008. The importance of this analysis was suggested by NAS panel member Dr. Francis O'Beirn (Trinity College Dublin and leader at the Marine Institute in Galway) at the September 4, 2008 NAS meeting. After Dr. Becker's presentation, Dr. O'Beirn noted that seals increased in 2002-2004 and then decreased in 2005 throughout the region, and was thus unlikely to be due to the oyster farm.

> Dr. Francis O'Beirn: *My point is that during the period that you're apportioning it to aquaculture, which is the latter years, 2005, 2006, and 07, a similar decrease has been observed* [at other regional sites]
>
> Dr. Ben Becker: *I did not mean to imply that there is any relationship to the total population size in the estero declining in relation to mariculture … The paper was talking about subsites in the upper estero related to mariculture.*

Dr. Becker agreed with Dr. O'Beirn. That was a key exchange. But in his 2011 paper, Becker failed to properly examine the relationship of the proportion of pups in DE vs. the total regional seal population. Rather, he examined the total regional seal population minus the Drakes Estero seals, which was a different analysis (especially given the stochastic event at Double Point in 2003 that drove hundreds of seals away from Double Point and into Drakes Estero).

Based upon these observations of regional vs. Drakes Estero population dynamics, Goodman thought it important – as did three MMC panel members -- to examine the influence of the total regional population on Drakes Estero. Ragen had the recommendations of the panel members for sixteen months prior to issuing his report, but he apparently did not ask Becker to consider models that included the total regional seal population (see below for how this can be done without a built-in dependency).

The logic was as follows. Goodman hypothesized that as the total regional seal population increased, one might find a disproportionate increase in the mothers and pups entering Drakes Estero. In others words, seal counts in Drakes Estero would go up with an increase in regional seal population, but they might do so disproportionately, and thus lead to an increase in the proportion of seals in Drakes Estero. The reason behind this hypothesis is that the haul-out sites along the coast appear to be space limited (i.e., beaches with cliffs to protect the pups from predation, and competition with aggressive elephant seals), whereas there is considerable available haul-out space in Drakes Estero, and no elephant seals with which to compete.

This is the variable (i.e., total regional seals) for which Goodman got most heavily criticized, and yet it is the variable that three panel members suggested. Nevertheless, as shown below, the variable can be easily modified (consistent with the MMC concerns) to answer the criticism, and the modified models retain their overall statistical significance and conclusions.

The November 22, 2011 MMC Drakes Estero Report stated:

> *"The scientist chosen by Drakes Bay Oyster Company completed a set of analyses that he believed countered the results of Becker et al. (2011). He pointed toward the elephant seal event at Double Point in 2003 and the total number of seals in the area as the dominant factors explaining harbor seal haulout patterns both regionally and within Drakes Estero. However, his analyses are difficult to evaluate because his statistical models are confounded by built-in dependencies that are inconsistent with the statistical procedures he used."*
>
> *"However, it is difficult to compare Dr. Goodman's results with those of the Park Service for two reasons. The purpose of this type of statistical analysis is to determine if a relationship exists between a dependent variable (in the above cases the proportion of Point Reyes pups found in Drakes Estero), and the various combinations of independent or explanatory variables listed above. First, the dependent and "independent" variables he used in numerous models, including his top models, have a built-in dependency—that is, the dependent variable also occurs as part of one of the explanatory variables. This means the regression results are artificially linked and inflated, and much more likely to appear "significant" using superficial statistical tests that do not account for this built-in dependency. The "adjusted R-squared" procedure used by Dr. Goodman does not account for this built-in dependency. Figure 20 illustrates that dependence by expanding the explanatory variables in Dr. Goodman's top six regression models. Second, he used explanatory variables that also are linked. For example, his top two models include the explanatory variables Double Point (i.e., DP) pups and total regional seals. However, the number of Double Point pups also is used in calculating the total regional seals."*

According to the MMC Report, Goodman's models were rejected because (i) his dependent and independent variables in his top models had a built-in dependency, and (ii) his top two models used independent variables that were linked (i.e., shared the same term when the independent variables were expanded).

These technical criticisms imply that major errors were made in our analysis, and thus that the outcome of our analysis was similarly in error. Was our analysis fatally flawed? The answer is no (see below). Goodman's top model can be easily modified to meet the technical criticisms, and the modified version leads to the same conclusions.

The MMC Report stated that Goodman's models *"are difficult to evaluate."* There was no indication, however, that the MMC or NPS (i) requested clarifications or revisions to Goodman's August 29 report or our October 23 report, or (ii) tried to modify Goodman's models on their own to make them easier to evaluate. For example, either the MMC or NPS could have tested the models by eliminating the built-in dependencies, or independently tested the dominant biological factors that Goodman was exploring: *"... the elephant seal event at Double Point in 2003 and the total number of seals in the area ..."* Or at the very least, the MMC could have brought this issue up with Goodman and Lewis and asked them to modify their models, but it did not do so.

Both by their actions and inaction, MMC established a double standard for these statistical reviews. Goodman's review was criticized for perceived limitations in its models, while the NPS models in several instances did the same thing, for which the MMC elected to be silent in their report. There is no indication that either the MMC or NPS applied the same "built-in dependency" or "double-linked" logic to the original NPS models (in Becker 2011) or to the new NPS models (in Becker's November 4 document and the MMC Report itself). Some of Becker's models contain these same issues, but MMC neither commented on nor dismissed them.

While the MMC criticism of built-in dependency is fair, Goodman's models were easily modified, tested, and validated (in a matter of a few minutes). In the end, however, it was a technical criticism with little consequence. Removal of the built-in dependency made no difference to Goodman's overall statistics and conclusions.

The MMC lack of collaboration since submission of the reviews, and failure to ask a single substantive question, led to a misinformed conclusion. The resulting MMC rejection of this class of models, and acceptance of the NPS models, displayed a statistical double standard and an unwillingness to consider the importance of the biology underlying these models: "*... the elephant seal event at Double Point in 2003 and the total number of seals in the area ...*"

Dr. Goodman had two weeks to examine the data, repeat Becker 2011, do further analysis, devise and test new models, and write his report. Dr. Ragen and Dr. Becker and others had over two months to analyze Goodman's models. All that was required was one email or phone conversation, and five minutes of statistical analysis, to correct the apparent built-in dependencies and show that the modified models retain the same degree of statistical significance as Goodman's original models.

After NPS rejected the MMC plan on August 30 to conduct an open process with a public meeting to review the critiques of Becker 2011, Ragen informed Goodman that the same review would occur, albeit informally, and that Goodman would be asked questions when they arose, asked for clarifications when appropriate, and asked for additional analysis when needed. Between August 29 and November 22, neither Goodman nor Lewis were asked by the MMC a single statistical question, asked for a single clarification, or asked for additional information. The process became closed.

It is troubling that Ragen chose not to raise this issue with either Goodman or Lewis, especially in light of Ragen's commitment to conduct an open review. All he had to do was bring his criticisms to our attention and we would have modified it. This highlights why instead of turning to a closed insular process, the MMC should have adhered to its initial plan for an open process with open discussion and exchange. <u>In brief, the variable dependencies in Dr. Goodman's original models were not fatal, were easily modified, and when evaluated, led to the same overall statistics and conclusions</u>.

Goodman's top models vs. Becker's top models

In his detailed analysis submitted to the MMC on August 29, Goodman developed his reasoning in two steps. First he analyzed Becker's top models, all of which included the OYST Hi/Low categorical designation for oyster activity at sandbars OB and UEN during pupping season (March-May). Goodman's analysis showed that the OYST Hi/Low variable was highly leveraged (i.e., unduly influenced) by a stochastic (random) event at Double Point in 2003 (documented in NPS reports and cited in Becker

2011). In brief, a rogue elephant seal killed ~ 40 seals and chased ~ 600 seals away from Double Point, with ~ 300 of them entering Drakes Estero and transiently increasing the proportion of adults and pups in Drakes Estero.

Below are a series of figures that show the impact of the random event at Double Point that coincided with the "low" oyster activity designation in the OYST Hi/Low model, and thus provided misleading statistical support for the NPS model. If one compares Figure 5 in the MMC Report (below) with the May 2007 figure from Koenen and Allen NPS Research Project Summary Report, it is clear that a stochastic event at Double Point in 2003 had a major influence on seals and pups in Drakes Estero in 2003 & 2004.

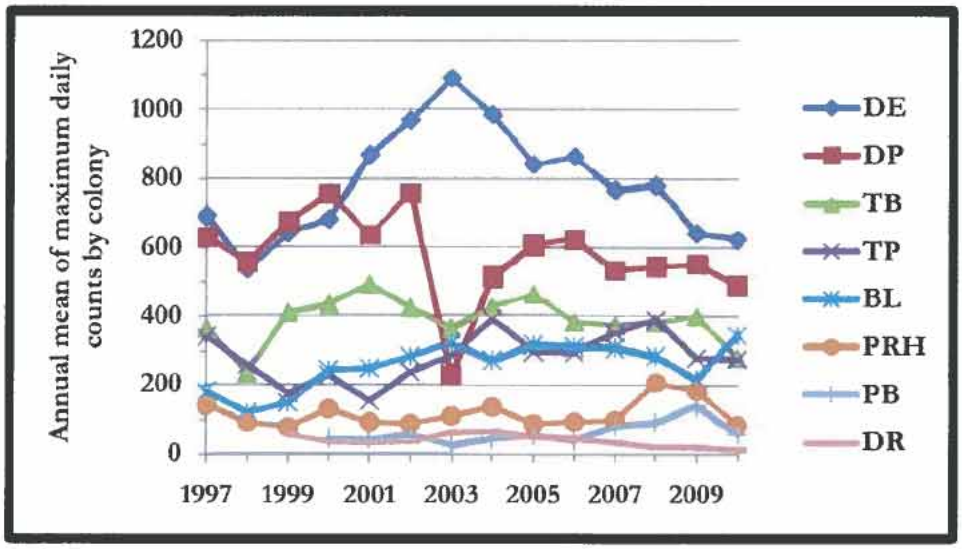
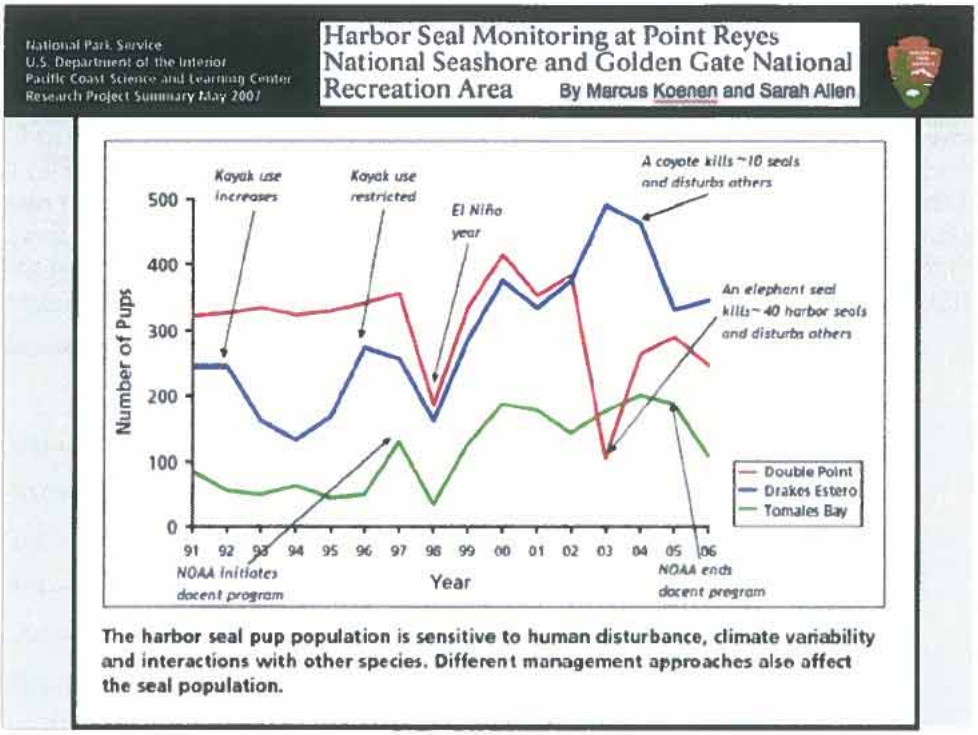


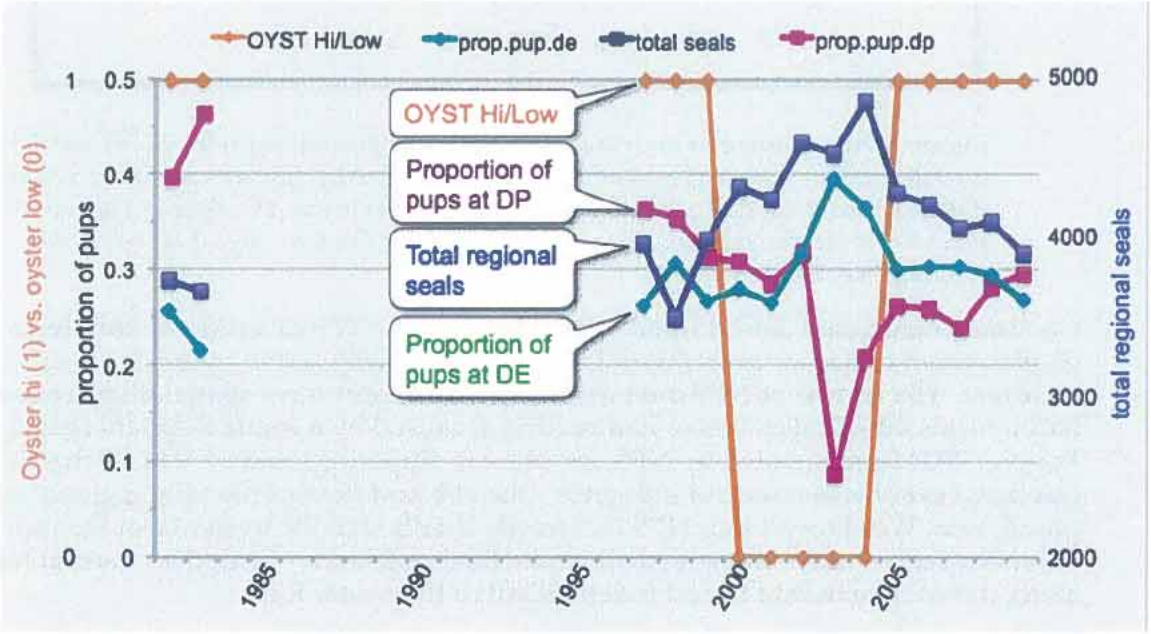
Figure 5. Annual mean of maximum daily counts (adults and pups) by colony and during the full year (left axis), and total of those counts (right axis). Colonies are Drake's Estero (DE), Double Point (DP), Tomales Bay (TB), Tomales Point (TP), Bolinas Lagoon (BL), Point Reyes Headland (PRH), Point Bonita (PB), and Duxbury Reef (DR) (data from National Park Service)

Goodman concluded, based upon NPS data, that the NPS assertion of long-term spatial displacement of harbor seals out of Drakes Estero attributed to oyster farm activity was incorrect. His review of NPS data indicated that a short-term spatial displacement of harbor seals into Drakes Estero had occurred, caused by a rogue elephant seal at Double Point in 2003 (documented by NPS; see above). Superimposed on this stochastic (random) event was a second influence – the ebb and flow of the total regional seal population. We showed that NPS incorrectly ascribed to the oyster farm the movement of harbor seals – movements that were *into* Drakes Estero -- caused by natural forces along the coast, external to and independent of the oyster farm.

These two natural forces – the stochastic event at Double Point in 2003, and the peak of the total regional seal population between 2002-2004 – coincided with the "low" oyster activity in the NPS OYST Hi/Low model, and thus likely highly influenced the models in Becker 2011. Such a hypothesis is consistent with Goodman's graph of NPS data below.

The event in 2003 led to a dramatic increase in the proportion of pups in Drakes Estero in 2003, with a residual decay in 2004. The proportion returned to baseline in 2005.

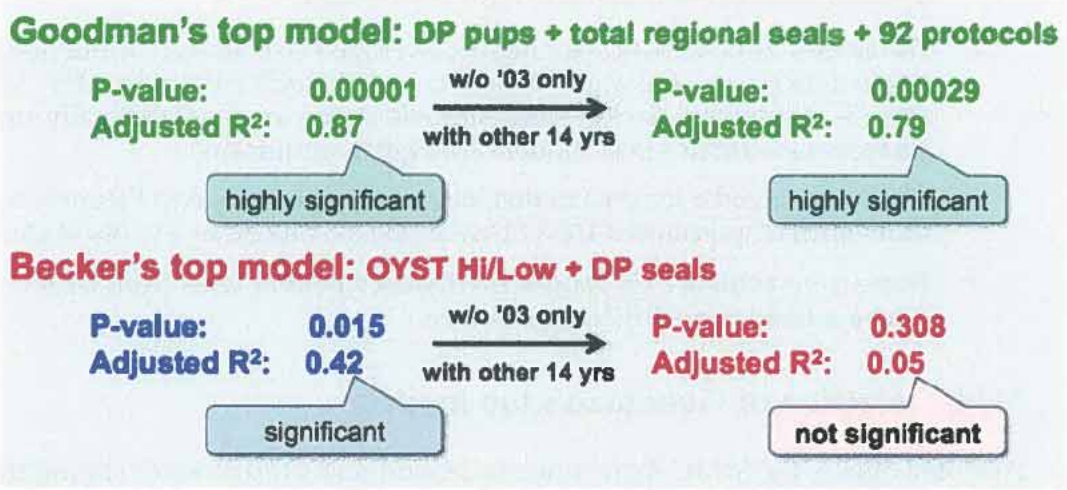




Statistics textbooks (see Goodman and Lewis *Analysis to MMC Report part I* for further details) recommend checking for influential points (or influential outliers), particularly points that are so unduly influential that they support the entirety of a supposed relationship. In a case such as this in which the outlier point is caused by an unrelated stochastic event (i.e., the cause is known), it is appropriate to diagnose whether that stochastic event unduly influences the correlation by eliminating the highly leveraged data point and then testing the significance and coefficient of the remaining data.

Goodman used this recommended diagnostic outlier test to ask if the OYST Hi/Low model, and Becker's best models that included this variable (OYST Hi/Low + DP seals), were unduly influenced by the 2003 event. Goodman eliminated both 2003 and 2004 from the analysis, and statistically analyzed the remaining thirteen data points. Goodman and Lewis (October 23 report to MMC) took this analysis one step further. They eliminated 2003 alone and analyzed the remaining fourteen data points. The MMC Report, as published, included Goodman's August 29 report in the appendix, but without explanation, does not include the Goodman and Lewis supplemental analysis from October 23.

Goodman and Lewis evaluated the NPS correlation by eliminating the influential outlier year (2003) and determined that this single data point leveraged the NPS correlation -- the correlation was no longer statistically significant (see figure below). Goodman and Lewis concluded that the influential outlier year (2003) had a disproportionate influence on the NPS correlation, and that the main independent variable used by the NPS (oyster farm activity) did not correlate with the dependent variable (number of harbor seals) when the stochastic event was removed.



Goodman then went on to ask: if not oyster activity, then what independent variables correlated with harbor seal counts in Drakes Estero? As shown in the figure on the previous page, the natural hypothesis was a combination of the event at Double Point (as modeled by either the DP pups or proportion of pups at DP) and the total regional seal population (as modeled by total regional seals). Goodman also included a variable for the 1992 protocols, since Becker had included data from 1982 and 1983 prior to this major management change, and it seemed reasonable to test the correlation of this change with the response variable.

Goodman's top model was $Pups_{DP}$ + $Seals_{Reg}$ + 92 protocols (using the nomenclature as in the MMC Report). He ran that model against the same dependent variable as used in Becker 2011: the proportion of pups in Drakes Estero ($Pups_{DE}/Pups_{Reg}$). He obtained the following result using multiple linear regression and adjusted R^2 analysis:

$Pups_{DP}$ + $Seals_{Reg}$ + 92 protocols	adjusted $R^2 = 0.87$	P-value = 0.00001
OYST Hi/Low + $Seals_{DP}$	adjusted $R^2 = 0.42$	P-value = 0.015

Goodman's top model had an adjusted R^2 value that was twice Becker's top model (0.87 vs. 0.42), and a P-value that was three orders of magnitude more significant than Becker's top model (0.00001 vs. 0.015).

As shown in the figure on the previous page, when 2003 alone was eliminated as a diagnostic test, Goodman's top model retained statistical significance.

$Pups_{DP}$ + $Seals_{Reg}$ + 92 protocols (-2003)	adjusted $R^2 = 0.79$	P-value = 0.0003
OYST Hi/Low + $Seals_{DP}$ (-2003)	adjusted $R^2 = 0.05$	P-value = 0.3

Under the identical diagnostic test, Becker's top model was no longer statistically significant. In contrast, Goodman's top model retained statistical significance, and was three orders of magnitude (1000X) more significant than Becker's best model.

This analysis of NPS data led Goodman and Lewis to the following four conclusions:

- The same conclusions are derived regardless of statistical method: Goodman and Lewis provided head-to-head comparison of GLM using AIC vs. MLR using R squared analysis, and derived same conclusion.
- The Becker 2011 statistics are highly leveraged (i.e., unduly influenced) by a single data point – the rogue elephant seal at Double Point in 2003. When 2003 alone is eliminated, Becker's best models are no longer statistically significant whereas Goodman's best models are highly significant.
- What was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point.
- There is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture.

MMC rejection of Goodman's top models

As noted above, the MMC Report rejected Goodman's top models, stating that:

> "[Goodman's] *analyses are difficult to evaluate because his statistical models are confounded by built-in dependencies that are inconsistent with the statistical procedures he used."*

The MMC Report went on to explain this issue as follows:

> *"First, the dependent and "independent" variables he used in numerous models, including his top models, have a built-in dependency—that is, the dependent variable also occurs as part of one of the explanatory variables. This means the regression results are artificially linked and inflated, and much more likely to appear "significant" using superficial statistical tests that do not account for this built-in dependency. … Second, he used explanatory variables that also are linked. For example, his top two models include the explanatory variables Double Point (i.e., DP) pups and total regional seals. However, the number of Double Point pups also is used in calculating the total regional seals."*

Below is Figure 20 from the MMC Report that shows the expanded independent variables with the built-in dependency.

Models to explain the proportion of pups in DE

1) Explanatory variables: DP pups plus total regional seals plus '92 protocols

$Pups_{DE}/Pups_{Reg} = Pups_{DP} + Seals_{Reg} + 92$

$Pups_{DE}/Pups_{Reg} = Pups_{DP} + (Adults_{Reg} + Pups_{notDE} + Pups_{DE}) + 92$ (expand $Seals_{Reg}$)

2) Explanatory variables: DP pups plus total regional seals

$Pups_{DE}/Pups_{Reg} = Pups_{DP} + Seals_{Reg}$

$Pups_{DE}/Pups_{Reg} = Pups_{DP} + (Adults_{Reg} + Pups_{notDE} + Pups_{DE})$ (expand $Seals_{Reg}$)

3) Explanatory variables: DP proportional pups

$Pups_{DEprop} = Pups_{DPprop}$

$Pups_{DEprop} = Pups_{DE}/Pups_{Reg}$ and $Pups_{DPprop} = Pups_{DP}/Pups_{Reg}$ (note)

$Pups_{DP} = Pups_{Reg} - Pups_{notDP,\ notDE} - Pups_{DE}$ (note)

$Pups_{DE}/Pups_{Reg} = (Pups_{Reg} - Pups_{notDP,\ notDE} - Pups_{DE})/Pups_{Reg}$ (substitute)

$Pups_{DE}/Pups_{Reg} = 1 - (Pups_{notDP,\ notDE}/Pups_{Reg}) - (Pups_{DE}/Pups_{Reg})$ (simplify)

4) Explanatory variables: DP pups plus total regional pups

$Pups_{DE}/Pups_{Reg} = Pups_{DP} + Pups_{Reg}$

$Pups_{DE}/Pups_{Reg} = Pups_{DP} + (Pups_{notDE} + Pups_{DE})$

5) Explanatory variables: DP seals plus total regional seals

$Pups_{DE}/Pups_{Reg} = Seals_{DP} + Seals_{Reg}$

$Pups_{DE}/Pups_{Reg} = (Adults_{DP} + Pups_{DP}) + (Adults_{Reg} + Pups_{Reg})$

$Pups_{DE}/Pups_{Reg} = (Adults_{DP} + Pups_{DP}) + (Adults_{Reg} + (Pups_{notDE} + Pups_{DE}))$

6) Explanatory variables: DP proportional seals

$Pups_{DE}/Pups_{Reg} = Seals_{DP}/Seals_{Reg}$

$Pups_{DE}/Pups_{Reg} = Seals_{DP}/(Adults_{Reg} + Pups_{notDE} + Pups_{DE})$

Figure 20. Statistical models (single or combined explanatory variables used by Dr. Corey Goodman to explain the proportion of regional pups in Drakes Estero. The models are confounded because terms in the dependent variable are also part of the independent variable; thus, the models have a built-in dependency. (DE = Drakes Estero; DP = Double Point; Reg = Regional; notDE = not at DE; notDP = not at DP; notDP,notDP = not at DP or DE)

Thus, concerning Goodman's top model ($Pups_{DP} + Seals_{Reg} + 92$), the MMC Report expanded "$Seals_{Reg}$" to "$Adults_{Reg} + Pups_{notDE} + Pups_{DE}$" and concluded that both the dependent variable ($Pups_{DE}/Pups_{Reg}$) and one of the independent variables ($Seals_{Reg}$) contain the same term: $Pups_{DE}$. Moreover, $Pups_{DP}$ is contained within the broader term $Pups_{notDE}$. Thus, the MMC Report reasoned that Goodman's top model had artificially linked variables that could have inflated both the adjusted R2 value and the P value. As a result, the MMC Report rejected these models and proceeded instead to collaborate with NPS and Dr. Becker on further refinements of his original and new models.

Goodman's modified models reaffirm overall statistics and conclusions

It is regrettable that Dr. Ragen failed to communicate with either Dr. Goodman or Mr. Lewis about this issue. Both reached out to Ragen. For example, on September 12, Goodman wrote to Ragen and asked if any substantive issues with his report had arisen. Several days later, Ragen answered no, and provided no discussion of issues for the next two months leading up to the release of the MMC Report on November 22. In parallel, Mr. Lewis reached out to Dr. Ragen by email on multiple occasions, first on October 24 when they mutually agreed to postpone a discussion, and again on November 1, writing *"it would be beneficial to discuss the science and statistical issues"* with no reply from Ragen.

Only through release of the MMC Report on November 22, was it made known that Ragen had questions about Goodman's models (never raised with Goodman and Lewis), had preemptively rejected Goodman's models, and had done so because of the so-called built-in dependency in his variables and the concern that this might inflate his R^2 and P values. All of this could have been tested and modified. When comparing proportional numbers to absolute numbers, our consulting Stanford statistics professor does not believe modifications are required. But nevertheless, it is easy to do, and we have now modified Goodman's best models.

<u>The variable dependencies in Dr. Goodman's original models were not fatal, were easily modified, and when evaluated, led to the same overall statistics and conclusions</u>.

Goodman's top model was $Pups_{DP} + Seals_{Reg} + 92$. The $Seals_{Reg}$ term contains $Pups_{DE}$ that is shared with the dependent variable. This is likely only a very minor issue, since the majority of the harbor seals counted in the "$Seals_{Reg}$" term are adults throughout the region (the pups make up only a minority of the total animals). Thus, we modified the model to $Pups_{DP} + Adults_{Reg} + 92$. The two statistical values – the adjusted R^2 and the P value – remained essentially the same.

Goodman's modified top model – substituting adults for seals – led to the same overall statistics and conclusions. This modified model, either alone or when 2003 is eliminated, remains three orders of magnitude more significant than Becker's models.

DP pups + total regional seals + 92 prot. (original)	adj $R^2 = 0.87$	P-value = 0.00001
DP pups + total regional adults + 92 protocols (new)	adj $R^2 = 0.86$	P-value = 0.00001
DP pups + total regional adults + 92 protocols (-2003)	adj $R^2 = 0.80$	P-value = 0.0002

These values are virtually identical to the values generated in the original Goodman August 29 review and Goodman and Lewis October 23 review (and remain 1000X more significant than Becker 2011). Clearly, the built-in dependency in this model was trivial, easily modified, and gave rise to the same conclusions.

While considerable time and attention was given to criticizing Goodman's top models in the MMC Report, it appears this was done to identify a technical problem with the models and not to test them. Had Ragen done so on his own, or consulted with Goodman or Lewis, it could have led to a more productive discussion in the MMC Report about the ecology-based models that are superior to Becker 2011.

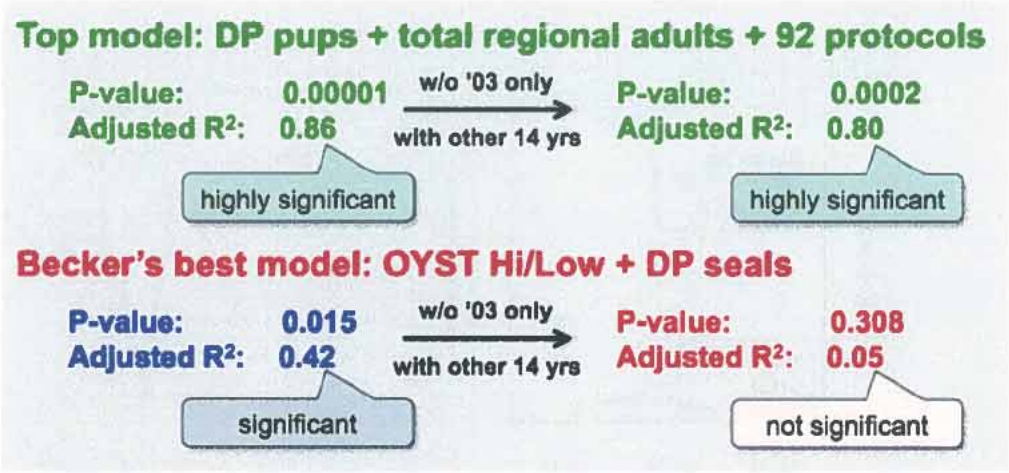
Dr. Goodman's top model (modified from seals to adults) is three orders of magnitude more statistically significant than Becker's best model (from Becker 2011). Moreover, it

is robust and remains statistically significant when 2003 alone is removed (in the diagnostic outlier test), whereas Becker's best models fail that diagnostic test.

Below is a chart, much like that included in Goodman's August 29 analysis, showing the relative ranking of Goodman's modified models and the models in the Becker 2011 paper. Goodman's top models remain superior to the models from Becker 2011.

notes	In Becker 2011?	model	P-value	Adj R^2
Goodman model	no	DP pups + total regional adults + 92 protocols	0.00001	0.87
Goodman model	no	DP pups + total regional adults	0.00034	0.69
Goodman model	no	DP pups + OYST Hi/Low	0.00330	0.55
Goodman model	no	DP pups + 92 protocols	0.00375	0.54
Goodman model	no	Total regional adults	0.00225	0.49
Goodman model	no	DP proportional adults	0.00522	0.42
Goodman model	no	DP pups + OYST annual harvest	0.00854	0.47
Becker model	yes	OYST Hi/Low + DP seals	0.01474	0.42
Goodman model	no	92 protocols	0.04201	0.26
Becker model	yes	OYST Hi/Low	0.04680	0.21

In the chart below, much as previously submitted to MMC, we use Goodman's modified top model (substituting adults for seals) and compared it to Becker's top model, using the diagnostic outlier test to examine the impact of removing 2003 alone.



Some of Becker's models are subject to the same criticism

While Goodman's models were subjected to the criticism of built-in and linked dependencies, it appears as if Becker's models were not subjected to the same standard.

For example, in both Becker's colony scale and regional scale analyses, Becker's models involving the proportion of seals at subsite A, when expanded, also contain terms found in the dependent variable, such as $Seals_{DE}$ or $Pups_{DE}$ (using the same logic as applied in Figure 20 of the MMC Report). In the case of Becker's regional scale model,

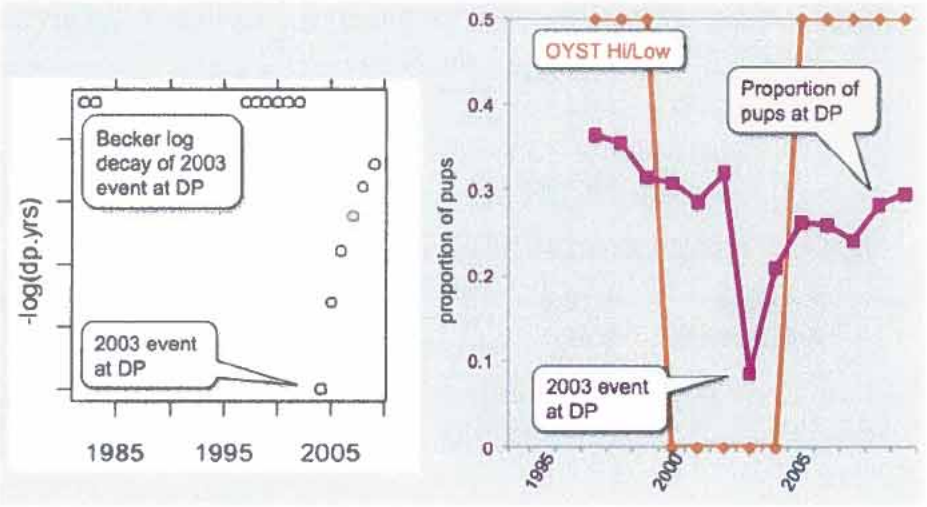
the dependent variable is either $Seals_{DE}/Seal_{Reg}$ or $Pups_{DE}/Pups_{Reg}$, and the independent variable is $Seals_A/Seals_{DE}$ can be expanded such that Seals includes Adults + Pups at each geography. In the case of Becker's colony scale model, the dependent variable is either $Seals_{up}/Seals_{DE}$ or $Pups_{up}/Pups_{DE}$, and the term $Seals_A$ in the independent variable can be expanded to include either $Seals_{up}$ or $Pups_{up}$ as part of the $Seals_{DEnotA}$, and $Seals_{DE}$ or $Pups_{DE}$ can be expanded to include $Seals_{up}$ or $Pups_{up}$ respectively.

Becker's models can probably be easily modified, just as were ours, by focusing the dependent variable on pups and the independent variable on adults.

Another example, in this case of a linked dependency, can be found in Becker's use in Table 5 of Becker 2001 of the model OYST + DP + Pup where DP = $Pups_{DP}$ and Pup = $Pups_{notDE}$ that can be expanded to include $Pups_{DP}$. All this points out is that in that such a narrowly defined biological system filled with co-dependencies, it is difficult to define independent variables that do not have either built-in or linked dependencies.

We do have one major concern about this issue as applied to Becker's models. We are concerned about the new models developed by Becker and described in the MMC Report. Those analyses, and those new models, were only shared with us for the first time on November 17, on the eve of the release of the MMC Report. We have reason to believe that additional materials were submitted to Ragen that were not shared with us. We were not given the opportunity to make the following evaluation and comment, and not provided with new data used in these models to which we do not have access.

At the suggestion of Dr. Harwood, Becker developed a mathematical model for the stochastic 2003 event at Double Point (see Goodman and Lewis *Analysis to MMC Report part I* for further details). Below on the left is shown Becker's logarithmic model for the 2003 event, a model that is a good best-fit curve for the proportion of pups at Double Point. On the right is our plot of the NPS data.



To add another independent variable with the 2003 event [as Becker did with *log(double point event.yrs)*] effectively doubled down on the 2003 event, creating a cryptic but very significant linked dependency – both were highly leveraged by the 2003 event.

The MMC Report, in writing about Goodman's top models, stated:

> "[Goodman] *used explanatory variables that also are linked."*

The same could be said – even more so – about Becker's new top model: OYST Hi/Low + log(Double Point.yrs). Both independent variables are highly leveraged by the 2003 event, the OYST variable by its coincidental shift from high to low to high (as confirmed using the diagnostic outlier test) and the log Double Point variable by definition. In brief, if our analysis of the OYST Hi/Low variable is correct using the diagnostic outlier test, then these two terms are linked in that both are highly leveraged by the same explanatory variable – the 2003 event at Double Point – one cryptic and the other overt.

Becker used different parameters for the dependent variable than in Becker 2011 (see Goodman and Lewis *Analysis to MMC Report part I*) giving rise to a larger R^2 for OYST Hi/Low (0.42 vs. 0.26 in Becker 2011). Becker then showed the following R^2 values:

OYST Hi/Low + log(Double Point.yrs)	$R^2 = 0.83$
log(Double Point.yrs)	$R^2 = 0.72$
OYST Hi/Low	$R^2 = 0.42$

By doubling down on the 2003 event, the R^2 value essentially doubled. In Table 9 (below) in the MMC Report these numbers are not put side-by-side to show that log (Double Point) as a single variable is far superior to OYST Hi/Low, suggesting that the 2003 event at Double Point predicted 72% of the variability in the harbor seal counts. The Best-fit curve for the 2003 event (modeled with a log decay) was the best single model. This R^2 value of 0.72 is telling us something very important, namely, that 72% of the variability in the Drakes Estero seal population over the fifteen years of data can be predicted by a single random event that occurred at Double Point in 2003.

Table 9. QAICc ranking of models with exponentially decaying function for Double Point

Model	QAICc	ΔQAICc	r^2
Oyster (High/Low) + log(Double Point.yrs)	81.3	0.0	0.83
Oyster (continuous)+ log(Double Point.yrs)	84.1	2.8	0.78
Log(Double Point.yrs)	84.7	3.4	0.72
Exp(Double Point.yrs)	88.2	6.9	0.67

If OYST Hi/Low is leveraged by 2003, then adding another term leveraged by that same year is not appropriate. The Log (Double Point) variable on its own is a proper model, and has an R^2 of 0.72, showing that the event at Double Point is a large and major driver of the adult seals and pups in Drakes Estero, just as predicted by Goodman and Lewis. The 2003 event at Double Point was more significant than oyster activity.

In essence, what Becker did was to take his OYST Hi/Low variable, which was already leveraged by the 2003 event, and add to it another independent variable that was entirely leveraged by the 2003 event (by definition of the best-fit curve). Thus, it is not surprising that he got a larger R squared. In fact, given the notion of the importance of the 2003 event, it would have been surprising if he had not. His two independent variables were different manifestations of the same, both leveraged by the 2003 event at Double Point.

Becker did test his OYST Hi/Low model by eliminating 2003 and 2004 using the diagnostic outlier test (although to be accurate, he protested being asked to conduct this test). Becker did not provide the P-value, but we presume it was not significant given the low R^2 value. When the 2003 event was eliminated from the OYST Hi/Low analysis by deleting 2003 and 2004, the R^2 value is 0.13. When the 2003 event was essentially duplicated in the OYST Hi/Low analysis by adding another independent variable

entirely leveraged by that event (by definition), the R^2 value is 0.83. The R^2 value of the 2003 event [log(Double Point)] independent variable on its own is 0.72 (compared to 0.42 for the OYST Hi/Low variable on its own).

OYST Hi/Low + log(Double Point.yrs)	$R^2 = 0.83$	
log(Double Point.yrs)	$R^2 = 0.72$	
OYST Hi/Low (with new parameters)	$R^2 = 0.42$	in Becker 2011, $R^2 = 0.26$
OYST Hi/Low - 2003	$R^2 = 0.13$	

We tested Becker's new mathematical models for the 2003 event (we tested the exponential model because we did not have access to the parameters of Becker's new log model) using the same parameters for the dependent variable as originally used in Becker 2011. Using proportion of pups in Drakes Estero as the dependent variable (as in Becker 2011), we obtain the following adjusted R^2 values:

Exp(Double Point.yrs) + 92 protocols	adjusted $R^2 = 0.76$
Exp(Double Point.yrs) + Tot reg. adults	adjusted $R^2 = 0.71$
Exp(Double Point.yrs) + OYST Hi/Low	adjusted $R^2 = 0.60$
Exp(Double Point.yrs)	adjusted $R^2 = 0.60$
Total regional adults	adjusted $R^2 = 0.49$
OYST Hi/Low + DP seals	adjusted $R^2 = 0.42$
92 protocols	adjusted $R^2 = 0.26$
OYST Hi/Low	adjusted $R^2 = 0.21$

The mathematical model for the 2003 event at Double Point had an adjusted R^2 value of 0.60 that was not improved by the addition of OYST Hi/Low, but that was improved significantly by the addition of either total regional adults or the 92 protocols. This suggests that when modeling the proportion of pups in Drakes Estero, the 2003 event dominated the variability of the harbor seals, and that the categorical measure of oyster activity added little of additional significance and thus was likely to be driven largely by the 2003 event.

We speculate that Becker found additional significance when adding oyster activity along with the mathematical models of the 2003 event because he switched the parameter of the dependent variable from the proportion of pups to the absolute mean number of seals. Whereas the proportion tended to normalize for the ebb and flow of the total regional population, the absolute count numbers allowed those increases and decreases in the regional population – which coincidentally correlate with the increase of oyster activity – to participate to a greater extent in the statistics.

In summary, we interpret these results from Becker's latest analysis, as published in the MMC Report, as confirming our conclusion that the stochastic event at Double Point in 2003, which randomly coincided with the "low" designation in the OYST Hi/Low variable, is the single most important independent variable in explaining the variability in the harbor seals in Drakes Estero over the study period. Partially subtracting the 2003 event by removing 2003 eliminated much of the R^2. Effectively doubling the 2003 event by adding another independent variable defined by a best-fit curve essentially doubled the R^2. The numbers tell the story. Our analysis leads to the hypothesis that much of the remaining variability can be explained by the ebb and flow of the total regional seal population, as defined by adult seals in our modified models. The 1992 protocols also may play a role (although we caution that the data are thin).

Conclusions and recommendations

1) The Becker 2011 statistics are leveraged (i.e., unduly influenced) by a single stochastic (random) event -- the rogue elephant seal at Double Point in 2003: when 2003 alone is eliminated (the diagnostic outlier test), Becker's best models are no longer significant.

2) In his August 29 report to the MMC, Goodman presented models relying on the seals at Double Point, the total regional seal population, and the 1992 protocols that were three orders of magnitude (1000X) more statistically significant than Becker's best models, and remained statistically significant when 2003 alone was removed (i.e., were robust to the diagnostic outlier test).

3) The MMC panel members in their reports in Appendix F of the MMC report sited the ecologic importance of both the total regional harbor seal population dynamic (peaking in 2002-2004) and the stochastic event at Double Point (in 2003 with residual impact in 2004) as potential major influences on the harbor seal population in Drakes Estero, and cautioned that both tended to artificially coincide with the NPS measure of oyster activity.

4) The MMC Report rejected Goodman's top models due to built-in and linked dependencies. It is troubling that Dr. Ragen failed to raise the issue with either Dr. Goodman or Mr. Lewis. It is equally troubling that neither MMC nor NPS modified the models themselves.

5) The variable dependencies in Goodman's original models were not fatal as stated by the MMC, were easily adjusted, and when modified, gave rise to the same overall statistics and conclusions. In other words, MMC dismissed the Goodman analysis based upon variable dependencies that in the end made no difference. At the same time, when NPS contained similar dependencies, MMC was silent.

6) Goodman's modified best model (DP pups + total regional adults + 92 protocols), substituting adults for seals, has an adjusted $R^2 = 0.86$ and a P-value = 0.00001. These values are virtually identical to those generated from the original model, and drive the same overall statistics and conclusions as in Goodman's August 29 report and the Goodman and Lewis October 23 report.

7) Dr. Goodman's top model (modified from seals to adults) is three orders of magnitude more statistically significant than Becker's best model (from Becker 2011). Moreover, it remains statistically significant when 2003 alone is removed (the diagnostic outlier test), whereas Becker's best models fail that test.

8) Becker's new models, including a mathematical model of the 2003 event at Double Point, may be guilty of the same linked dependency as Goodman's top models, but it appears as if they were not scrutinized in the MMC Report. By adding another independent variable entirely leveraged by the stochastic 2003 event, NPS essentially doubled down – they tested two variables that were both leveraged by the same event – and no surprise, found an increased R squared.

9) The NPS data are too thin, and too highly leveraged by a stochastic event in 2003, to be able to support the NPS correlation between harbor seals and oyster activity. Moreover, the NPS data are inadequate for MMC to affirm the NPS claim of a correlation between harbor seals and oyster activity.

10) What was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point. There is no evidence for long-term spatial displacement of seals and pups OUT of Drakes Estero that can be related to shellfish aquaculture.

11) The MMC mistakes could have been avoided had the MMC proceeded with their original open process rather than the insular closed process they conducted. Open dialogue, open discussion, and open exchange could have helped avoid these mistakes. Unfortunately, the closed process led to a flawed MMC Report.

November 27, 2011

From: Dr. Corey Goodman, elected member, National Academy of Sciences, and
David Lewis, Director, U.C. Cooperative Extension Marin County

To: Steve Kinsey, Supervisor, Marin County Board of Supervisors

Re: I. Marine Mammal Commission Drakes Estero Report acceptance of NPS correlation of harbor seals with oyster activity in Becker 2011 paper

Dear Supervisor Kinsey,

You asked us to examine the NPS science concerning the oyster farm in Drakes Estero, with particular reference to the potential impact of the oyster farm on the harbor seals. Beginning in April of 2007, you were told that the Park Service had overwhelming evidence of harm to the harbor seals by the oyster farm. The first three generations of NPS claims of harm to the harbor seals fell by the wayside, but in April of this year, NPS scientists published a new paper (Becker, Press, and Allen, 2011; herein called Becker 2011) using statistical analysis to provide evidence for long-term spatial displacement of harbor seals and their pups caused by the oyster farm.

Over the past few months, we worked to understand and analyze the NPS Becker 2011 paper. As reported earlier, we concluded that the NPS assertion of long-term spatial displacement of harbor seals out of Drakes Estero attributed to oyster farm activity was incorrect. Our review of NPS data indicated that a short-term spatial displacement of harbor seals into Drakes Estero had occurred, caused by a rogue elephant seal at Double Point in 2003 (documented by NPS). Superimposed on this stochastic (random) event was a second influence – the ebb and flow of the total regional seal population. We showed that NPS incorrectly ascribed to the oyster farm the movement of harbor seals – movements that were into Drakes Estero -- caused by natural forces along the coast.

We report here on our analysis of the Marine Mammal Commission Report with a focus on one key conclusion of the Report: the MMC accepted the Becker 2011 conclusion that there is a correlation between harbor seals vs. oyster farm activity.

How did the MMC and we come to such different conclusions? Here we describe that the MMC made a series of errors in accepting the NPS correlation. In brief, the NPS data are so thin, and so highly influenced by a stochastic event in 2003, that they cannot possibly be used to conclude any correlation with oyster farm activity.

The November 22, 2011 MMC Drakes Estero Report accepted the National Park Service's correlation, as found in the Becker et al. 2011 paper, that as oyster activity increases, the number of harbor seals in Drakes Estero decreases. The MMC stated:

> *"The Marine Mammal Commission believes that the data supporting the above analyses are scant and have been stretched to their limit. Nevertheless, the analyses in Becker et al. (2011) provide some support for the conclusion that harbor seal habitat-use patterns and mariculture activities in Drakes Estero are at least correlated. However, the data and analyses are not sufficient to demonstrate a causal relationship. Additional, carefully guided study would be required to determine if the apparent relationship is one of cause and effect."*

Although concluding that the NPS data was *"scant" "stretched to their limit,"* and *"not*

sufficient to demonstrate a causal relationship," the MMC nevertheless concluded there was *"some support"* for the NPS correlation that oyster activity and harbor seals have an inverse relationship. We conclude that the NPS correlation is statistically flawed, and that the MMC mistakenly accepted that flawed relationship.

While the MMC Report accepted the NPS correlation in Becker 2011, the MMC panel members, as represented in their own reports, were more critical. In the MMC Panel Member's Report appended to the MMC Report (appendix F), Dr. Peter Boveng (National Marine Mammal Laboratory, NOAA, Seattle, WA) wrote:

> *"The statistical challenges are great, the data are marginal for that purpose, and as everyone now knows the stakes are very high (or at least perceived to be very high by many parties). Consequently, if the numbers continue to be used in an adversarial manner rather than to inform a collaborative approach, there should be yet another review, starting with a diagnostic exploration of the data (i.e., sampling properties, any inherent structure that could compromise analysis, evidence of insufficient QA/QC, etc)."*

We conducted such a *"diagnostic exploration of the data"* as recommended by MMC panel member Boveng, but the MMC and NPS both declined to do so. Correlations, especially ones based on thin data, are highly sensitive to statistical outliers -- influential observations that can lead to false conclusions about the model. The NPS correlation, based on fifteen data points, is just such a case. The NPS correlation is highly leveraged (i.e., unduly influenced) by a single outlier data point. That influential outlier is a major lethal event that took place in 2003 and led to a dramatic and transient displacement of harbor seals into Drakes Estero. The MMC correctly concluded that NPS used a *"scant"* dataset that was *"stretched to the limit."* The MMC, however, failed to acknowledge that as a result of the limited dataset, a single outlier data point could leverage – or unduly influence – a correlation that was not present in the remaining years. As a result, the MMC failed to recognize that the NPS dataset is highly leveraged by a stochastic (random) event that did not involve the oyster farm.

A single stochastic (i.e., random) event in 2003 at Double Point drove hundreds of harbor seals and pups into Drakes Estero. This highly leveraged outlier (i.e., an event that had undo influence on the NPS correlation) occurred during the same period in which the NPS models categorized (incorrectly) oyster activity at a low point. This drove an artificial correlation between low oyster activity vs. high harbor seal numbers.

Had the event at Double Point occurred from 1982-1999, or from 2005-2009, it would have driven exactly the opposite correlation in the NPS model, but by circumstances, the random Double Point event occurred when the NPS model categorized oyster activity as low. The NPS correlation was unduly influenced by this single stochastic event, leading to an unsupported correlation of harbor seals and oyster activity.

The NPS correlation of oyster activity with harbor seals is supported only by the lethal 2003 event, with some carryover into 2004, after which levels return to pre-2003 observations. According to statisticians, if a supposed relationship is correct, then removing a single observation should not destroy the claimed relationship. In this case, removing a single observation does indeed destroy the relationship. The MMC, however, reported that they did not even ask NPS to conduct this key diagnostic outlier test to address this issue, notwithstanding requests from Congress and DBOC to do so.

[As discussed later, MMC did ask NPS, and NPS did conduct a version of this test, notwithstanding MMC's assertion that they did not.]

The MMC compounded their first decision – rejecting the diagnostic test for a highly leveraged outlier – by their second decision to accept the wrong diagnostic experiment from NPS in support of the NPS correlation. In trying to account for the impact of the lethal event in 2003 on their model, the NPS was allowed to "double down" – in effect, to mistakenly add 2 + 2 = 4 when they should have subtracted 2 - 2 = 0. The NPS did not eliminate the 2003 event from their model, but rather they compounded the impact of the 2003 event in their analysis. This will be explained below.

We have discussed our analysis with the statistics professors that we previously consulted at Stanford and U.C. Davis, and with another faculty at U.C. Davis. All concur with our analysis – the NPS data are too thin and the data too leveraged (i.e., unduly influenced) by the stochastic event in 2003 to be able to support any conclusion that establishes a correlation of harbor seals with oyster farm activity. All concur that the subsequent NPS analysis was fundamentally flawed by the doubling error. We affirm that the NPS correlation at the regional level in Becker 2011 is entirely supported by the stochastic event in 2003. In summary, there is no statistically significant correlation at the regional level of harbor seals with oyster activity.

We believe, as a result, that there are no scientific data – and no supported correlation – upon which to make a policy decision concerning the future of the oyster farm. There is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture. The MMC made a series of errors when they accepted the NPS correlation.

To resolve this issue, we recommend the following: Interested parties (e.g., elected officials, agency or committee staff, and the press) can verify our analysis by consulting with independent statisticians – independent of us, the NPS, the marine mammal community, and NGOs. Any professional statistician (e.g., the American Statistical Association) could help resolve this issue. We welcome such an independent analysis.

Overview

The NPS has fifteen years of data, with one data point per year, available for its regional scale analysis (i.e., the movement of seals between Drakes Estero and the coastal haul-out sites). NPS examined a correlation using these fifteen data points. The analysis of what MMC called *"scant"* data led to a correlation between a dependent variable (the proportion of pups in Drakes Estero) and an independent variable (a categorical measure of oyster farm activity in Drakes Estero: OYST Hi/Low). The NPS analysis led to a correlation that is just barely statistically significant.

Dr. Goodman initially examined the NPS analysis and observed that the NPS correlation appeared to be driven (or was highly leveraged) by a single influential stochastic event that took place in 2003. In 2003, according to NPS records, a single rogue (or lethal) elephant seal at Double Point (a coastal haul-out site) killed ~ 40 harbor seals and drove ~ 300 harbor seals into Drakes Estero, thus dramatically increasing the proportion of pups in Drakes Estero for 2003 (and with a residual decay in 2004). The

proportion returned to baseline in 2005.

Goodman and Lewis evaluated the NPS correlation by eliminating the influential outlier year (2003) and determined that this single data point leveraged the published correlation -- the correlation was no longer statistically significant ($P > 0.1$). There was a residual impact of the 2003 event in 2004, and thus eliminating this year also led (to a lesser extent) to a decrease in statistical significance. However, we showed that the other thirteen data points, when eliminated one at a time, did not significantly lower the statistical significance of the relationship. We concluded that the influential outlier year (2003) had a disproportionate influence on the NPS correlation, and that the main independent variable used by the NPS (oyster farm activity) did not correlate with the dependent variable (number of harbor seals) when the stochastic event was removed.

The MMC examined the NPS analysis, and worked with NPS to redo their analysis, but refused to ask NPS to properly test their model by removing the single outlier as requested by Congress and DBOC. Dr. Tim Ragen, Executive Director, MMC, wrote to Kevin Lunny on November 17, just a few days before releasing the MMC Report:

> *"I did not ask the Service to run its analyses without the 2003 and 2004 data points, as I do not believe anyone has provided legitimate justification for doing so. You can go through any statistically significant relationship and pick out certain data points that, if removed, would reduce the significance of the relationship. However, if there is not a specific reason for doing so, then that is cherry picking."*

We disagree. There is a *"legitimate justification."* First, if one compares Figure 5 in the MMC Report (below) with the May 2007 figure from Koenen and Allen NPS Research Project Summary Report (next page), it is clear that a stochastic event at Double Point in 2003 had a major influence on seals and pups in Drakes Estero in 2003 & 2004.

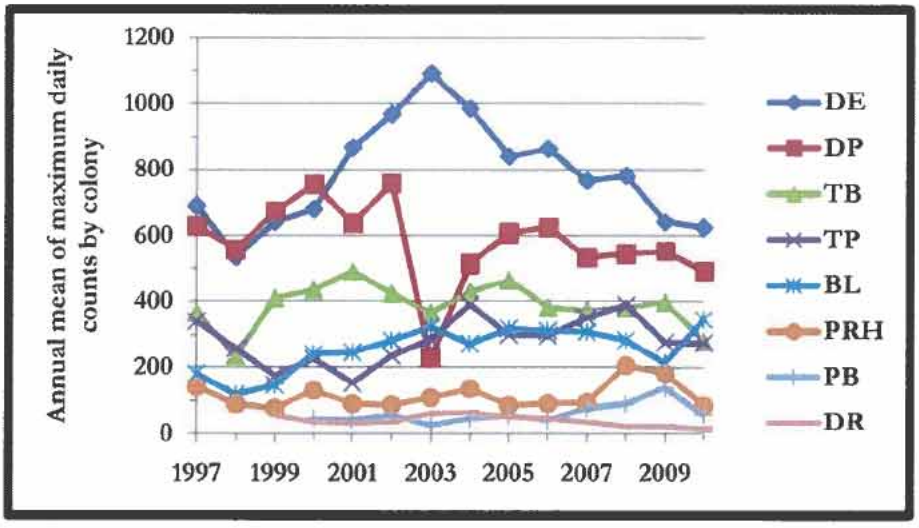
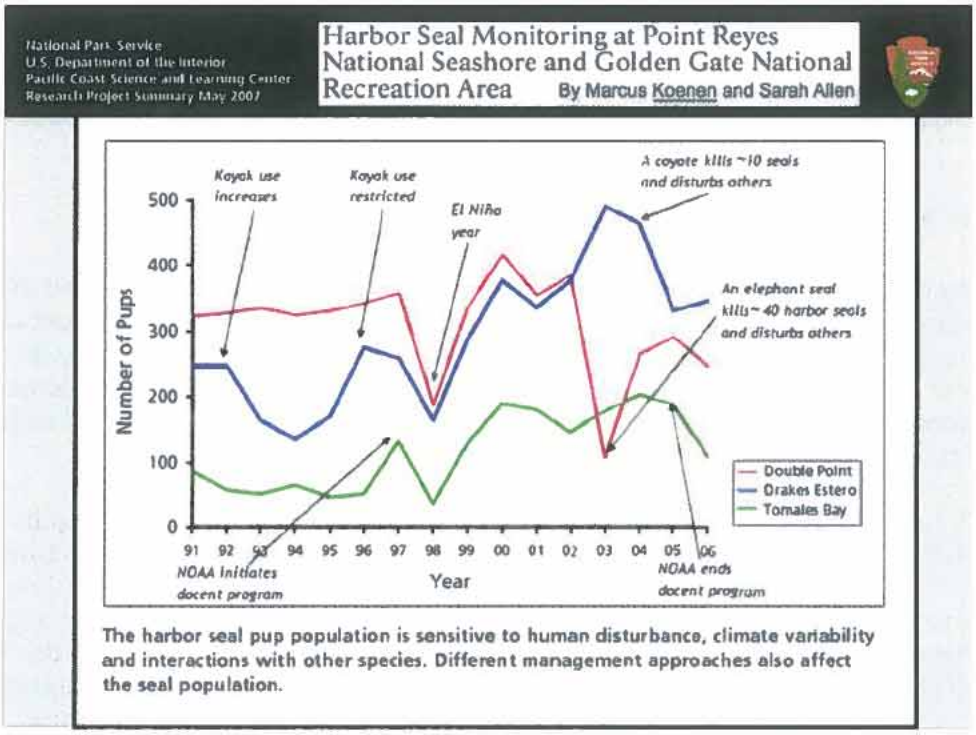


Figure 5. Annual mean of maximum daily counts (adults and pups) by colony and during the full year (left axis), and total of those counts (right axis). Colonies are Drake's Estero (DE), Double Point (DP), Tomales Bay (TB), Tomales Point (TP), Bolinas Lagoon (BL), Point Reyes Headland (PRH), Point Bonita (PB), and Duxbury Reef (DR) (data from National Park Service)



Second, the MMC acknowledged that there was a legitimate justification to test the impact of the stochastic event in 2003, they just objected to our diagnostic test. Third, according to statisticians, it is common in regression analysis to determine if one point highly leverages a correlation. Such an analysis was particularly critical in this case since the NPS correlation was based upon such thin (or "*scant*") data that a stochastic event could have led to a false conclusion.

Statistics textbooks (see below) recommend checking for influential points, particularly points that are so unduly influential that they support the entirety of a supposed relationship. In a case such as this in which the outlier point is caused by an unrelated stochastic event (i.e., the cause is known), it is common to diagnose whether that stochastic event unduly influences the correlation by eliminating the highly leveraged data point and then testing the significance and coefficient of the remaining data.

Our analysis concluded that the NPS correlation is leveraged by a single data point (the 2003 event). This brings both the NPS correlation and the MMC acceptance of that correlation into question. The data are simply too thin to draw any conclusion.

We present our reasoning below why (i) it was legitimate to test the NPS correlation by eliminating the stochastic 2003 event; (ii) it was a mistake for MMC to reject the request by Congress and DBOC to ask NPS to test the NPS model by eliminating 2003; and (iii) it was a mistake for the MMC to allow NPS to substitute a different test that did not assess whether 2003 leveraged the NPS oyster activity model. NPS added another independent variable leveraged by the same event. This revealed the importance of the 2003 event, but failed to test its influence on the oyster activity variable.

Thus, we agree with the MMC that the NPS data are "*scant*" and "*stretched to the limit.*" However, we disagree with the MMC acceptance of the NPS correlation. The NPS data

are so thin that a single stochastic event in 2003 unduly influenced the NPS correlation. The NPS data do not support the NPS correlation – the scant data do not permit any conclusion about harbor seals and oyster activity, and certainly present no scientific evidence on which to base either a scientific conclusion or a resulting policy decision.

The NPS Becker, Press, and Allen 2011 paper

In April 2011, NPS Dr. Becker, Mr. Press, and Dr. Allen published a peer-reviewed paper claiming to have evidence showing long-term spatial displacement of harbor seals (and in particular mothers and their pups) out of Drakes Estero with increased oyster activity. The NPS paper was based in part upon a statistical analysis at the regional scale using a General Linear Model (GLM using AIC analysis) of fifteen data points (one per year: 1982-1983, 1997-2009).

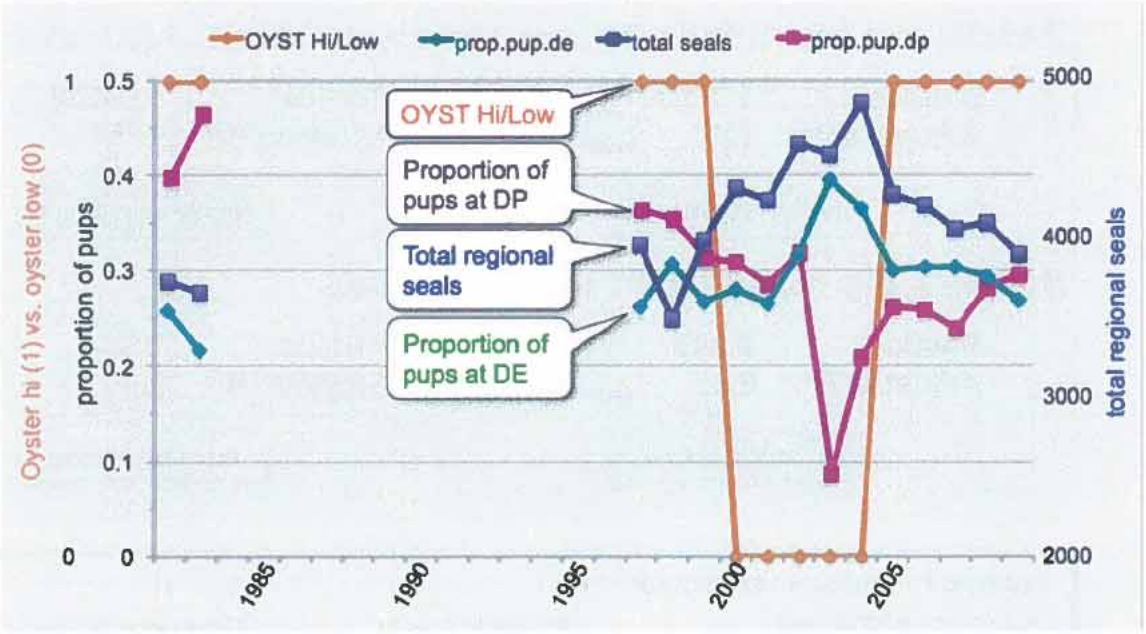
NPS used a Hi/Low categorical designation as a measure of oyster activity to correlate with the proportion of seals and pups in Drakes Estero. The OYST Hi/Low designation had "high" activity in ten years (1982-1983, 1997-1999, 2005-2009) and "low" activity in five intervening years (2000-2004) at sandbars UEN and OB (the oyster bag beds closest to the seal haul-out sites) during pupping season (March to May). We do not agree with the high vs. low categorical designation, but our analysis below accepts the (incorrect) designation and tests whether it correlates with seals and pups. In a separate document we will return to the issue of MMC accepting this categorical designation.

Dr. Goodman's analysis

At the invitation of the MMC, Dr. Goodman submitted a detailed review of the Becker 2011 paper on August 29. Goodman was struck by what the NPS data showed, namely, that the number of harbor seals (and in particular mothers and their pups) went up transiently in Drakes Estero in 2003, partially dropped back down in 2004, and returned to baseline in 2005. There did not appear to be a long-term movement of seals and pups **out** of Drakes Estero, but rather a short-term movement of seals **into** Drakes Estero.

What caused this transient spike in seals and pups into Drakes Estero? The answer was found in additional NPS records documenting a rogue – or lethal – elephant seal in 2003 at Double Point, one of the major harbor seal (and shared elephant seal) haul-out sites along the Point Reyes coast. According to a 2007 NPS document, in 2003, this single elephant seal killed ~ 40 harbor seals and chased ~ 600 seals and pups away from Double Point. The numbers from that year, and historical trends, suggest that ~ 300 of those seals and pups (~ 50% of them) were displaced **into** Drakes Estero. The traumatized harbor seals apparently had a decaying memory of the 2003 event, and thus there was a residual impact on seal distribution (between Double Point and Drakes Estero) the following year (2004), returning to baseline in 2005.

In brief, in 2003, there was a precipitous decrease in seals and pups at Double Point with a concomitant dramatic increase in seals and pups in Drakes Estero, all apparently caused by a stochastic event – a single lethal elephant seal. Thus, 2003 was an outlier data point (with a residual impact in 2004) that unduly influenced the fifteen-year correlation between oyster activity and harbor seals.



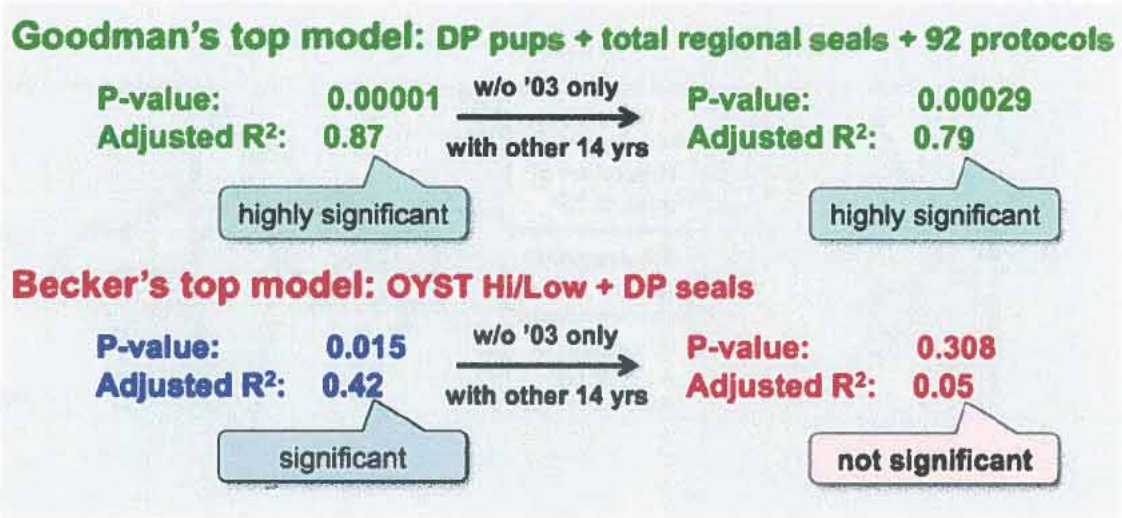
Dr. Goodman's August 29 analysis was based upon a statistical analysis using Multiple Linear Regression (MLR using adjusted R squared) of the same fifteen data points as in the Becker 2011 paper. As a diagnostic tool, given that 2003 appeared to be an outlier data point (with a residual impact in 2004), Dr. Goodman deleted 2003 and 2004 and tested the remaining thirteen years. He showed that when 2003 and 2004 were eliminated, the remaining years had no statistical significance in the relationship between oyster activity and harbor seals – the relationship was effectively flat-lined.

Goodman and Lewis supplemental analysis

In response to a critique from Dr. Dominique Richard, Goodman and Lewis provided MMC with further analyses on October 23 to supplement Goodman's August 29 analysis. Richard was critical of Goodman for using a different statistical method than Becker 2011. Richard did not know (and evidently MMC had not provided) that Goodman had already reported to MMC the answer to that issue. Lewis had repeated Goodman's analysis with the same statistical method as used in the Becker 2011 paper (GLM using AIC) and derived the same conclusions: the NPS correlation with oyster activity was leveraged by the stochastic event at Double Point in 2003. Both analyses reached the same conclusion: the NPS correlation was leveraged by the 2003 event.

Goodman and Lewis made two further additions to Goodman's initial analysis in their October 23 supplemental analysis. First, they tested the "outlier hypothesis" by scanning all fifteen years one at a time. In his August 29 report, Goodman had eliminated both years impacted by the stochastic event at Double Point: 2003 and 2004. We went a step further by showing that when 2003 alone was eliminated from the analysis, the remaining fourteen years had no statistical significance in the relationship between oyster activity and harbor seals. In addition, we did this diagnostic test – the elimination of 2003 alone – using both statistical methods head-to-head (i.e., GLM using

AIC vs. MLR using R squared) and derived the same conclusion.



Significant = green; not significant = red

ANALYSIS WITH 2003	Multiple Linear Regression P-values	Generalized Linear Model P-values
Goodman's Top Model:	0.00001	
DP pups	0.00005	< 0.0001
Total regional seals	0.00014	0.0002
92 protocols	0.01579	0.0127
Becker's Top Model:	0.01474	
OYST Hi/Low	0.00842	0.011
Double Point seals	0.03463	0.0463

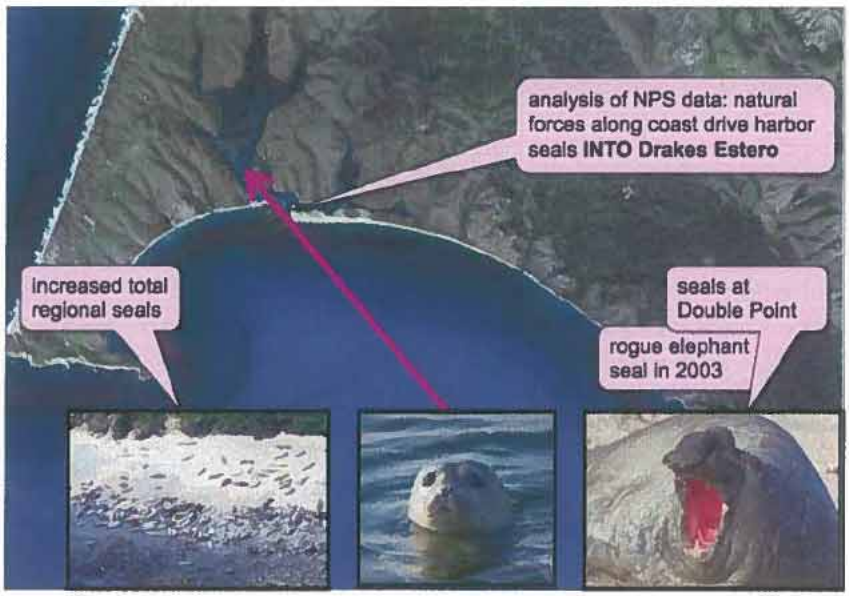
ANALYSIS WITHOUT 2003	Multiple Linear Regression P-values	Generalized Linear Model P-values
Goodman's Top Model:	0.00029	
DP pups	0.00229	0.0024
Total regional seals	0.00080	0.0008
92 protocols	0.02054	0.0163
Becker's Top Model:	0.87444	
OYST Hi/Low	0.68948	0.1581
Double Point seals	0.91052	0.4774

We concluded that the NPS correlation was leveraged (i.e., unduly influenced) by an outlier data point – a lethal event in 2003. When 2003 alone was eliminated, NPS Becker's best model was no longer statistically significant. We concluded that what was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by the lethal event at Double Point.

Note: concerning Goodman's top model shown above (DP pups + total regional seals + 92 protocols), the MMC Report criticized it because of a built-in dependency: the "total

regional seals" independent variable contained within it "Drakes Estero pups" also found in the dependent variable. In response, we re-ran our analysis using a modified version of Goodman's model (DP pups + total regional adults + 92 protocols) and obtained the same result. This modified model, either alone or when 2003 is eliminated, remains three orders of magnitude more significant than Becker's best model.

DP pups + total regional seals + 92 prot. (original) adj $R^2 = 0.87$ P-value = 0.00001
DP pups + total regional adults + 92 protocols (new) adj $R^2 = 0.86$ P-value = 0.00001
DP pups + total regional adults + 92 protocols (-2003) adj $R^2 = 0.80$ P-value = 0.0002



Marine Mammal Commission response to Goodman's analysis

Kevin Lunny wrote to Dr. Ragen, Executive Director, MMC, on September 12 and asked a series of seven questions intended for NPS Dr. Ben Becker. Lunny wrote:

> *"Is your OYST independent variable on its own, when run against the proportion of pups in Drakes Estero, still statistically significant when you exclude the years ... 2003 and 2004?"*

Lunny submitted this question before we submitted to Ragen on October 23 that the NPS correlation was no longer significant when 2003 alone was eliminated. Thus, Lunny requested elimination of both 2003 and 2004, when elimination of 2003 alone was sufficient. Ragen responded to Lunny over two months later on November 17:

> *"I did not ask the Service to run its analyses without the 2003 and 2004 data points, as I do not believe anyone has provided legitimate justification for doing so. You can go though any statistically significant relationship and pick out certain data points that, if removed, would reduce the significance of the relationship. However, if there is not a specific reason for doing so, then that is cherry picking. The better way to handle a situation like this is to make sure that you are using a statistical model that accurately represents the relationship being*

depicted. In this case, I believe that Dr. Harwood provided the best guidance for how to model the influence of the 2003 Double Point event, and that was by modeling it as an abrupt change that rapidly (exponentially or logarithmically) dissipates. With that in mind, I did ask the Service to run the analysis modeling Double Point as suggested by Dr. Harwood. See the attachments."

This email to Lunny forms the basis of the reasoning behind the MMC acceptance of the NPS correlation (see page 54 and 55 of the MMC report). There are two key points to Ragen's comment and Becker's additional analysis: first, he contended that there was no *"legitimate justification"* for eliminating 2003 and 2004 (or 2003 alone) and thus he did not ask NPS to do so; and second, he instead asked NPS to do what Harwood had suggested, namely, to model the 2003 event as either an exponential or logarithmic decay. Below we deal with each of these points.

It was legitimate to test the NPS model by eliminating single data points

Dr. Ragen argued that he had been provided with no legitimate justification for testing the NPS Becker correlation by eliminating 2003 and 2004 (or 2003 alone), and thus did not ask NPS to do so (this statement was not accurate as the MMC actually had asked NPS to do this test – see below). Yet, a few sentences later in the same paragraph, he contradicted his argument by agreeing that there was indeed a special stochastic event in 2003 at Double Point, and that is was worth modeling the influence of that event.

Clearly, Ragen considered the lethal 2003 event at Double Point to be a legitimate reason to add an additional independent variable, so it is difficult to understand why it was not equally legitimate to consider eliminating the data point as a diagnostic test of whether it highly leveraged (i.e., unduly influenced) the OYST Hi/Low variable. Ragen considered it legitimate to remove 1982 and 1983 in another part of the MMC report (thus accepting this diagnostic method). Thus, why was it not equally legitimate to eliminate 2003 and 2004, or 2003 alone as we submitted to him on October 23?

It is common in regression analysis to determine if one data point leverages (or unduly influences) the correlation (or relationship) in a dataset. Is the relationship "real" and based upon the majority of data points? Or is the relationship unduly influenced by a single data point? That is a standard question in statistics that textbooks and lectures deal with, and that confronts all regression – or correlation – analysis. The issue is particularly acute with the NPS correlation because the data are so limited.

Statistics textbooks recommend checking for influential data points. If the correlation is leveraged by a single point, it brings the correlation into question. In this case, testing 2003 was justified – it is an outlier based upon the rogue (or lethal) elephant seal at Double Point that caused a lethal event. A few examples are provided below.

The Rockefeller lecture *"Regression Diagnostics"* states:

> *"Outliers can sometimes cause problems with regression results."* The problem is when *"one observation is allowed to have too much influence over the regression (and any research or policy conclusions that flow from it). One solution is to report findings with and without outliers so that fair readers can make up their own minds."*

In *"A Review of Statistical Outlier Methods"* from 2006, Steven Walfish wrote:

> *"An outlier has a low probability that it originates from the same statistical distribution as the other observations in the data set. … Once an observation is identified—by means of graphical or visual inspection—as a potential outlier, root cause analysis should begin to determine whether an assignable cause can be found for the spurious result."*
>
> *"Outliers in regression can overstate the coefficient of determination (R^2), give erroneous values for the slope and intercept, and in many cases lead to false conclusions about the model. Outliers in regression usually are detected with graphical methods such as residual plots including deleted residuals."*
>
> *"When performing regression analysis, always review residual plots to ensure no outliers are affecting the model coefficients and inflating the R^2 value."*

In *"The power of outliers (and why researchers should ALWAYS check for them)"* from 2004, Jason Osborne and Amy Overbay from North Carolina State University wrote:

> *"Conceptually, there are strong arguments for removal or alteration of outliers. The analyses reported in this paper also empirically demonstrate the benefits of outlier removal. Both correlations and t-tests tended to show significant changes in statistics as a function of removal of outliers, and in the overwhelming majority of analyses accuracy of estimates were enhanced. In most cases errors of inference were significantly reduced, a prime argument for screening and removal of outliers."*

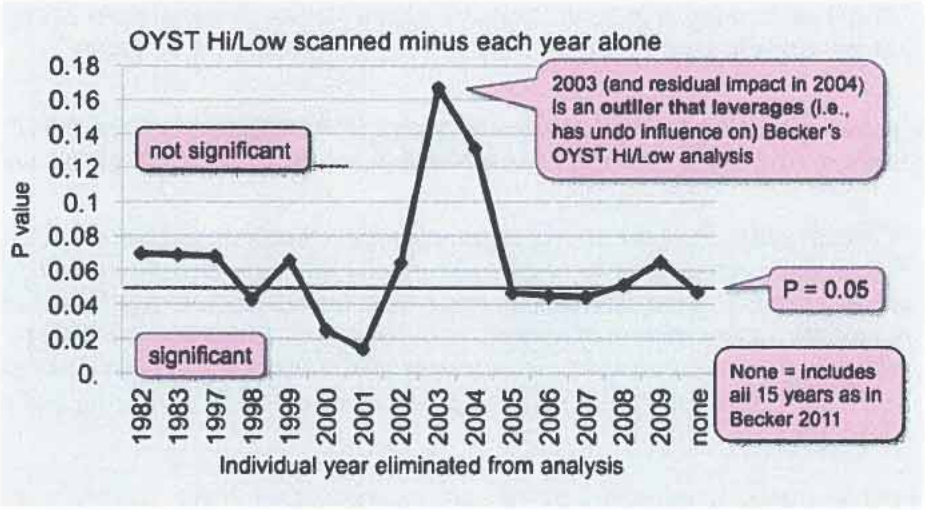
In the UCLA online statistics book *"Regression Diagnostics"* the authors wrote:

> *"A single observation that is substantially different from all other observations can make a large difference in the results of your regression analysis. If a single observation (or small group of observations) substantially changes your results, you would want to know about this and investigate further. There are three ways that an observation can be unusual.*
>
> *Outliers: In linear regression, an outlier is an observation with large residual. In other words, it is an observation whose dependent-variable value is unusual given its values on the predictor variables. An outlier may indicate a sample peculiarity or may indicate a data entry error or other problem.*
>
> *Leverage: An observation with an extreme value on a predictor variable is called a point with high leverage. Leverage is a measure of how far an observation deviates from the mean of that variable. These leverage points can have an effect on the estimate of regression coefficients.*
>
> *Influence: An observation is said to be influential if removing the observation substantially changes the estimate of coefficients. Influence can be thought of as the product of leverage and outlierness."*

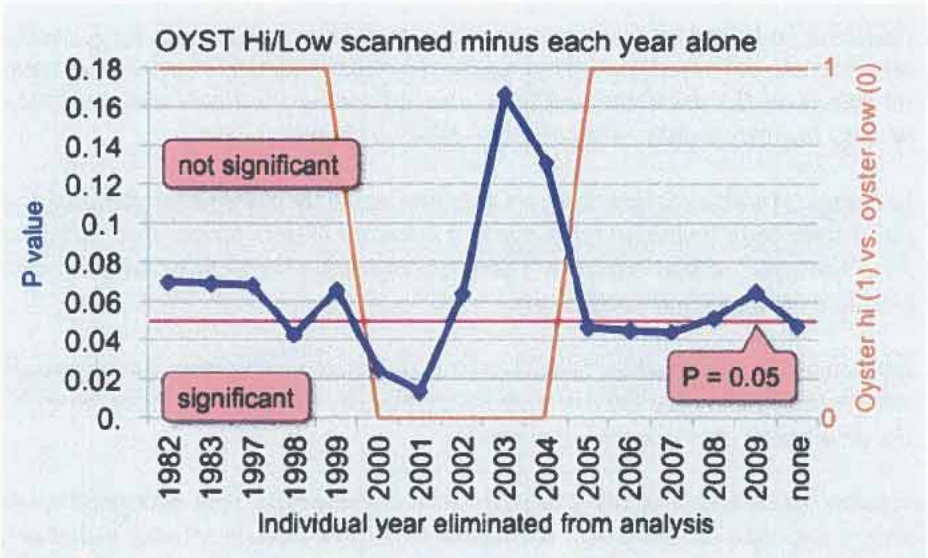
In conclusion, to determine the integrity of a correlation, it is accepted to diagnostically test whether a single observation (or small group of observations) substantially leverages the relationship. Given the thin data used to determine the NPS correlation, it

is particularly important to determine if the stochastic event in 2003 had undo influence on the NPS correlation. We concluded that it did.

Below is a test of the key NPS correlation in Becker 2011 (proportion of pups in Drakes Estero vs. OYST Hi/Low) with a scan in which each year was removed individually. Only elimination of 2003 & 2004 lead to significant decreases in the P value (remember that statistical significance is measured by $P < 0.05$). OYST Hi/Low is leveraged by 2003 & 2004. 2003 is the year of the rogue elephant seal at Double Point. The impact of this event persisted with decay into 2004. Thus, the request to test the NPS model without 2003 & 2004 (or 2003 alone) was justified. This diagnostic test showed that without the 2003 event, the NPS correlation was not statistically significant.



The NPS correlation was artificially driven because the 2003 stochastic event (the rogue elephant seal at Double Point) coincided with the (equally artificial) "low" oyster activity designation in the NPS model (see below). Notice the increase in statistical significance when 2000 and 2001 are removed, further suggesting that the OYST Hi/Low model is highly leveraged by the stochastic 2003 event at Double Point.



NPS improperly tested the NPS correlation by modeling the stochastic 2003 event as another independent variable

The MMC engaged Dr. Harwood from St. Andrews, Scotland, to review the Becker 2011 paper. Harwood, in his analysis of Becker 2011 for the MMC, also recognized that an unusual event in 2003 – the rogue elephant seal at Double Point – was likely to have leveraged much of Becker's analysis, although he did not know the full extent of the NPS data. After reading Goodman's analysis, Harwood wrote on September 2:

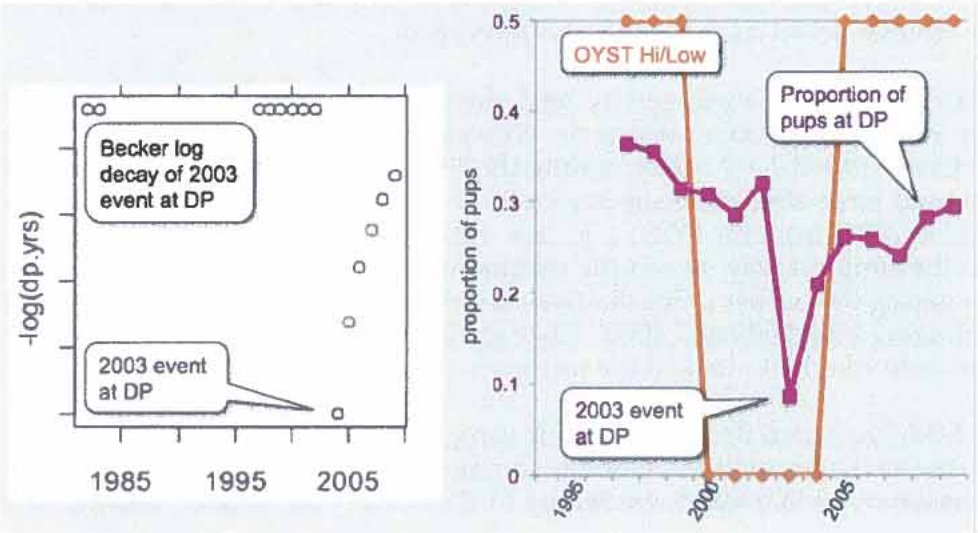
> *"[Goodman] also provides more detailed information about the impact of the "rogue" elephant seal at Double Point in 2003, which suggest that its impact was greater than described in Becker et al (they simply describe it as "aggressive", not lethal!) ..."*

In his initial analysis of the Becker 2011 paper, Harwood wrote on August 29:

> *"The most likely explanation of these changes is that a large number of mothers and pups deserted Double Point in 2003, presumably because of the presence of the aggressive elephant seal, for other colonies, particularly Drakes Estero. These animals gradually returned to Double Point from 2004 onwards."*
>
> *"I think it would be more appropriate to model this disturbance in exactly the same way as the 1998 ENSO event: a fixed effect (whose size is estimated by the appropriate coefficient in the GLM) in 2003, whose influence declines exponentially over time."*

In the Becker 2011 paper, the NPS scientists tested the ENSO event in 1998 by modeling it as a fixed event whose influence declined exponentially over time. That would be an acceptable way of modeling the 2003 event, essentially accounting for the dramatic displacement of seals and pups into Drakes Estero in 2003, with a residual impact (modeled as an exponential or logarithmic decay) in 2004. [Some scientists would prefer to model the event using the raw data rather than a best-fit curve.]

Below is shown Becker's logarithmic model for the 2003 event, a mathematical model that is a good best-fit curve for the proportion of pups at Double Point.



To add another independent variable with the 2003 event [as Becker did with *exp(double point event.yrs)* or *log(double point event.yrs)*] does not test whether the OYST Hi/Low independent variable is highly leveraged by the 2003 event. Rather, Becker's introduction of a new independent variable (not in Becker 2011) doubles down on the 2003 event – it creates a new independent variable that by definition is leveraged to model the 2003 event.

Becker used different parameters for the dependent variable than in Becker 2011 (see discussion below), Becker then showed the following R^2 values:

OYST Hi/Low + log(Double Point.yrs)	$R^2 = 0.83$
log(Double Point.yrs)	$R^2 = 0.72$
OYST Hi/Low	$R^2 = 0.42$

By doubling down on the 2003 event, the R^2 value doubled. In Table 9 (next page) in the MMC Report these numbers are not put side-by-side to show that log (Double Point) as a single variable is superior to OYST Hi/Low suggesting that the 2003 event at Double Point predicted 72% of the variability in the harbor seal counts. The Best-fit curve for the 2003 event (modeled with a log decay) was clearly the best single model.

Table 9. QAICc ranking of models with exponentially decaying function for Double Point

Model	QAICc	ΔQAICc	r^2
Oyster (High/Low) + log(Double Point.yrs)	81.3	0.0	0.83
Oyster (continuous)+ log(Double Point.yrs)	84.1	2.8	0.78
Log(Double Point.yrs)	84.7	3.4	0.72
Exp(Double Point.yrs)	88.2	6.9	0.67

The issue was to determine if the 2003 event had undo influence on the OYST Hi/Low analysis. MMC rejected (incorrectly) the diagnostic test of eliminating the 2003 event and testing the remaining years. NPS modeled the 2003 event at Double Point as an abrupt change with an exponential or logarithmic decay. That much was acceptable.

Becker however erred. Becker should have subtracted the change from his model OYST Hi/Low. Instead Becker added the 2003 event model as another independent covariate. If OYST Hi/Low was leveraged by 2003, as the Goodman and Lewis analysis indicated, then adding another 2003-leveraged covariate would not decrease the significance of the OYST Hi/Low covariate – it would simply add one to another – or in the gambler's bet – double down on the bet on the 2003 event.

If OYST Hi/Low is leveraged by 2003, then adding another term leveraged by that same year is not a proper test of the NPS model. In other words, whereas Becker effectively added $2 + 2 = 4$ by adding the 2003 event as another independent variable, he should have effectively subtracted $2 - 2 = 0$ by statistically removing 2003 (and the decay in 2004) from the OYST Hi/Low variable. Goodman and Lewis had already done so in the simplest way, by simply eliminating 2003 alone from the model (and thus eliminating the outlier point that was unduly influencing the correlation) and also by eliminating both 2003 and 2004. They scanned the correlation by removing each data point individually to look at the influence of each point on the statistical significance.

The MMC accepted Becker's analysis using the log(Double Point.yrs) independent variable as the test that Harwood recommended. Having had our request for open discussion with Harwood rejected by MMC in early September, and Harwood's

September 2 comments on our analysis not provided to us by MMC until November 4, we are left re-reading Harwood's August review, trying to determine in what context Harwood proposed this experiment. Keep in mind that Harwood wrote his suggestion before reading Goodman's analysis. Harwood's suggestion was an appropriate way to test the importance of the 2003 Double Point event as an independent variable. But it was not an appropriate way to diagnose if the OYST Hi/Low variable was unduly influenced by the 2003 event. We do not know how Harwood intended his suggestion to be used.

In essence, what Becker did was to take his OYST Hi/Low variable, which was already leveraged by the 2003 event, and add to it another independent variable that was entirely leveraged by the 2003 event (by definition of the best-fit curve). Thus, it is not surprising that he got a larger R squared. In fact, given the notion of the importance of the 2003 event, it would have been surprising if he had not. His two independent variables were different manifestations leveraged by the 2003 event at Double Point.

MMC did in fact ask NPS to run its analyses without 2003 and 2004

As mentioned above, on September 12, Kevin Lunny wrote to Dr. Ragen and asked a series of questions intended for NPS Dr. Ben Becker after NPS Superintendent Muldoon told Lunny that they would not answer questions directly, but would only respond to questions from the MMC. Ragen responded to Lunny over two months later on November 17 (and just a few days before the release of the MMC Report on November 22):

> *"I did not ask the Service to run its analyses without the 2003 and 2004 data points, as I do not believe anyone has provided legitimate justification for doing so. You can go though any statistically significant relationship and pick out certain data points that, if removed, would reduce the significance of the relationship. However, if there is not a specific reason for doing so, then that is cherry picking."*

During September and October, Lunny repeatedly asked Ragen whether he had submitted Lunny's questions to Becker. On September 19, Ragen answered:

> *"I'll let you know when I have sent them and have a response."*

On September 28, Ragen wrote:

> *"... I am not inclined to send anything until I am confident that I have everything as close to right as possible."*

Ragen wrote to Lunny on November 17 (just a few days before release of the MMC Report) and reversed himself and said that he had not asked the Park Service to do the experiment of eliminating 2003 and 2004. Ragen misled Lunny.

Six days after writing Lunny, on November 23 (a day after the release of the MMC Report), we obtained a copy of an undated report that Dr. Becker submitted to Dr. Ragen that contradicted Ragen's written statement to Lunny. It appears to have been prepared after August 29 and prior to Dr. Ragen's completion and release of the MMC

report. Entitled "*Analysis of Drakes Estero Mean Seal Count Data without 2003 and 2004 data (with and without 1982-1983),*" in this report Becker analyzes the regional scale analysis of OYST Hi/Low without 2003 and 2004 that Ragen told Lunny on the 17th that he did not ask Becker to do. Becker wrote:

> *"prepared at the request of the Marine Mammal Commission"*
>
> *"... at the request of the MMC, we performed this analysis sans 2003-2004."*

We do not know when Ragen asked Becker to do this experiment. Since Ragen told us that his report was nearly finished on November 1, we reasonably assume that he knew the results of all of the additional analyses by then. We were never informed about Becker's further analysis. We do not know why Ragen did not discuss this analysis with us in an open process. These results appear to confirm what Goodman and Lewis had concluded, namely, that the NPS correlation is highly leveraged by 2003 and 2004.

Becker argued that it was *"problematic to simply throw out data points"* and that he did *"not endorse the technique of throwing out data points."* As mentioned above, such a diagnostic test of influential outlier points is common in statistical analysis. Becker argued that Harwood's approach is better, but then Becker employed that approach inappropriately – adding an additional independent variable rather than testing if the 2003 event highly leveraged the OYST Hi/Low correlation.

For other analyses, such as exclusion of 2003 and 2004 while testing the NPS correlation at the colony scale, Becker provided both the coefficients and the P-values. But for his analysis in which he eliminated 2003 and 2004 while testing the NPS correlation at the regional scale, Becker did not provide the coefficients or P-values. It appears as if the P-values may no longer have been statistically significant. This is suggested by the low R^2 value. The R^2 value dropped from 0.42 to 0.13 when 2003 and 2004 were eliminated.

Concerning the analysis with the elimination of 2003 and 2004, Becker wrote:

> *"However, this analysis is certainly inferior to models explicitly accounting for a Double Point effect which have already been submitted to MMC."*

The difference is dramatic. When the 2003 event is eliminated from the OYST Hi/Low analysis by deleting 2003 and 2004, the R^2 value is 0.13. When the 2003 event is essentially duplicated in the OYST Hi/Low analysis by adding another independent variable entirely leveraged by that event (by definition), the R^2 value is 0.83. The R^2 value of the 2003 event [log(Double Point)] independent variable on its own is 0.72 (compared to 0.42 for the OYST Hi/Low variable on its own).

OYST Hi/Low + log(Double Point.yrs)	$R^2 = 0.83$	
log(Double Point.yrs)	$R^2 = 0.72$	
OYST Hi/Low (with new parameters)	$R^2 = 0.42$	in Becker 2011, $R^2 = 0.26$
OYST Hi/Low - 2003	$R^2 = 0.13$	

In the analysis in Becker 2011, the OYST Hi/Low model gave an R^2 value of 0.26. In Becker's new analysis, OYST Hi/Low gives an R^2 value of 0.42. What caused the 60% increase? The answer: Becker changed the parameters of his dependent variable, and as a result, included a greater influence of the changing total regional population.

Becker changed parameters compared to Becker 2011 and included more influence of the ebb and flow of the total regional seal population

Although the MMC Report implies that Becker's further analysis confirmed the Becker 2011 paper, in fact Becker changed virtually every parameter of the dependent variable (the measure of harbor seals in Drakes Estero) compared to what he published in Becker 2011. Whereas we analyzed Becker 2011, Becker provided a whole new analysis using new variables (Becker 2011 version 2.0). We believe that at least one of Becker's changed parameters artificially increased the NPS correlation by increasing the impact of the ebb and flow of the total regional population, something that was partly normalized in the original analysis. By changing most of the parameters of the dependent variable, Becker was no longer reviewing Becker 2011, but rather a modified Becker 2011 that undermined MMC's ability to conclude that Becker 2011 was affirmed.

Although Harwood suggested that NPS focus on pups and not seals, Becker did the opposite and focused his new analysis on seals and not pups. Becker changed from measuring the maximum (peak breeding season) harbor seal count to the mean count between April 15 and May 15. Because of what was contained in the NPS database, Becker measured the mean differently in different years, ranging from the mean of a collection of individual observation data points, to the mean of the weekly maximum count.

Becker changed from measuring the proportion of seals or pups in Drakes Estero to measuring the actual seal count level (which could be influenced by total regional population changes, see below). Finally, Becker added an additional year: 2010.

It is important to note that we do not have much of the data Becker relied upon for his new analysis. Neither NPS nor MMC provided it. While we requested and received the data used for Becker 2011, and were thus able to test the NPS models, we do not have the mean data or the 2010 data (or any other undisclosed data that might have been used in Becker's review).

Dependent variable & dataset	Becker, Press, Allen 2011 paper	Goodman & Lewis analysis	Becker November 7, 2011 response
Dependent variable: Pups?	Yes, pups and seals (pups larger impact)	Yes, focus on pups (but also did seals)	No, only seals
Dependent variable: Maximum?	Yes, maximum (peak breeding season)	Yes, maximum (peak breeding season)	No, mean (4/15-5/15, except '82-83, '97-99)
Dependent variable: Proportion?	Yes, proportion	Yes, proportion	No, total seal counts
Used 7/28/11 NPS "Becker 2011" data?	Yes	Yes	No
Data available for independent review?	Yes	Yes	No
Used same years as in Becker 2011?	Yes	Yes	No (added 2010)

Could Becker's changes in parameters have influenced the statistical outcome? The answer is yes. In particular, we are concerned about the shift from proportion of seals

or pups in Drakes Estero to the absolute seal count number. When Becker 2011 defined the dependent variable as the proportion of seals or pups in Drakes Estero, he normalized for the impact per se of the total regional population by measuring changes according to proportion of seals or pups. This is important, because, as shown below, there was an increase in the total Point Reyes regional harbor seal population peaking around 2002-2004 and then dropping off ever since. That peak in the regional seal population artificially coincided with three of the "low" oyster farm activity years (as defined by the NPS designation).

When Becker converted from the proportion of seals or pups to the total Drakes Estero counts in his dependent variable, he introduced the impact of the peak regional population in 2002-2004 on the number of seals in Drakes Estero.

Several MMC panel members noted this dynamic in the regional population that coincided with the OYST Hi/Low designation (and thus might falsely drive a correlation). In the Panel Member's Report in Appendix F of the MMC Report, several of them asked that the total regional population be introduced as an independent variable (something we have done as part of our best models – see separate document on our response to the MMC Report criticism of our best models).

Concerning the issue of regional population, Dr. Sean Hayes (National Marine Fisheries Service, Southwest Fisheries Science Center) wrote (Appendix F, MMC Report):

> *"I am concerned that there were other unaccounted for variables in the population such as changing oceanographic conditions, and the larger California harbor seal population dynamic itself ..."*
>
> *"Given the size of the Drakes Estero population (Becker et al. 2010) it is likely to respond to whatever large scale dynamics influence the California stock. ... there were some results suggesting Drakes Estero population dynamic correlated with the regional population dynamic and all were declining somewhat during the period of increased mariculture activity."*

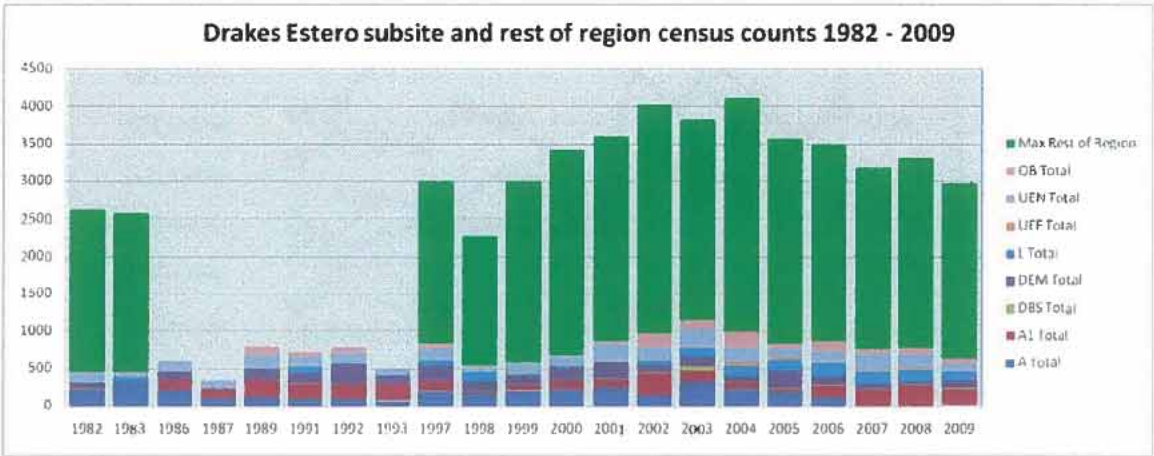
Dr. Steven Jeffries (Washington Department of Fisheries and Wildlife) wrote (Appendix F, MMC Report):

> *"The changing population dynamics that have occurred as regional harbor seal numbers have grown will contribute to why harbor seal use haulout sites in these esteros and adjacent areas and is influenced by natural density dependent factors affecting the overall harbor seal population."*
>
> *"I would like to see a new analysis by an applied biometrician with additional covariants used including: ... overall population trends for the California harbor seal stock, California sea lions and elephants seals ..."*

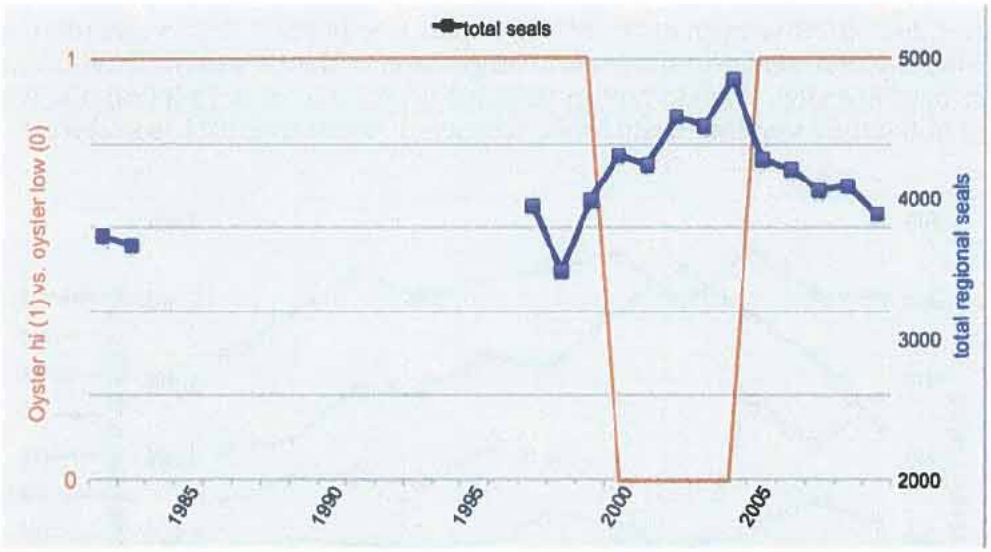
Dr. Brian Kingzett (Vancouver Island University) wrote (Appendix F, MMC Report):

> *"During discussion it was stated by panelists and others that the regional seal population, has been expanding over the long term and may have hit carrying capacity. This population is exposed to a variety of anthropogenic and natural phenomena that could affect behavior, survival and reproductive success. It would*

not be unlikely for this population to undergo trends both positive and negative and all possible factors should be assessed when looking for potential reasons to explain year to year variability." (the graph below is from Kingzett's report)



We agree, which is why we believe Becker should have continued with proportional counts (rather than switch to total counts) as in Becker 2011. The change of this parameter falsely increased the significance of the NPS correlation because of the coincidence of the regional population peak in 2002-2004.



The MMC Report was remiss for not including the total regional seal population in Figure 5 (next page). As shown above, including the total regional population allows the reader to observe that the decrease from the period 2002-2004 to 2010 at Drakes Estero is represented in the overall regional population trend and likely has nothing to do with the oyster farm. As Dr. Sean Hayes wrote, there was evidence that the "... *Drakes Estero population dynamic correlated with the regional population dynamic and all were declining somewhat during the period of increased mariculture activity."* Figure 5 in the MMC Report did not permit the reader to observe that relationship.

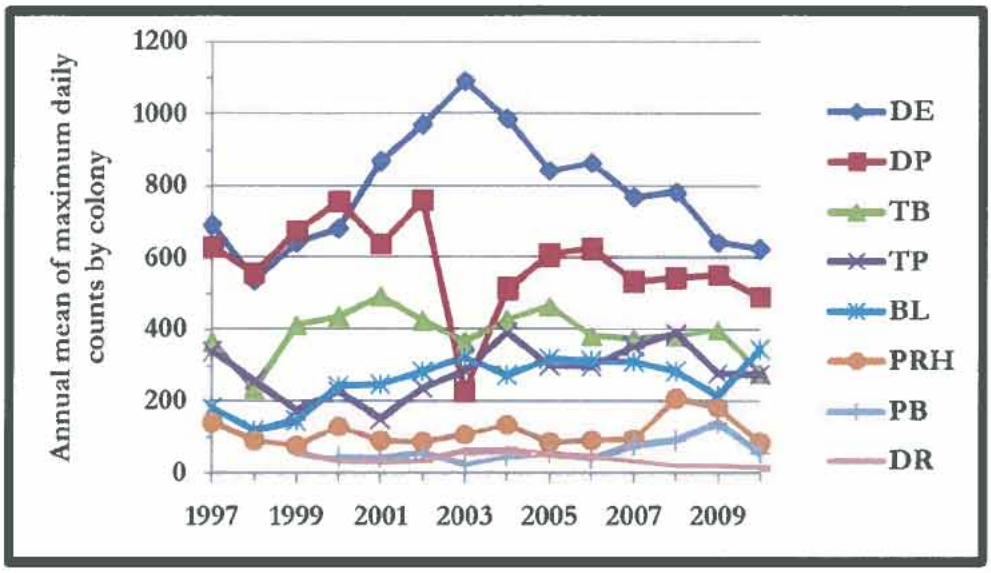


Figure 5. Annual mean of maximum daily counts (adults and pups) by colony and during the full year (left axis), and total of those counts (right axis). Colonies are Drake's Estero (DE), Double Point (DP), Tomales Bay (TB), Tomales Point (TP), Bolinas Lagoon (BL), Point Reyes Headland (PRH), Point Bonita (PB), and Duxbury Reef (DR) (data from National Park Service)

In the June 2011 draft version of the MMC Report (see below), Ragen included the curve for the total regional seal population for comparison to the curves for Drakes Estero and the other haul-out sites. We do not understand why the total population line was not included in the final version of the MMC Report in November 2011 (see above).

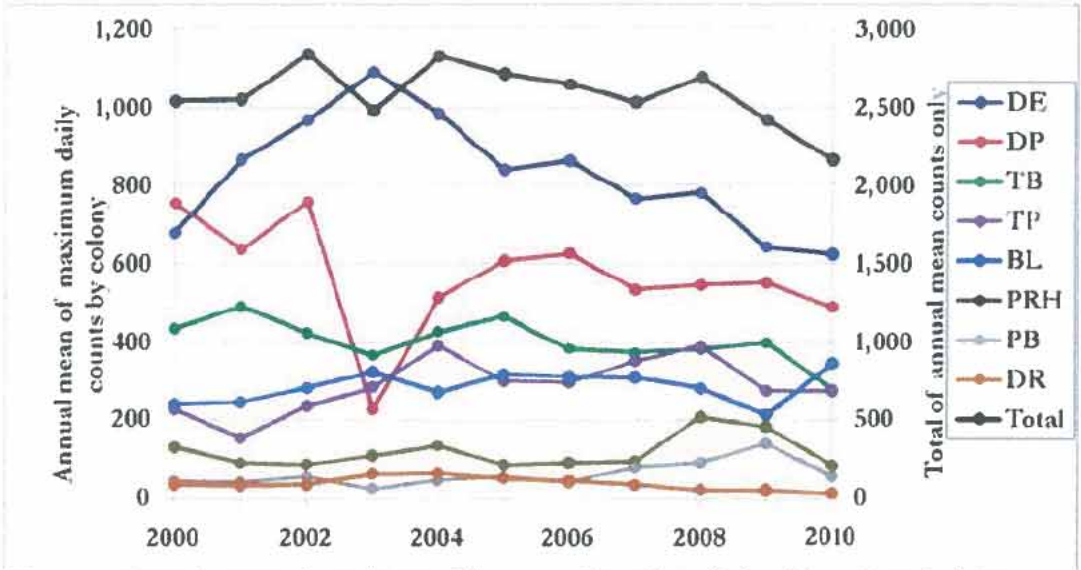


Figure 5. Annual mean of maximum daily counts by colony (left axis), and total of those counts (right axis). Colonies are Drake's Estero (DE), Double Point (DP), Tomales Bay (TB), Tomales Point (TP), Bolinas Lagoon (BL), Point Reyes Headland (PRH), Point Bonita (PB), and Duxbury Reef (DR). (Data from National Park Service.)

Conclusions and recommendations

1) The elimination of the outlier data point (2003) to determine if this event highly leveraged (i.e., unduly influenced) the NPS correlation was a legitimate and appropriate diagnostic test. MMC was incorrect to reject this diagnostic test.
2) The Becker 2011 statistics are leveraged (i.e., unduly influenced) by a single stochastic (random) event -- the rogue elephant seal at Double Point in 2003: when 2003 alone is eliminated, Becker's best models are no longer significant.
3) The same conclusions are derived regardless of statistical method: Goodman and Lewis provided head-to-head comparison of GLM using AIC vs. MLR using R squared analysis, and derived the same conclusion: the NPS oyster activity model is entirely supported by the stochastic (and lethal) 2003 event.
4) Having rejected the request to ask NPS to do the outlier diagnostic test of their model, MMC instead accepted a different analysis from NPS that was purported to determine the leverage of the 2003 event on the NPS correlation. Rather than subtracting the 2003 event from their correlation, NPS instead added another independent variable that was leveraged by the 2003 event. Instead of effectively testing $2 - 2 = 0$, NPS in essence tested $2 + 2 = 4$. MMC accepted an incorrect test.
5) By adding another independent variable entirely leveraged by the lethal 2003 event, NPS essentially doubled down – they tested two variables that were both leveraged by the same event – and no surprise, found an increased R squared.
6) Although MMC stated to Kevin Lunny that it had not asked NPS to do the outlier diagnostic test, it actually had asked NPS to test their model without 2003 and 2004. In the absence of 2003, the NPS model was no longer significant.
7) The MMC mistakenly accepted the NPS correlation that was highly leveraged by the random 2003 event at Double Point. The MMC made two compounded errors. First, MMC did not request the outlier diagnostic test. Second, MMC allowed NPS to do an inappropriate test that added rather than subtracted the 2003 event and never determined whether it leveraged the oyster activity model.
8) The NPS data are too thin, and too highly leveraged by a stochastic event in 2003, to be able to support the NPS correlation between harbor seals and oyster activity. Moreover, the NPS data are inadequate for MMC to affirm the NPS claim of a correlation between harbor seals and oyster activity.
9) What was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point. There is no evidence for long-term spatial displacement of seals and pups OUT of Drakes Estero that can be related to shellfish aquaculture.
10) The MMC mistakes could have been avoided had the MMC proceeded with their original open process rather than the insular closed process they conducted. Open dialogue, open discussion, and open exchange could have helped avoid these mistakes. Unfortunately, the closed process led to a flawed MMC Report.

To resolve this issue, we recommend the following: Interested parties (e.g., elected officials, agency or committee staff, and the press) can verify our analysis by consulting with independent statisticians – independent of us, the NPS, marine mammal community, and NGOs. Any professional statistician (e.g., the American Statistical Association) could help resolve this issue. We welcome such an independent analysis.

Epilogue: using Becker's exponential model in a subtraction experiment to test whether the 2003 event at Double Point leveraged Becker's model

Several people have asked us if there might be another method – in addition to the diagnostic outlier test – to test whether Becker's OYST Hi/Low model was highly leveraged by the 2003 event at Double Point. One suggestion has been a variation on another experiment that Goodman did in his August 29 analysis. The notion is to leave all fifteen years, but to make an adjustment for the 2003 event by decreasing the number of pups in Drakes Estero according to the exponential decay.

In Goodman's August 29 report, he did a variation of this adjustment experiment using the following reasoning. The mean proportion of pups at Double Point (prop.pup.dp) for the fifteen-year study period was 0.296. In 2003, a rogue elephant seal killed ~ 40 seals and chased away ~ 600 seals from Double Point, leaving the prop.pup.dp at 0.085. Thus, the rogue elephant seal led to a decrease in the prop.pup.dp of 0.211 that equals 260 pups. Many of the pups chased away from Double Point went into Drakes Estero. Based upon NPS data, it is conservative to assume that ~ 50% of the pups from DP went into Drakes Estero (i.e., 130 pups). Goodman subtracted 130 pups from DE and recalculate the prop.pup.de to an adjusted value from 0.394 to 0.289. A similar adjustment for 2004 led to an adjusted prop.pup.de value of 0.321. That adjustment experiment led to an adjusted R^2 of – 0.0619 and a P value of 0.5943, indicating that the relationship of oyster activity (OYST Hi/Low) to harbor seal pups in Drakes Estero was no longer statistically significant. The relationship is best described as flat-lined.

What if we did this same adjustment experiment using Becker's exponential decay mathematical model for the 2003 event at Double Point to determine the adjustment of the pups in Drakes Estero? Whereas we could determine the numbers for Becker's exponential, we did not have the parameters for his log model. Both gave similar values, and to our eye, the exponential model appeared to provide a better curve-fit model for the changes in the proportion of pups at Double Point.

We ran the experiment conservatively, and then even more conservatively. In the first version, we used Becker's exponential model and assumed that 125 pups entered Drakes Estero in 2003 as a result of the rogue elephant seal at Double Point (the actual number is closer to 150). In the second more conservative model, we assumed that only 100 pups entered Drakes Estero as a result of the 2003 event at Double Point. In both cases, the adjustment number dropped off exponentially in each subsequent year as modeled by Becker. For example, in the first version, the adjustment number dropped from 125 pups in 2003, to 47 pups in 2004, to 19 pups in 2005, to 6 pups in 2006, to 2 pups in 2007, to 0 pups in 2008.

We adjusted the proportion of pups in Drakes Estero (prop.pup.de) using this exponential decay of the original value. The "125" vs. "100" in the definition of the models (below) defines the adjustment to the number of Drakes Estero pups in the starting year, 2003.

For Becker's OYST Hi/Low model, we obtained the following values:

OYST Hi/Low (Becker 2011, no adjustment)	adjusted $R^2 = 0.21$	P value = 0.0468
OYST Hi/Low (Becker exp decay, 100 pups)	adjusted $R^2 = 0.13$	P value = 0.1053
OYST Hi/Low (Becker exp decay, 125 pups)	adjusted $R^2 = 0.08$	P value = 0.1661

We then conducted the same experiment with Becker's top model from Becker 2011: OYST Hi/Low + DP seals. For Becker's best model, we obtained the following values:

OYST Hi/Low + DP seals (no adjustment)	adjusted $R^2 = 0.42$	P-value = 0.01474
OYST Hi/Low + DP seals (exp decay, 100)	adjusted $R^2 = 0.10$	P-value = 0.21526
OYST Hi/Low + DP seals (exp decay, 125)	adjusted $R^2 = 0.00$	P-value = 0.38657

We then conducted the same experiment with Goodman's modified top model: DP pups + total regional adults + 92 protocols (see Goodman and Lewis part II for further details – this modified model has none of the dependencies criticized in the original model). For Goodman's modified best model, we obtained the following values (note – we have also included the model without the Double Point variable):

DP pups + total reg adults + 92 (no adjustment)	adjusted $R^2 = 0.86$	P-value = 0.00001
DP pups + total reg adults + 92 (exp decay, 100)	adjusted $R^2 = 0.71$	P-value = 0.00078
Total reg adults + 92 protocols (exp decay, 100)	adjusted $R^2 = 0.63$	P-value = 0.00109
Total reg adults + 92 protocols (exp decay, 125)	adjusted $R^2 = 0.58$	P-value = 0.00226
DP pups + total reg adults + 92 (exp decay, 125)	adjusted $R^2 = 0.59$	P-value = 0.00469
Total reg adults + 92 protocols (no adjustment)	adjusted $R^2 = 0.57$	P-value = 0.00264

Predictably, with both Becker's best model (OYST Hi/Low + DP seals) and Goodman's modified best model (DP pups + total regional adults + 92 protocols), the subtraction of Becker's exponential decay adjustment rendered the Double Point term of less statistical significance, particularly so in the version that adjusted Drakes Estero in 2003 by 125 pups.

Thus, when we used Becker's exponential decay mathematical model of the 2003 event as a subtraction experiment to determine if the 2003 event highly leveraged the OYST Hi/Low variable, we found that both the conservative and very conservative adjustments rendered Becker's model to be no longer statistically significant. In contrast, Goodman's modified best model retained its statistical significance.

We conclude from this adjustment experiment that the 2003 event highly leveraged the OYST Hi/Low variable and thus highly leveraged the NPS correlation of oyster activity with harbor seals. Goodman's best model (including the pups at Double Point + the total regional adult seal population + the 92 protocols) remained statistically significant under the adjustment conditions of this test. These results further confirm the diagnostic outlier test described in the main body of this report.

Goodman and Lewis, Part I: Conclusions and recommendations

1) The elimination of the outlier data point (2003) to determine if this event highly leveraged (i.e., unduly influenced) the NPS correlation was a legitimate and appropriate diagnostic test. MMC was incorrect to reject this diagnostic test.
2) The Becker 2011 statistics are leveraged (i.e., unduly influenced) by a single stochastic (random) event -- the rogue elephant seal at Double Point in 2003: when 2003 alone is eliminated, Becker's best models are no longer significant.
3) The same conclusions are derived regardless of statistical method: Goodman and Lewis provided head-to-head comparison of GLM using AIC vs. MLR using R squared analysis, and derived the same conclusion: the NPS oyster activity model is entirely supported by the stochastic (and lethal) 2003 event.
4) Having rejected the request to ask NPS to do the outlier diagnostic test of their model, MMC instead accepted a different analysis from NPS that was purported to determine the leverage of the 2003 event on the NPS correlation. Rather than subtracting the 2003 event from their correlation, NPS instead added another independent variable that was leveraged by the 2003 event. Instead of effectively testing $2 - 2 = 0$, NPS in essence tested $2 + 2 = 4$. MMC accepted an incorrect test.
5) By adding another independent variable entirely leveraged by the lethal 2003 event, NPS essentially doubled down – they tested two variables that were both leveraged by the same event – and no surprise, found an increased R squared.
6) Although MMC stated to Kevin Lunny that it had not asked NPS to do the outlier diagnostic test, it actually had asked NPS to test their model without 2003 and 2004. In the absence of 2003, the NPS model was no longer significant.
7) The MMC mistakenly accepted the NPS correlation that was highly leveraged by the random 2003 event at Double Point. The MMC made two compounded errors. First, MMC did not request the outlier diagnostic test. Second, MMC allowed NPS to do an inappropriate test that added rather than subtracted the 2003 event and never determined whether it leveraged the oyster activity model.
8) The NPS data are too thin, and too highly leveraged by a stochastic event in 2003, to be able to support the NPS correlation between harbor seals and oyster activity. Moreover, the NPS data are inadequate for MMC to affirm the NPS claim of a correlation between harbor seals and oyster activity.
9) What was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point. There is no evidence for long-term spatial displacement of seals and pups OUT of Drakes Estero that can be related to shellfish aquaculture.
10) The MMC mistakes could have been avoided had the MMC proceeded with their original open process rather than the insular closed process they conducted. Open dialogue, open discussion, and open exchange could have helped avoid these mistakes. Unfortunately, the closed process led to a flawed MMC Report.

To resolve this issue, we recommend the following: Interested parties (e.g., elected officials, agency or committee staff, and the press) can verify our analysis by consulting with independent statisticians – independent of us, the NPS, marine mammal community, and NGOs. Any professional statistician (e.g., the American Statistical Association) could help resolve this issue. We welcome such an independent analysis.

Goodman and Lewis Part II: Conclusions and recommendations

1) The Becker 2011 statistics are leveraged (i.e., unduly influenced) by a single stochastic (random) event -- the rogue elephant seal at Double Point in 2003: when 2003 alone is eliminated (the diagnostic outlier test), Becker's best models are no longer significant.
2) In his August 29 report to the MMC, Goodman presented models relying on the seals at Double Point, the total regional seal population, and the 1992 protocols that were three orders of magnitude (1000X) more statistically significant than Becker's best models, and remained statistically significant when 2003 alone was removed (i.e., were robust to the diagnostic outlier test).
3) The MMC panel members in their reports in Appendix F of the MMC report sited the ecologic importance of both the total regional harbor seal population dynamic (peaking in 2002-2004) and the stochastic event at Double Point (in 2003 with residual impact in 2004) as potential major influences on the harbor seal population in Drakes Estero, and cautioned that both tended to artificially coincide with the NPS measure of oyster activity.
4) The MMC Report rejected Goodman's top models due to built-in and linked dependencies. It is troubling that Dr. Ragen failed to raise the issue with either Dr. Goodman or Mr. Lewis. It is equally troubling that neither MMC nor NPS modified the models themselves.
5) The variable dependencies in Goodman's original models were not fatal as stated by the MMC, were easily adjusted, and when modified, gave rise to the same overall statistics and conclusions. In other words, MMC dismissed the Goodman analysis based upon variable dependencies that in the end made no difference. At the same time, when NPS contained similar dependencies, MMC was silent.
6) Goodman's modified best model (DP pups + total regional adults + 92 protocols), substituting adults for seals, has an adjusted $R^2 = 0.86$ and a P-value = 0.00001. These values are virtually identical to those generated from the original model, and drive the same overall statistics and conclusions as in Goodman's August 29 report and the Goodman and Lewis October 23 report.
7) Dr. Goodman's top model (modified from seals to adults) is three orders of magnitude more statistically significant than Becker's best model (from Becker 2011). Moreover, it remains statistically significant when 2003 alone is removed (the diagnostic outlier test), whereas Becker's best models fail that test.
8) Becker's new models, including a mathematical model of the 2003 event at Double Point, may be guilty of the same linked dependency as Goodman's top models, but it appears as if they were not scrutinized in the MMC Report. By adding another independent variable entirely leveraged by the stochastic 2003 event, NPS essentially doubled down – they tested two variables that were both leveraged by the same event – and no surprise, found an increased R squared.
9) The NPS data are too thin, and too highly leveraged by a stochastic event in 2003, to be able to support the NPS correlation between harbor seals and oyster activity. Moreover, the NPS data are inadequate for MMC to affirm the NPS claim of a correlation between harbor seals and oyster activity.

10) What was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point. There is no evidence for long-term spatial displacement of seals and pups OUT of Drakes Estero that can be related to shellfish aquaculture.

11) The MMC mistakes could have been avoided had the MMC proceeded with their original open process rather than the insular closed process they conducted. Open dialogue, open discussion, and open exchange could have helped avoid these mistakes. Unfortunately, the closed process led to a flawed MMC Report.

Evaluation of the MMC review of the NPS Becker 2011 paper: executive summary

MARINE MAMMAL COMMISSION

review of NPS Becker, Press, and Allen 2011 paper

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

by Dr. Corey Goodman
November 22, 2011

Summary of MMC review of NPS Becker et al. 2011 paper: 1

1) **MMC indicated they would follow MMC policy to conduct an open review (open discussion, open dialogue, open exchange).** Although initially reluctant to do so, in June MMC agreed to review Becker 2011.
2) **Goodman & Harwood (MMC consultant) submitted reviews of Becker 2011 to MMC** on August 29. They had been given two weeks to complete their analyses. Goodman's 143-page statistical analysis was highly critical.
3) **NPS rejected the MMC plan that NPS respond to all reviews and participate in a MMC-sponsored public meeting.**
4) **MMC worked with NPS for over two months in a closed process**, in contrast to their June announcement – no public meeting, no open exchange & discussion, little shared, Goodman excluded.
5) **MMC posed no statistical questions nor raised any issues with Goodman regarding his statistical analysis.** Ragen did not share Harwood's Sept 2 or NPS Becker's responses in a timely fashion.
6) **MMC, just a few days before the release of the MMC report, finally shared Becker's rebuttal of Goodman's analysis**, over two weeks after Ragen said he was nearly done with his report (Nov 1), and two and one-half months after Goodman submitted his analysis.

Summary of MMC review of NPS Becker et al. 2011 paper: 2

7) **MMC accepted NPS Becker's rebuttal,** misrepresented what Becker had done, and dismissed Goodman's analysis without giving Goodman (and collaborator Lewis, on behalf of Supervisor Kinsey) opportunity to respond.

8) **NPS Becker rebuttal analysis was a statistical bait & switch.**

- **Becker did not replicate Becker 2011,** contrary to what Ragen asserted.
- **Becker changed the key parameters** of what he used as a measurement of the Drakes Estero seals and pups compared to Becker 2011.
- **Becker used both different & new data** not found in Becker 2011, some of it not publicly available (e.g., 2010 data; mean data from earlier years).
- **Becker neither replicated Goodman's statistical variables nor tested Goodman's models,** contrary to what Ragen asserted.
- **Becker misused an analysis method proposed by Harwood to test the impact of the 2003 event** – thereby essentially double counting the 2003 event caused by the rogue elephant seal at Double Point.

9) **Neither MMC nor NPS Becker appear to have performed the tests directed by the Senate Commerce Subcommittee on Appropriations**

10) **MMC abandoned its open process as mandated by MMC policy,** replaced it with a closed process excluding Goodman and Lewis, and accepted Becker's faulty analysis without open exchange and dialogue.

Evaluation of the MMC review of the NPS Becker 2011 paper: detailed analysis and timeline

MARINE MAMMAL COMMISSION

review of NPS Becker, Press, and Allen 2011 paper

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

by Dr. Corey Goodman
November 22, 2011

Conclusions from Goodman & Lewis analysis of Becker 2011

There are four major conclusions to the analysis by Goodman and Lewis:

- The same conclusions are derived regardless of statistical method: Goodman and Lewis provided head-to-head comparison of GLM using AIC vs. MLR using R squared analysis, and derived same conclusion.
- The Becker 2011 statistics are leveraged (i.e., driven by a single data point) by a rogue elephant seal at Double Point in 2003: when 2003 alone is eliminated, Becker's best models are no longer statistically significant whereas Goodman's best models are highly significant.
- What was called a long-term displacement OUT of Drakes Estero was actually a short-term displacement INTO Drakes Estero caused by events at Double Point.
- There is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture.

How did Becker respond to this analysis? Becker changed variables, used different and new data, did not test the models by eliminating 2003, and never tested Goodman's models: Becker produced a bait and switch. Yet Ragen, having not given Goodman & Lewis the opportunity to respond to Becker's Nov 7 rebuttal, nevertheless accepted Becker's analysis.

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 1

1. April: Becker et al. 2011 paper published; disclosed by EAC not NPS
2. June: draft MMC report – Becker 2011 correlation same as Becker 2009
3. June: MMC told correlations in Becker 2011 different from Becker 2009; MMC asked to conduct independent review of Becker 2011
4. July 28: MMC initiated review of Becker 2011 & established open process
5. July 28 - August: Becker provided data to replicate & test Becker 2011
6. August: Goodman, Harwood, & Richard given two weeks to submit reviews
7. Aug 29: Reviews of Becker 2011 submitted to MMC
8. Aug 30: NPS rejected MMC open transparent process including responses to reviews within 48 hours and participation in public meeting
9. Aug 31: MMC proposed private meeting that excluded Goodman; said Goodman & Harwood analyses were "*nail in the coffin*" of Becker 2011
10. Sept 1: Ragen unsure how MMC would proceed
11. Sept 1: Ragen prohibited Goodman from talking with Harwood
12. Sept 1: Ragen agreed to provide all responses, comments, and questions with Goodman and to consult with Lewis as well as Goodman

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 2

13. Sept 2: Harwood submitted response to Goodman's analysis to Ragen that Ragen withheld until November 4
14. Sept 8: MMC process announced; MMC to consult with all parties
15. Sept – Nov: Ragen did not consult Goodman, Lewis, or Lunny
16. Sept – November: Ragen had extensive conversations with Becker
17. Sept 9: Goodman alerted Ragen that in Becker's response to MMC on June 16, Becker had changed a variable compared to Becker 2011; Goodman cautioned Ragen that if he asked Becker to run further analysis, he should "*look at all of the numbers carefully*." This was good advice, since Becker's November 7 analysis did not replicate Becker 2011.
18. Sept 12: Ragen talked with Lewis but did not ask any questions
19. Sept 12: Goodman asked Ragen if he had received any comments
20. Sept 12: Lunny submitted 7 questions for Becker via Ragen; Ragen waited until Nov 17 and cited why he did not ask many of the questions
21. Sept 15: Bennett and Richard submit criticisms of Goodman's analysis to Ragen

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 3

22. Sept 16: Ragen answered Goodman's September 12th note and said he had no questions for Goodman without acknowledging either Harwood's or Bennett's/Richard's comments on Goodman's analysis
23. Sept 22: EAC announced that Richard had submitted critique of Goodman to MMC; MMC did not provide critique to Goodman, or tell him
24. Oct 6: Goodman visited Ragen in his office, asked if he had any questions or received criticisms or comments, and Ragen answered no.
25. Oct 7: Ragen sent Richard's critique sent to Goodman; amongst other comments, Richard criticized Goodman's choice of statistical method
26. Oct 23: Goodman & Lewis submitted to MMC head-to-head analysis using both methods (i.e., Becker's and Goodman's) with same conclusion
27. Oct 24, November 1: Lewis emailed Ragen, offered to discuss analysis; Ragen never engaged Lewis – never asked for his statistical help even though Ragen knew Lewis had replicated Goodman's analysis at the request of Marin County Supervisor Kinsey – using Becker's method
28. Oct - Nov: Ragen never questioned Goodman or Lewis about Goodman's analysis, Harwood's comments, or Becker's response

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 4

29. Nov 1: Ragen told Weiman he was finishing up report, hoped to distribute to advisors on November 6
30. Nov 4: Ragen distributed Harwood's September 2 response
31. Nov 5: Ragen asked Goodman for detailed results of each model (provided to Ragen on September 9, but nevertheless provided again)
32. Nov 6: Goodman & Lewis responded to Harwood's comments, providing head-to-head comparisons using both statistical methods, and showed Becker's models were statistically leveraged by 2003 alone
33. Nov 7: Becker analysis to Ragen dated 11/7; not forwarded to us
34. Nov 8: Ragen told Weiman he was finally finishing report, yet he had not shared any of Becker's analysis with Goodman, Lewis, or Lunny
35. Nov 17: Ragen provided Becker's November 7 analysis, and Ragen gave his response to Lunny's September 12 questions intended for Becker (although evidently not sent to Becker). Clearly Ragen already knew the conclusions of Becker's analysis, since on November 1, he told Weiman he was about to finish his report and distribute it to his advisors on November 6, whereas the copy of Becker's analysis provided to us was dated Nov 7.

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 5

36. Nov 17: Ragen apparently knew about Becker's analysis and had not shared it. For how long had Ragen known? How many iterations? What communication? Where, for example, is the communication in which Ragen wrote, in response to question #5 concerning the proportion of pups at Double Point, that "*the Park Service didn't run the … model because they didn't feel it made biological sense …*" Why did NPS get the right to reject this question? Why was none of this shared with Goodman & Lewis?
37. Nov 22: Ragen released MMC report influenced by Becker's Nov 7 analysis with no opportunity for Goodman & Lewis to respond

Having proposed an open process involving open dialogue and exchange with all parties on August 30 – a process that NPS soundly rejected – Ragen instead turned to a closed process in which he communicated with Becker and excluded Goodman & Lewis, even when Goodman & Lewis reached out to him. Becker was allowed to rebut Goodman's analysis with a bait & switch in which he did not do what Ragen believed he had done. Goodman and Lewis were given no opportunity to respond and challenge Becker's analysis. The MMC was influenced by Becker's faulty analysis with no open discussion.

Sept 15: Senate Commerce Subcommittee on Appropriations

Calendar No. 170

112TH CONGRESS *1st Session*	SENATE	REPORT 112–78

DEPARTMENTS OF COMMERCE AND JUSTICE, AND SCIENCE, AND RELATED AGENCIES APPROPRIATIONS BILL, 2012

Independent Report.—The Committee appreciates the Marine Mammal Commission's willingness to assess the 2011 statistical analysis prepared by the National Park Service [NPS] regarding the potential displacement of breeding and pupping harbor seals by shellfish aquaculture at Point Reyes National Seashore. As part of this on-going review, the Committee urges the Commission to thoroughly examine the reviews and analyses prepared by other statisticians on the NPS study to ensure a comprehensive assessment of all viewpoints. This should include a response to criticisms that the study: (1) should not have used data points for 1982–1983; (2) did not account fully for the impact of an aggressive elephant seal in the Double Point area on 2003 and 2004 harbor seal populations in Drake's Estero; and (3) did not accurately interpret aerial photographs and public health records when converting oyster harvest records to high/low values for further analysis. It also should include an analysis of the study's statistical significance if the 1982–1983 and/or 2003–2004 data are removed.

NPS Becker did not test the Becker 2011 statistical analysis; he changed parameters. Becker did not account fully for the impact of the aggressive elephant seal at Double Point; his analysis was flawed. Becker did not include analysis of the Becker 2011 models if 2003-2004 data are removed; MMC Ragen excused Becker from doing that test because he said there was no legitimate reason to do it. Thus Becker did not do what the Subcommittee directed.

MMC accepted Becker's rebuttal to Goodman's analysis of Becker 2011 paper; failed to fulfill Senate request for analysis

- September 12: since NPS refused to respond directly to questions and be accountable for their published Becker 2011 paper, Lunny submitted questions for Dr. Becker – via Ragen – as required by NPS.
- November 17: on the eve of release of the MMC report, Ragen finally responded to Lunny's September 12 questions – over two months after initial request – and provided Becker's November 7 analysis.
- November 17: Ragen explained why he had not forwarded many of the questions to Becker. **Ragen claimed that Becker had (but he had not)**:
  - replicated the results of Becker 2011,
  - replicated Goodman's models and found them inferior to Becker's models,
  - eliminated 1982-1983 and shown it to be of no importance, and
  - tested the impact of the 2003 event at Double Point (the rogue elephant seal) and shown it to be of little importance.
- **MMC accepted NPS Becker's rebuttal,** misrepresented what Becker had done, and dismissed Goodman's analysis without giving Goodman (and collaborator Lewis, on behalf of Supervisor Kinsey) opportunity to respond.

MMC accepted Becker's rebuttal to Goodman's analysis of Becker 2011 paper; failed to fulfill Senate request for analysis

- **NPS Becker rebuttal analysis was a statistical bait & switch.**
  - **Becker did not replicate Becker 2011,** contrary to what Ragen asserted.
  - **Becker changed the key parameters** of what he used as a measurement of the Drakes Estero seals and pups compared to Becker 2011.
  - **Becker used both different & new data** not found in Becker 2011, some of it not publicly available (e.g., 2010 data; mean data from earlier years).
  - **Becker neither replicated Goodman's statistical variables nor tested Goodman's models,** contrary to what Ragen asserted.
  - **Becker misused an analysis method proposed by Harwood to test the impact of the 2003 event** – thereby essentially double counting the 2003 event caused by the rogue elephant seal at Double Point.
- **Neither MMC nor NPS Becker appear to have conducted the statistical review of the Becker 2011 paper as directed by the Senate Commerce Subcommittee on Appropriations requested** (Sept 15)

Bait and switch: Becker 2011 vs. Becker 11/7/11 response.
1. Major changes made in dependent variable and dataset

Dependent variable & dataset	Becker, Press, Allen 2011 paper	Goodman & Lewis analysis *	Becker November 7, 2011 response
Dependent variable: Pups?	Yes, pups and seals (pups larger impact)	Yes, focus on pups (but also did seals)	**No**, only seals
Dependent variable: Maximum?	Yes, maximum (peak breeding season)	Yes, maximum (peak breeding season)	**No**, mean (4/15-5/15, except '82-83, '97-99)
Dependent variable: Proportion?	Yes, proportion	Yes, proportion	**No**, total seal counts
Used 7/28/11 NPS "Becker 2011" data?	Yes	Yes	**No**
Data available for independent review?	Yes	Yes	**No**
Used same years as in Becker 2011?	Yes	Yes	**No** (added 2010)

Becker abandoned the Becker 2011 paper, instead used new data not available to others, added 2010, & substituted every aspect of dependent variable, from proportion of pups at Drakes Estero as measured by maximum peak, to total seal counts as measured by mean.

Bait and switch: Becker 2011 vs. Becker 11/7/11 response. 2. Goodman's models were not properly tested

Goodman model variables	Did Becker test Goodman's variables and models in his 11/7/11 response?
Total regional seal population (= total population including Drakes Estero)	**No**, tested seals excluding Drakes Estero, and only with different dependent variable
Total pups at Double Point (DP)	**No**, tested only total seal counts at Double Point, not pups, and not proportion of pups, and only with different dependent variables
Proportion of pups at Double Point (Goodman's best single variable model)	**No**, tested only total seal counts at Double Point, not pups, and not proportion of pups, and only with different dependent variables
DP pups + total regional seals + 92 protocols	**No**
DP pups + total regional seals	**No**
DP pups + total regional pups	**No**

Although Ragen wrote to Lunny that Becker had tested Goodman's best models, in his November 7, 2011 document to Ragen, Becker neither tested Goodman's key covariates (predictors) nor Goodman's models.

Bait and switch: Becker 2011 vs. Becker 11/7/11 response. 3. 1982-1983 were tested, but not 2003-2004, or 2003 alone

Models tested with which years eliminated?	Goodman and Lewis analysis	Senator Feinstein and Senate Commerce Subcommittee	Did Becker's 11/7/11 response test his models as requested?
1982 and 1983 (pre-1992 protocols) as in Becker 2011	Yes, tested models in Becker 2011 paper without 1982 & 1983	Requested MMC test models in Becker 2011 paper this way	**No,** Becker tested but not as in Becker 2011; with different dependent variable
2003 and 2004 (rogue elephant seal)	Yes, tested models in Becker 2011 paper without 2003 & 2004	Requested MMC test models in Becker 2011 paper this way	**No**, Ragen excused Becker from testing his models in this way
2003 alone (rogue elephant seal)	Yes, tested models in Becker 2011 paper with more stringent test without only 2003	Eliminating 2003 alone is more stringent version of requested test	**No**, we are unaware whether Ragen ever considered this test as submitted by us

Becker tested models without 1982 & 1983, but not the models in Becker 2011, but rather new models with a different dependent variable (see previous page), and was excused by Ragen from testing his models without 2003 & 2004, or the more stringent test, without 2003 alone.

Bait and switch: Becker 2011 vs. Becker 11/7/11 response.
4. Becker did not properly test 2003 elephant seal at DP

How did Goodman and Lewis analyze impact of rogue elephant seal at Double Point in 2003?	How did Becker (11/7/11) analyze impact of rogue elephant seal at Double Point in 2003?
To test if elephant seal at Double Point (DP) in 2003 (with residual impact in 2004) was the key driver of the OYST Hi/Low correlation, Goodman eliminated 2003 & 2004 while Goodman and Lewis subsequently eliminated 2003 alone, a more stringent test.	**Becker did not test** the OYST Hi/Low variable by either eliminating 2003 or adjusting 2003 for rogue elephant seal. Rather, Becker simply added a new variable – *exp(double point event)* or *log(double point event)* on top of OYST Hi/Low. That did not test for whether the OYST Hi/Low was being largely driven by the Double Point 2003 event.
To test the importance of the pups at Double Point on the pups at Drakes Estero, Goodman examined models based upon both the total pups and the proportion of pups at DP, and showed that they were highly significant even without the Double Point 2003 event.	**Becker did not test** the importance of the pups at Double Point. His only model was total seals at Double Point (a measure much less relevant than pups) and he did not model the proportion of pups at DP.

Becker never took the Double Point "event" (rogue elephant seal in 2003 which drove seals into the estero) out of the OYST Hi/Low correlation but rather added a measure of the event on top of OYST Hi/Low.

Bait and switch: Becker 2011 vs. Becker 11/7/11 response.
5. What is important is what Becker did not include

What did Becker include?	What did Becker not do include?
Becker ran his new analysis using a completely different dependent variable	**Becker did not test** his models or Goodman's models using the same data as Becker 2011
Becker tested only total seal counts in Drakes Estero	**Becker did not test** proportion of pups DE as in Becker 2011
Becker tested regional seals without Drakes Estero	**Becker did not test** total regional population as in Goodman's best models
Becker tested only total seals at Double Point	**Becker did not test** pups & proportion of pups at Double Point as in Goodman's best models
	Becker did not test Goodman's best models
	Becker did not test Becker 2011 models without 2003 & 2004, or without 2003 alone
	Becker did not test impact of 2003 DP event by eliminating 2003 from OYST Hi/Low model

Ragen claimed that Becker tested Goodman's models, but he did not. He never tested his own models without 2003 DP event, or Goodman's best models, with or without 2003 DP event. Becker's response was a bait and switch, and only shared with us after Ragen's report was written. Why?

Becker did not do what Ragen claimed he did: Becker did not test Goodman's models as in Becker 2011

Table 3. A priori models ranked by delta QAICc for the proportion of Point Reyes seal pups and total seals using Drakes Estero. Δi
QAICc distance from the best model and wi indicates mo
Modeling oyster harvest as a continuous variable or low o
1999–2004 gives similar results. Models ranking within t
QAICc units (in bold) were used for multimodel inferenc
Oyst: low oyster harvest from 2000–2004; DP: Double Po
A: proportion of Drakes Estero seals using subsit
anthropogenic disturbance rate. Rankings are simila
continuous oyster harvest rather than *categorical*

Age class	Model			
Pup	**Oyst+Double Point (DP)**	**0.0**	**0.35**	
	Oyst+DP+A	**1.3**	**0.18**	**0.63**
	Oyst+A	**1.4**	**0.18**	**0.46**
	Oyst+ENSO	**2.6**	**0.09**	**0.42**
	Oyst	**3.3**	**0.06**	**0.26**
	Year	5.0		
	Oyst+Dist	5.6	0.02	0.32
	Oyst+DP+Dist+A	6.3	0.01	0.66
	DP+Year	6.4	0.01	0.29
	DP	7.3	0.01	0.12

Where do Goodman's best models rank?

- DP pups + total reg seals + 92 protocol
- DP pups + total regional seals
- proportion pups at Double Point (DP)
- DP pups + total regional pups
- DP seals + total regional seals

Becker did not replicate Table 3 with Goodman's models ranked with his.

Prop.pup.de

OYST Hi/Low

Becker's top models all included OYST Hi/Low categorical variable.

Becker did not test Goodman's top models in the same ranking using QAICc as he did in Table 3 in Becker 2011. He did not test "prop.pup.de" as in Becker 2011, and he did not test Goodman's covariates and models.

Ragen excused Becker from the key test -- eliminating 2003: Ragen said no "*legitimate justification*" for doing so

Lunny wrote on September 12:

"Is your OYST independent variable on its own, when run against the proportion of pups in Drakes Estero, still statistically significant when you exclude the years … 2003 and 2004?"

Ragen responded on November 17:

"I did not ask the Service to run its analyses without the 2003 and 2004 data points, as I do not believe anyone has provided legitimate justification for doing so. You can go though any statistically significant relationship and pick out certain data points that, if removed, would reduce the significance of the relationship. However, if there is not a specific reason for doing so, then that is cherry picking. *The better way to handle a situation like this is to make sure that you are using a statistical model that accurately represents the relationship being depicted. In this case, I believe that Dr. Harwood provided the best guidance for how to model the influence of the 2003 Double Point event, and that was by modeling it as an abrupt change that rapidly (exponentially or logarithmically) dissipates. With that in mind, I did ask the Service to run the analysis modeling Double Point as suggested by Dr. Harwood. See the attachments."*

On Oct 23, Goodman & Lewis submitted to MMC a further analysis in which 2003 alone was eliminated showing that Becker's models were leveraged by 2003. Without 2003, Becker's models were not statistically significant

Ragen was incorrect: regression diagnostics looking for undo influence of leveraged outliers is a standard method

No "*legitimate justification*" for "*cherry picking*" 2003 & 2004: incorrect

It is common in regression analysis to determine if one point leverages the correlation. Statistics textbooks recommend checking for influential points. If the correlation is leveraged by a single point, it brings the correlation into question. In this case, testing 2003 is justified – it is an outlier based upon the rogue elephant seal at Double Point.

- Rockefeller lecture "Regression Diagnostics" states: "*Outliers can sometimes cause problems with regression results.*" The problem is when "*one observation is allowed to have too much influence over the regression (and any research or policy conclusions that flow from it). One solution is to report findings with and without outliers so that fair readers can make up their own minds.*"
- UCLA stats book "Regression Diagnostics" states:

2.1 Unusual and influential data

A single observation that is substantially different from all other observations can make a large difference in the results of your regression analysis. If a single observation (or small group of observations) substantially changes your results, you would want to know about this and investigate further. There are three ways that an observation can be unusual.

Outliers: In linear regression, an outlier is an observation with large residual. In other words, it is an observation whose dependent-variable value is unusual given its values on the predictor variables. An outlier may indicate a sample peculiarity or may indicate a data entry error or other problem.

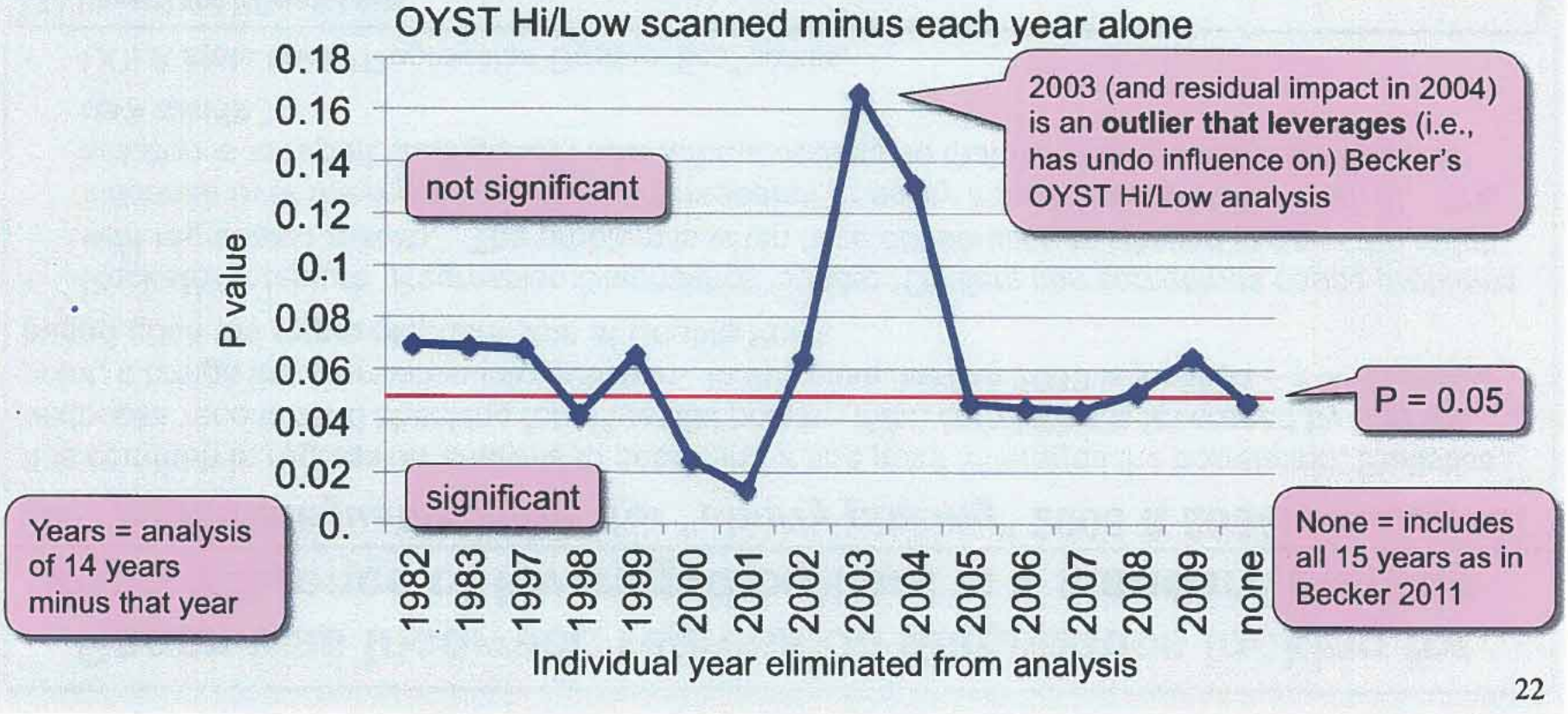
Leverage: An observation with an extreme value on a predictor variable is called a point with high leverage. Leverage is a measure of how far an observation deviates from the mean of that variable. These leverage points can have an effect on the estimate of regression coefficients.

Influence: An observation is said to be influential if removing the observation substantially changes the estimate of coefficients. Influence can be thought of as the product of leverage and outlierness.

Ragen was incorrect: regression diagnostics looking for undo influence of leveraged outliers is a standard method

No "*legitimate justification*" for "*cherry picking*" 2003 & 2004: incorrect

Below is a test of Becker's key model (OYST Hi/Low) with a scan with each year removed individually. Only elimination of 2003 & 2004 lead to significant decreases in the P value. OYST Hi/Low is leveraged by 2003 & 2004. 2003 is the year of the rogue elephant seal at Double Point. The impact of this event persisted into 2004. Thus, the request to test Becker's model without 2003 & 2004 (or 2003 alone) was fully justified.



Becker was incorrect: adding 2003 as another independent variable did not test if OYST Hi/Low was leveraged by 2003

Best to model 2003 *"as an abrupt change that rapidly (exponentially or logarithmically) dissipates."* **Becker did this incorrectly**

Harwood and Goodman recognized that an unusual event in 2003 – the rogue elephant seal at Double Point – was likely to have leveraged much of Becker's analysis.

Harwood wrote on September 2: "*[Goodman] also provides more detailed information about the impact of the "rogue" elephant seal at Double Point in 2003, which suggest that its impact was greater than described in Becker et al (they simply describe it as "aggressive", not lethal!) …*"

Harwood wrote on August 29: "*The most likely explanation of these changes is that a large number of mothers and pups deserted Double Point in 2003, presumably because of the presence of the aggressive elephant seal, for other colonies, particularly Drakes Estero.*" "*I think it would be more appropriate to model this disturbance … as … a fixed effect (whose size is estimated by the appropriate coefficient in the GLM) in 2003, whose influence declines exponentially over time.*"

In modeling the 2003 event at Double Point as an abrupt change with an exponential decay, Becker should have subtracted the change from his model OYST Hi/Low, but instead he added it as another independent covariate. If OYST Hi/Low was leveraged by 2003, as Goodman's analysis indicated, then adding another 2003-leveraged covariate would not decrease the significance of the OYST Hi/Low covariate – it would simply add one to another. If OYST Hi/Low is leveraged by 2003, then adding another term leveraged by that same year is not a proper test.

A brief summary of the analysis by Goodman & Lewis: how robust are the models without 2003? (i.e., without the rogue elephant seal at Double Point in 2003)

Goodman's top model: DP pups + total regional seals + 92 protocols

P-value: 0.00001
Adjusted R^2: 0.87

highly significant

w/o '03 only → with other 14 yrs

P-value: 0.00029
Adjusted R^2: 0.79

highly significant

Becker's top model: OYST Hi/Low + DP seals

P-value: 0.015
Adjusted R^2: 0.42

significant

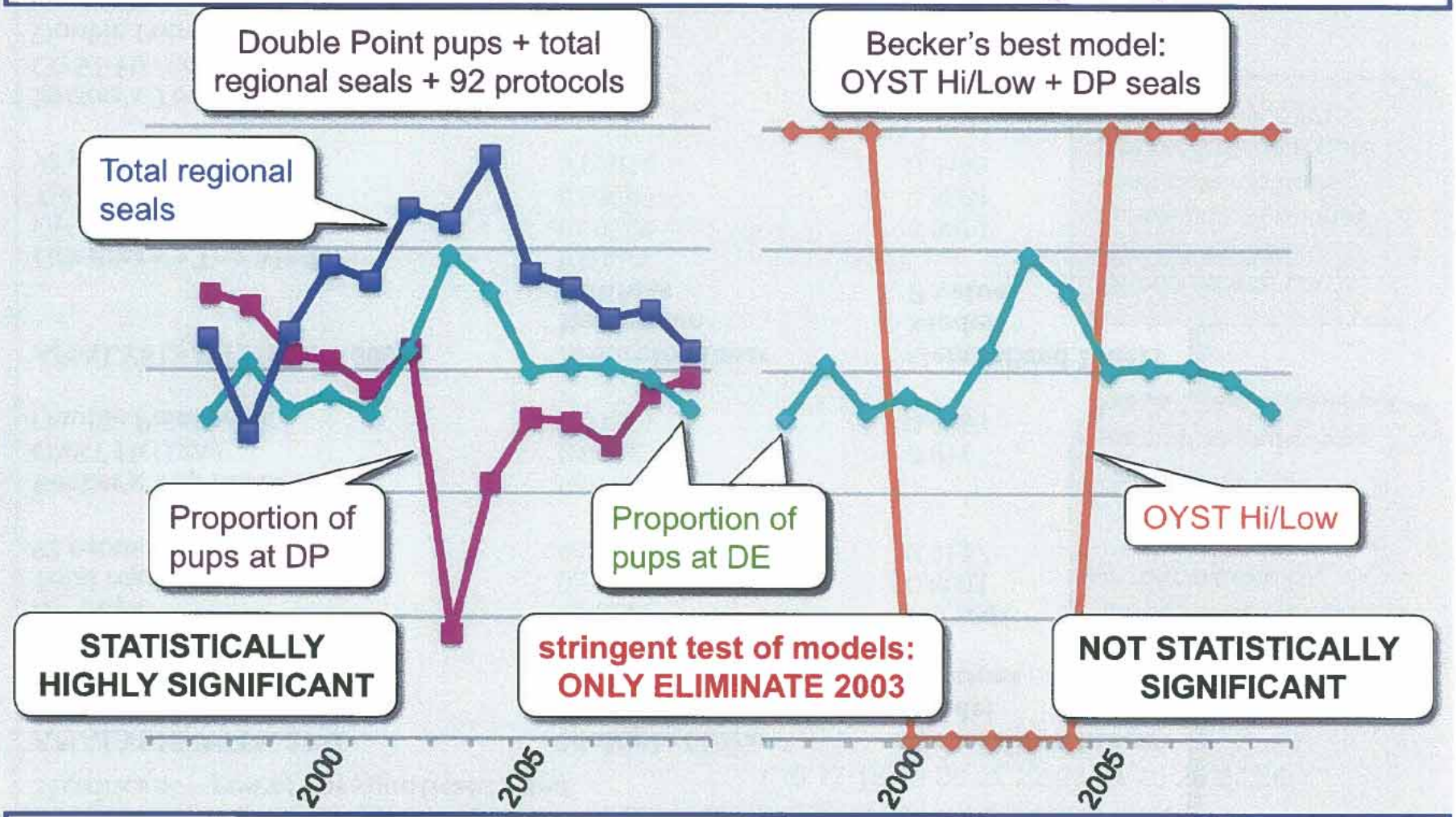
w/o '03 only → with other 14 yrs

P-value: 0.308
Adjusted R^2: 0.05

not significant

If the models represent a significant long-term pattern, then they should be significant with only 14 of the 15 years. **Becker's best models fail that test (-2003) whereas our models (e.g., DP pups + total regional seals) do not.**

If we test the models by eliminating 2003 (the rogue elephant seal at Double Point) and leave the remaining 14 years …



… then Becker's best model (involving OYST Hi/Low) is no longer statistically significant, whereas our best models are

Goodman & Lewis derived the same conclusion when they tested the models using both stat methods (MLR vs. GLM)

Significant = green; not significant = red

ANALYSIS WITH 2003	Multiple Linear Regression P-values	Generalized Linear Model P-values
Goodman's Top Model:	0.00001	
DP pups	0.00005	< 0.0001
Total regional seals	0.00014	0.0002
92 protocols	0.01579	0.0127
Becker's Top Model:	0.01474	
OYST Hi/Low	0.00842	0.011
Double Point seals	0.03463	0.0463

Goodman and Lewis submitted this analysis to Ragen on October 23 in response to Dr. Richard's criticism that Goodman had used a different method compared to Becker.

ANALYSIS WITHOUT 2003	Multiple Linear Regression P-values	Generalized Linear Model P-values
Goodman's Top Model:	0.00029	
DP pups	0.00229	0.0024
Total regional seals	0.00080	0.0008
92 protocols	0.02054	0.0163
Becker's Top Model:	0.87444	
OYST Hi/Low	0.68948	0.1581
Double Point seals	0.91052	0.4774

Goodman and Lewis derived the same conclusion when they used both methods: Becker's models were leveraged by 2003.

MLR using adjusted R squared vs. GLM using AIC analysis: the same conclusions – Becker's models leveraged by 2003

MMC process was not open, did not followed MMC policy

MARINE MAMMAL COMMISSION

29 March 2011

From: Timothy J. Ragen

To: John P. Holdren

Subject: Scientific Integrity at the Marine Mammal Commission

I. FOUNDATIONS OF SCIENTIFIC INTEGRITY IN GOVERNMENT

The Marine Mammal Commission's organization, policies and procedures are intended to—

1. **Ensure a culture of scientific integrity.**
   - The Commission uses a longstanding review process to develop sound scientific and policy advice and formulate recommendations to further the purposes of the Marine Mammal Protection Act. The process is designed to facilitate "honest investigation, open discussion, refined understanding, and a firm commitment to evidence." It includes—

   - The Commission abides by government-wide requirements providing whistleblower protection. As a small agency, the Commission does not have its own Inspector General. However, the Commission has entered into a cooperative agreement with the Inspector General of the Department of Commerce to conduct independent investigations should the need arise or if the objectivity of the Executive Director, the Chair of the Commission, or the General Counsel should be placed in question by a whistleblower's allegations.

MMC process was not open, did not followed MMC policy

- The Commission actively seeks input from and open dialogue among all parties engaged in all issues (scientific, technological, and otherwise) pertaining to marine mammals. The Commission considers the open exchange of information and viewpoints as central to well-informed decision making.

In conducting its review of Becker 2011 paper, the MMC did not follow the White House scientific integrity policy it quoted of "*honest investigation, **open discussion**, refined understanding, and a firm commitment to evidence.*" From August 29 to the November release of its report, the MMC did not follow its policy that "*the Commission actively seeks input from and **open dialogue** among all parties engaged in all issues …*" The MMC was closed and biased, and did not foster an "***open exchange** of information and viewpoints …*"

After NPS rejected an open process on August 30, Ragen reverted to a closed process. Why did the process become so one-sided? Why did MMC accept Becker's bait and switch? Why did MMC accept Becker's claim that he had tested Goodman's models when he had not? There are many concerns about the MMC conduct.

Evaluation of the MMC review of the NPS Becker 2011 paper: origin of MMC review of Becker 2011

MARINE MAMMAL COMMISSION

review of NPS Becker, Press, and Allen 2011 paper

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

by Dr. Corey Goodman
November 22, 2011

A brief history of the MMC analysis of the Becker paper: Nov 2009 Terms of Reference for Drakes Estero study

REVIEW OF HARBOR SEAL AND HUMAN INTERACTIONS IN DRAKE'S ESTERO, CALIFORNIA

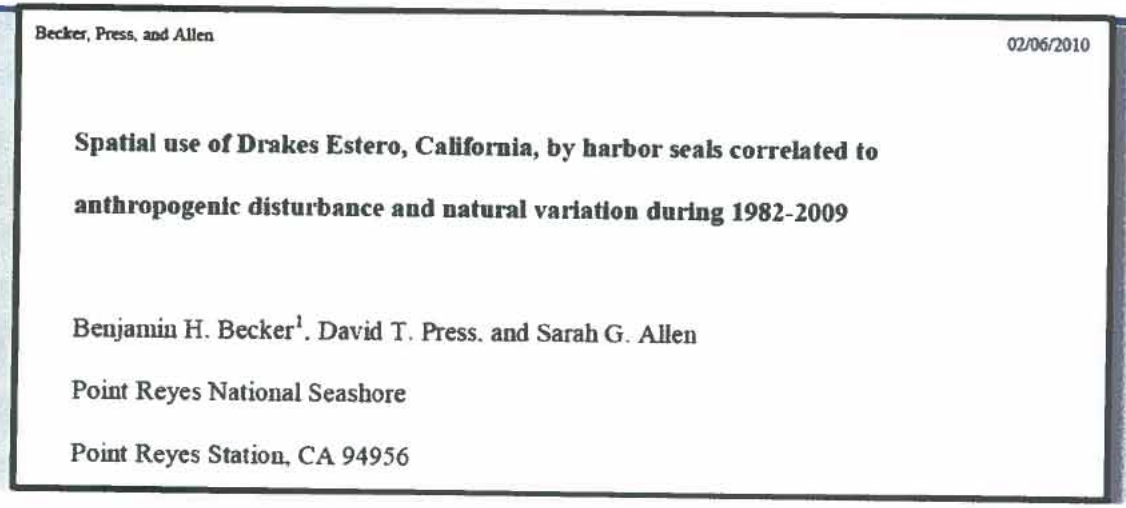
MARINE MAMMAL COMMISSION

TERMS OF REFERENCE

In conducting its review, the Commission will (1) use the best available scientific information regarding human impacts on harbor seals in the estero; (2) evaluate the strengths and weaknesses of those data, including information gaps, and (3) recommend research and management activities to reduce scientific uncertainty and ensure the protection of harbor seals and their habitat.

A brief history of the MMC analysis of the Becker paper: Becker 2010 paper submitted to MMC in February 2010

February 2010: The Becker et al. paper (then called Becker 2010) was submitted to the MMC in February 2010 just prior to the MMC panel meeting from February 21-24, 2010. Despite not having access to the NPS data and computer codes, Dr. Goodman critiqued certain aspects of the paper, as did MMC panel members. Goodman objected to the inclusion of data from 1982 and 1983 (data NPS previously denied existed, data prior to the 92 protocols, and data followed by a 14-year gap), argued that annual oyster harvest was not relevant (to sandbars OB and UEN during pupping season), and showed how the NPS assumptions for their OYST Hi/Low analysis were incorrect. The MMC panel recommended, much as had the NAS panel before them, that NPS not use annual oyster harvest but instead should obtain the correct data from Kevin Lunny on oyster activity at OB/UEN during pupping season. They never did so.



Becker, Press, and Allen 02/06/2010

Spatial use of Drakes Estero, California, by harbor seals correlated to anthropogenic disturbance and natural variation during 1982-2009

Benjamin H. Becker[1]. David T. Press. and Sarah G. Allen

Point Reyes National Seashore

Point Reyes Station, CA 94956

A brief history of the MMC analysis of the Becker paper: Ragen stated NPS analysis would be properly evaluated

Leading up to the MMC meeting in February 2010, Dr. Ragen promised to get an MMC-sponsored statistician to help analyze the data and statistics in the Becker paper (then called Becker 2010). He even circulated a resume of a potential candidate. At the MMC meeting in February, Dr. Ragen agreed to do an independent statistical analysis of Becker 2010, and to allow Dr. Goodman and Mr. Lunny to ask the MMC-sponsored statistician to run particular tests of the Becker models.

Just prior to the MMC panel meeting in February 2010, on February 5, Ragen wrote to Dave Weiman:

"I have told you on numerous occasions that if new information is presented in the review, I will ensure that others have sufficient time to review and evaluate it and, until everyone has done so, it will be treated with extra caution."

A brief history of the MMC analysis of the Becker paper: Ragen promised to get it reviewed by a statistician

March 2010: Dr. Ragen's commitment to get the Becker 2010 paper reviewed by a statistician was confirmed in an email from Gordon Bennett (at the time, the Sierra Club representative, and one of the two people who initially petitioned the MMC to get involved) to Dr. Ragen and some 20 other people (including the MMC panel members, NPS scientists, representatives of CDFG, CA Coastal Commission, etc.) on March 29, 2010 in which he stated:

"There seems to be a considerable amount of effort going into resolving issues with this disturbance covariant that has a de minimus correlation with seal numbers. I look forward to getting through this issue expeditiously. Meanwhile we have heard nothing about the harvest covariant that Becker 2009 and 2010 found had a significant correlation with seal numbers. We agreed at the February 21 meeting that the MMC would do an independent statistical and biological review of the underlying data and Becker's work."

To my knowledge, in 2010 and leading up to the publication of Becker et al. 2011 paper in April 2011, Dr. Ragen failed to retained a statistician as promised and failed to analyze the Becker 2010 paper.

A brief history of the MMC analysis of the Becker paper: Becker said NPS would not submit the paper, but they did

On June 28, 2010, when questioned about the disposition of the Becker 2010 paper, Dr. Ben Becker wrote to Dave Weiman:

"... no, we haven't submitted it to a journal and don't plan to until we hear back from the Marine Mammal Commission's peer review process."

In September 2010, Dr. Ragen recommended to PRNS Superintendent Cicely Muldoon that NPS not publish the Becker paper at all. Ragen later assured Mr. Lunny that NPS would not publish the flawed paper, and certainly not before the MMC report was completed.

Contrary to Ragen's recommendation, and what they had told Mr. Weiman, the NPS scientists nevertheless proceeded to submit their paper for publication a month later, in October (without telling the MMC, let alone waiting for the MMC review). The paper was accepted for publication in February and NPS still withheld knowledge of it from the MMC. It was publicly released on April 6, 2011, but not by NPS. It was first announced by Amy Trainer, Executive Director of the Environmental Action Committee of West Marin. Not only did NPS not inform the MMC about their paper, but the MMC first became aware of the paper when Weiman told Ragen on April 8.

A brief history of the MMC analysis of the Becker paper: Field Solicitor Gavin Frost did not know about the paper

The Becker 2011 paper was released to the public two weeks after the Interior Department released the Frost Report (March 22, 2011). The Frost Report concluded that these same NPS scientists – the authors of the Becker et al. 2011 paper -- were "*biased,*" had a "*troubling mind-set*," had shown a "*willingness to allow subjective beliefs and values to guide scientific conclusions*," and had violated the NPS Code of Scientific and Scholarly Conduct.

We now know, based upon a conversation with him on September 15, 2011, that DOI Field Solicitor Gavin Frost did not know about Becker 2011. He had talked to Dr. Becker and Mr. Press about the Becker 2010 paper and their presentation to the MMC panel in February 2010, but he was never given a copy of the paper that had already been submitted for publication prior to the beginning of his investigation.

A brief history of the MMC analysis of the Becker paper: Ragen's June 2011 draft MMC report accepted Becker 2011

After the Becker 2011 paper was published in April, it took until late June to convince Ragen that he should request the data and codes and properly review Becker 2011. Dr. Goodman was baffled that Ragen was not analyzing the paper. Goodman called Ragen on several occasions, asking him to review Becker 2011. On April 26 and again on May 1, Goodman wrote to Ragen, and told him that Becker 2011 was fundamentally flawed and used the wrong data and assumptions. But Ragen ignored those concerns when he wrote his draft report. None of Goodman's concerns about Becker 2011 were discussed or evaluated in Ragen's draft report in June 2011.

On June 7, Ragen presented his draft report to Lunny and Goodman. Ragen accepted the correlations in the Becker 2011 paper, but criticized the paper for claiming but having not proven causation. About Becker 2011, in his draft report shared with us on June 7, Ragen wrote:

"The results of this analysis are consistent with, and extend, the results of Becker et al. (2009)."

"... the data remain inadequate to test for a cause-and-effect relationship. In the Commission's view, the relationship depicted in Figure 2A of Becker et al. (2009) likely continues to drive the results in Becker et al. (2011), and no amount of statistical manipulation can address this limitation in the data."

A brief history of the MMC analysis of the Becker paper: Goodman asked Ragen to properly review Becker 2011

June 2011: Dr. Goodman objected that Dr. Ragen had accepted the correlation in Becker 2011 without obtaining the data and codes and properly testing it. It appeared as if Ragen did not understand Becker 2011. Becker 2011 was not based upon the correlation shown in Figure 2A in Becker 2009. It was more complicated. Goodman was not convinced that the correlations of Becker 2011 were correct. Goodman suspected that the statistics were being driven by certain years and events, but access to the NPS data and codes was required to test that hypothesis. Goodman asked Ragen to get the data. Ragen argued vigorously that Goodman was wrong (he was certain of it), that the correlation on Figure 2A in Becker 2009 drove the statistics in Becker 2011 (he was wrong), and that no objection would change that correlation. He confidently quoted Becker as having assured him that the results in Becker 2011 were rock solid even in light of Goodman's criticisms.

Dr. Goodman wrote the following note of his conversations on June 18:

"Dave and Melissa asked Tim how he could continue to let the NPS scientists off the hook without doing what he promised at the beginning, namely, getting an independent statistician and testing the NPS model by using the correct data and assumptions rather than the faulty ones they used. … Tim didn't have an answer for Dave, other than he thought if he showed them wrong, it would be too strong a political statement for him to make."

A brief history of the MMC analysis of the Becker paper: Ragen proposed that Becker review Becker 2011

June 19: Ragen finally agreed to review the Becker 2011 paper, but had not yet decided to have it truly independently reviewed. Dave Weiman wrote to Ragen:

"Your recommendation that, as a concluding step in the MMC review, a joint test of Becker's statistical model used in his 2011 published paper be undertaken is an excellent one. In the 2011 published paper, Becker claimed to have three decades of evidence showing that oyster farm activity has led to the spatial displacement of harbor seals in Drakes Estero. Let's put Becker, you, Kevin Lunny, Dr. Goodman, and others as appropriate together to test his statistical model. We assert, based on records and data, that Becker used the wrong data and assumptions, and that if the correct data are used, the correlations and NPS conclusions will not be affirmed."

Ragen talked to Becker that day and came back, having rejected Goodman's proposal of an independent review and instead accepted Becker's counter-proposal that NPS not share their data or codes, but rather that Goodman send his requests to Becker and that Becker run the tests. Ragen proposed a set of tests that he and Becker had agreed that Becker would perform (all of which would not have caused Becker's model problems – they were the wrong tests – softballs). The NPS conditions for the review were rigged – pre-select the tests, make sure Goodman is not in the room, and insist on NPS maintaining exclusive control of the data and codes. Goodman rejected Ragen's proposal, and Ragen was not pleased.

A brief history of the MMC analysis of the Becker paper: Goodman proposed and Ragen rejected open review

June 21: Goodman wrote to Ragen, rejecting his June 19 proposal and once again asking for NPS to release their data and codes:

"Thanks very much to you and Dave for proposing that MMC sponsor, and to NPS for agreeing to participate in, an independent verification and test of the statistical model in the Becker et al. 2011 (Becker 2011) paper. … As I wrote to you on April 26, 2011, there is a process that should be followed, and what you have proposed in your June 19 email does not permit independent analysis. One of the fundamental hallmarks of the scientific method, and one of the tenets and responsibilities of publishing scientific papers, is to make the materials and methods available for others to reproduce, test, and expand upon. The NPS Code of Scientific and Scholarly Conduct says it best: "fully disclose all research methods used, available data, and final reports and publications in a timely manner..." so as not to "...hinder the scientific or scholarly activities of others..."

Later that day, on June 21, Ragen rejected Goodman's proposal in a phone call with Weiman. In an email to Goodman, Weiman described the call as follows: "*As before, he firmly (almost defiantly) insisted the Becker correlation was sound.*" Ragen allowed NPS to reject the course of action laid out in MMC's own Terms of Reference in favor of a process more closed – and desirable – to NPS. Neither MMC nor Goodman would be given the opportunity to review the Becker et al. 2011 paper.

A brief history of the MMC analysis of the Becker paper: Goodman persisted -- MMC should review Becker 2011

June 22: Goodman continued to be persistent that MMC should sponsor an independent review of Becker 2011. On the morning of June 22, Goodman had a phone call with Ragen, Lunny, and Weiman. Goodman explained to Ragen why Becker 2011 was not based upon the correlation shown in Figure 2A in Becker 2009. Goodman described how the NPS scientists claimed that oyster farm activity had led to a 7% displacement of seal pups out of Drakes Estero. Goodman then asked Ragen if he could explain how NPS derived that 7% number (Becker's key conclusion -- accepted without critique in Ragen's draft report), or at least show which figures and tables led to its derivation. Ragen admitted he could not. Goodman asked Ragen how his report could comment on Becker 2011 when he did not understand how its key conclusions were derived?

After the call with Ragen, Weiman sent out a note that captured what all of us on the call perceived: "*Tim Ragen did not understand Becker 2011.*" Weiman wrote:

"Corey said, directly but politely, we don't think you fully understand the NPS-Becker claim of correlation based on his model and paper. A few questions were posed to Ragen. He was unable … to answer them about the Becker [2011] *paper. All of us came away with the sense that, indeed, Corey was right. Ragen didn't understand the paper."*

A brief history of the MMC analysis of the Becker paper: Ragen finally agreed that MMC would review Becker 2011

June 22: On the morning of June 22, Ragen heard from Goodman asking MMC to review the Becker 2011 paper. Later that day, Ragen heard from Senator Feinstein – in a letter – asking MMC to review the Becker 2011 paper. By later that afternoon, Ragen finally agreed to do what he had refused to do the day before (and for several months) – insist that NPS provide the data and codes for an independent review of Becker 2011. What happened to change his mind? We speculate that it was a confluence of events, including being reminded that he didn't fully understand Becker 2011, being reminded of his Terms of Reference (for his panel report), and having the Senator ask for a briefing concerning the paper. Over the course of five hours on June 22, Ragen switched his position and decided that he had to review Becker 2011.

Late that same afternoon (June 22), Ragen told Weiman that Becker had agreed to make the codes, data, and assumptions available. Ragen reported that he had talked to Becker, and that Becker had agreed to participate in a small technical workshop with MMC's statistician and Dr. Goodman. Such an open meeting never took place – NPS ultimately rejected any proposal of a technical workshop or public meeting.

A brief history of the MMC analysis of the Becker paper: Ragen was unsure of what he would do with the reviews

June – July: It took an additional five weeks for PRNS Superintendent Cicely Muldoon and Ragen to come to an agreement on the release of the NPS data and codes. NPS initially objected and then tried to negotiate the release of the data, when, given that the paper was published, they simply needed to release the data. Ragen finally announced his process on July 25. NPS made an incomplete release of data and codes on July 28. Once again, Goodman was persistent and data-driven. He had to make a second request for data and codes on August 1 (answered on August 3), a third request on August 5 (answered on August 10), and a fourth request on August 11 (answered on August 20). Goodman still didn't get everything he requested, but the NPS data and codes provided were sufficient to analyze Becker 2011. Goodman's report was submitted to the MMC on August 29. He had received advice and help from a Stanford statistics professor, a U.C. Davis statistics professor, and David Lewis, the director of U.C. Cooperative Extension Marin County.

August: Goodman asked Ragen repeatedly during the month of August what the MMC process would be once the reviews were submitted. Ragen had no answer. Goodman requested to discuss the paper with Dr. Harwood (the MMC consultant), but Ragen turned him down. Ragen knew from his discussions with Muldoon in July that NPS would be reluctant to participate in a meeting. Ragen told Goodman he was not sure what he would do.

A brief history of the MMC analysis of the Becker paper: Ragen defined an MMC process, but NPS rejected it

August 29: Ragen informed us of the MMC review plan – an excellent one.

Step one. MMC would give all reviewers 48 hours to respond to the other reviews.

Step two. MMC would give NPS 48 hours to provide a written response.

Step three. MMC would hold a meeting to bring all of us together within a few weeks for a public meeting.

Ragen's proposal was almost identical to what the MMC did in February 2010, with two distinctions. The first, in addition to the parties who participated in February 2010, Ragen would invite the statisticians who reviewed or advised in the data analysis. Second, unlike the first meeting, the public would be invited to observe, but not participate (in February 2010, Ragen allowed public participation in the meeting itself, but given the technical discussions, he thought it would not be useful this time).

Ragen should have announced his plan to all parties and implemented it, but instead he went to the NPS for their approval, and NPS rejected his proposal (as predicted from his conversations with PRNS Superintendent Muldoon in July). In our opinion, it seemed clear that NPS would reject the proposed MMC review process if given the opportunity. We believed that NPS should not have been given the choice.

A brief history of the MMC analysis of the Becker paper: Open process rejected, MMC went with closed process

A few days later, on September 1, in conversations with Goodman, and separately with Weiman, Ragen proposed a closed-door, statisticians-only meeting, and then insisted that Goodman not participate because he was not a statistician. Ragen got upset when he learned that Goodman had done all of the statistical analysis himself. Goodman told Ragen that three other scientists had given him advice, but that he did the analysis, and was prepared to discuss and defend it. Another justification was offered. Goodman was also to be excluded for cause – Ragen told Goodman he was disruptive. It appeared to us as if NPS could not tolerate an open process that included Goodman. Ragen apparently was pressured by NPS and their supporters to exclude Goodman from the review process (he gave us reason to believe this).

Having proposed an open process involving open dialogue and exchange with all parties on August 30 – a process that NPS soundly rejected – Ragen instead turned to a closed process in which he communicated with Becker and excluded Goodman & Lewis (the Marin County scientific representative), even when Goodman & Lewis reached out to him. Becker was allowed to rebut Goodman's analysis with a bait & switch in which he did not do what Ragen believed he had done. Goodman and Lewis were given no opportunity to respond and challenge Becker's analysis.

Evaluation of the MMC review of the NPS Becker 2011 paper: emails and notes supporting timeline

MARINE MAMMAL COMMISSION

review of NPS Becker, Press, and Allen 2011 paper

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

by Dr. Corey Goodman
November 22, 2011

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 1

1. April: Becker et al. 2011 paper published; disclosed by EAC not NPS
2. June: draft MMC report – Becker 2011 correlation same as Becker 2009
3. June: MMC told correlations in Becker 2011 different from Becker 2009; MMC asked to conduct independent review of Becker 2011
4. July 28: MMC initiated review of Becker 2011 & established open process
5. July 28 - August: Becker provided data to replicate & test Becker 2011
6. August: Goodman, Harwood, & Richard given two weeks to submit reviews
7. Aug 29: Reviews of Becker 2011 submitted to MMC
8. Aug 30: NPS rejected MMC open transparent process including responses to reviews within 48 hours and participation in public meeting
9. Aug 31: MMC proposed private meeting that excluded Goodman; said Goodman & Harwood analyses were "*nail in the coffin*" of Becker 2011
10. Sept 1: Ragen unsure how MMC would proceed
11. Sept 1: Ragen prohibited Goodman from talking with Harwood
12. Sept 1: Ragen agreed to provide all responses, comments, and questions with Goodman and to consult with Lewis as well as Goodman

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 2

13. Sept 2: Harwood submitted response to Goodman's analysis to Ragen that Ragen withheld until November 4
14. Sept 8: MMC process announced; MMC to consult with all parties
15. Sept – Nov: Ragen did not consult Goodman, Lewis, or Lunny
16. Sept – November: Ragen had extensive conversations with Becker
17. Sept 9: Goodman alerted Ragen that in Becker's response to MMC on June 16, Becker had changed a variable compared to Becker 2011; Goodman cautioned Ragen that if he asked Becker to run further analysis, he should "*look at all of the numbers carefully*." This was good advice, since Becker's November 7 analysis did not replicate Becker 2011.
18. Sept 12: Ragen talked with Lewis but did not ask any questions
19. Sept 12: Goodman asked Ragen if he had received any comments
20. Sept 12: Lunny submitted 7 questions for Becker via Ragen; Ragen waited until Nov 17 and cited why he did not ask many of the questions
21. Sept 15: Bennett and Richard submit criticisms of Goodman's analysis to Ragen

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 3

22. Sept 16: Ragen answered Goodman's September 12th note and said he had no questions for Goodman without acknowledging either Harwood's or Bennett's/Richard's comments on Goodman's analysis
23. Sept 22: EAC announced that Richard had submitted critique of Goodman to MMC; MMC did not provide critique to Goodman, or tell him
24. Oct 6: Goodman visited Ragen in his office, asked if he had any questions or received criticisms or comments, and Ragen answered no.
25. Oct 7: Ragen sent Richard's critique sent to Goodman; amongst other comments, Richard criticized Goodman's choice of statistical method
26. Oct 23: Goodman & Lewis submitted to MMC head-to-head analysis using both methods (i.e., Becker's and Goodman's) with same conclusion
27. Oct 24, November 1: Lewis emailed Ragen, offered to discuss analysis; Ragen never engaged Lewis – never asked for his statistical help even though Ragen knew Lewis had replicated Goodman's analysis at the request of Marin County Supervisor Kinsey – using Becker's method
28. Oct - Nov: Ragen never questioned Goodman or Lewis about Goodman's analysis, Harwood's comments, or Becker's response

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 4

29. Nov 1: Ragen told Weiman he was finishing up report, hoped to distribute to advisors on November 6
30. Nov 4: Ragen distributed Harwood's September 2 response
31. Nov 5: Ragen asked Goodman for detailed results of each model (provided to Ragen on September 9, but nevertheless provided again)
32. Nov 6: Goodman & Lewis responded to Harwood's comments, providing head-to-head comparisons using both statistical methods, and showed Becker's models were statistically leveraged by 2003 alone
33. Nov 7: Becker analysis to Ragen dated 11/7; not forwarded to us
34. Nov 8: Ragen told Weiman he was finally finishing report, yet he had not shared any of Becker's analysis with Goodman, Lewis, or Lunny
35. Nov 17: Ragen provided Becker's November 7 analysis, and Ragen gave his response to Lunny's September 12 questions intended for Becker (although evidently not sent to Becker). Clearly Ragen already knew the conclusions of Becker's analysis, since on November 1, he told Weiman he was about to finish his report and distribute it to his advisors on November 6, whereas the copy of Becker's analysis provided to us was dated Nov 7.

Timeline of Becker's response to Goodman & Lewis analysis of Becker 2011 paper: Part 5

36. Nov 17: Ragen apparently knew about Becker's analysis and had not shared it. For how long had Ragen known? How many iterations? What communication? Where, for example, is the communication in which Ragen wrote, in response to question #5 concerning the proportion of pups at Double Point, that "*the Park Service didn't run the … model because they didn't feel it made biological sense …*" Why did NPS get the right to reject this question? Why was none of this shared with Goodman & Lewis?
37. Nov 22: Ragen released MMC report influenced by Becker's Nov 7 analysis with no opportunity for Goodman & Lewis to respond

Having proposed an open process involving open dialogue and exchange with all parties on August 30 – a process that NPS soundly rejected – Ragen instead turned to a closed process in which he communicated with Becker and excluded Goodman & Lewis, even when Goodman & Lewis reached out to him. Becker was allowed to rebut Goodman's analysis with a bait & switch in which he did not do what Ragen believed he had done. Goodman and Lewis were given no opportunity to respond and challenge Becker's analysis. The MMC was influenced by Becker's faulty analysis with no open discussion.

July 28: Ragen described the MMC process

From: Tim Ragen [mailto:tragen@mmc.gov]
Sent: Thursday, July 28, 2011 11:45 PM
To: Ben Becker; Cicely Muldoon; Corey Goodman; Dave Press; David Weiman; Gordon Bennett; John Harwood; Kevin Lunny; Neal Desai; Sarah Allen
Subject: Review of Becker et al. (2011), email 1 of 4

Dear All,

1) **In the next three emails, please find attached the data and programs that you need to evaluate/reconstruct all the analyses in the Becker et al. (2011) paper, as well as the paper and its precursor, Becker et al. (2009).**

2) **Because the review is focused on the statistical methods used in Becker et al. (2011), the question that I request you address is whether the statistical analyses used in the paper are reasonable given the nature of the questions asked and the data available.**

3) **If you have a question about the material or believe that you might need some additional information, please let me know and I will contact Ben for that information. I will ask him to send it to me and I will distribute it to all parties. If we encounter a delay in getting you that information, we may extend the review period if that is necessary. I don't want to extend the review period, but recognize that you should not lose time during the review because you are waiting for information from me.**

4) **I would like these to be independent reviews, so please do not contact the other parties to discuss your reviews and findings.**

5) **Please complete your reviews and send them to me by Aug 19. You may send me questions or requests for additional information at any time during that period and I will immediately pass them to Ben.**

6) **I will distribute all three reviews to all three parties after I receive them all.**

7) **Based on the reviews, I will make a determination as to whether the Commission needs any additional information/discussion to complete its report. Depending on the outcome of that determination, I may request a teleconference or meeting to discuss the reviews.**

Please contact me if you have any questions.

August 29: Ragen planned to send out next steps next day

From: Tim Ragen
Subject: **next steps 2**
Date: August 29, 2011 4:37:24 PM PDT
To: Ben Becker , Cicely Muldoon , Corey Goodman , Dave Press <dave_press@nps.gov> , David Weiman Gordon Bennett , John Harwood Kevin Lunny , Neal Desai <Neal.Desai.npca@gmail.com> Sarah Allen

Hi All,

Thanks, All, for getting me your analyses. I will send you a plan for our next steps tomorrow morning. Best, Tim

---

Timothy J. Ragen, Ph.D.
Executive Director
U.S. Marine Mammal Commission
4340 East-West Highway, Room 700
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301.504.0101 (direct)
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tragen@mmc.gov (email)
http://www.mmc.gov (web)

August 30: Report on Ragen's plan on afternoon August 29

From: David Weiman <agresources@erols.com>
Date: August 30, 2011 5:53:08 AM PDT
To: "Goodman Ph. D., Corey S." <corey.goodman@me.com>, "Lunny, Kevin" <kevin@drakesbayoyster.com>, "Lunny, Nancy" <nancy@drakesbayoyster.com>
Cc: "Cichantek, Melissa" <melissa.cichantek@gmail.com>
Subject: Notes from Call with TR

All.

Yesterday, called Tim to "confirm" that Corey's analysis package was indeed, received (due diligence that we complied with MMC deadlines).

It was maybe 30 minutes after CSG hit "enter" and sent the material. TR had to check and indeed, it had been received.

Asked TR, what happens next? And, per our discussions last Friday, had he heard from DF's office.

TR:

* Had talked to DF's office (either Watts or Banks)
* Between them, developed a short-term plan.
* DF's office sent a letter urging a "public meeting" of the MMC to review the Becker Report.
* In immediate short term, assume all parties to be provided copies of three reviews (Gordon/Richard, MMC's guy in Scotland, and CSG).
* NPS to be asked to respond within 48 hours.
* Tim to ask parties for a "date" to meet and discuss.

In sum, the focus is on the NPS and their conduct and actions, NOT DBOC. And, most significantly, the focus is exclusively on NPS science and the Becker report.

TR advises that he will circulate a plan and timetable this am.

August 30: Report on NPS rejection of Ragen's process

From: David Weiman
Subject: TR
Date: August 30, 2011 2:46:42 PM PDT
To: Goodman Ph. D., Corey S. <corey.goodman@me.com>, Kevin Lunny, Nancy Lunny
Cc: Melissa Cichantek

NPS rejected MMC request to respond to Goodman's analysis. NPS rejected MMC request to participate in public meeting.

All.

Major developments.

(1) NPS will not agree to review and comment on the three analyses – Goodman, Hackwood and Bennett.

(2) NPS will not agree to a meeting.

(3) NPS recommends that Commission review materials, publish report.

(4) NPS recommends new version of report be circulated for review and comment.

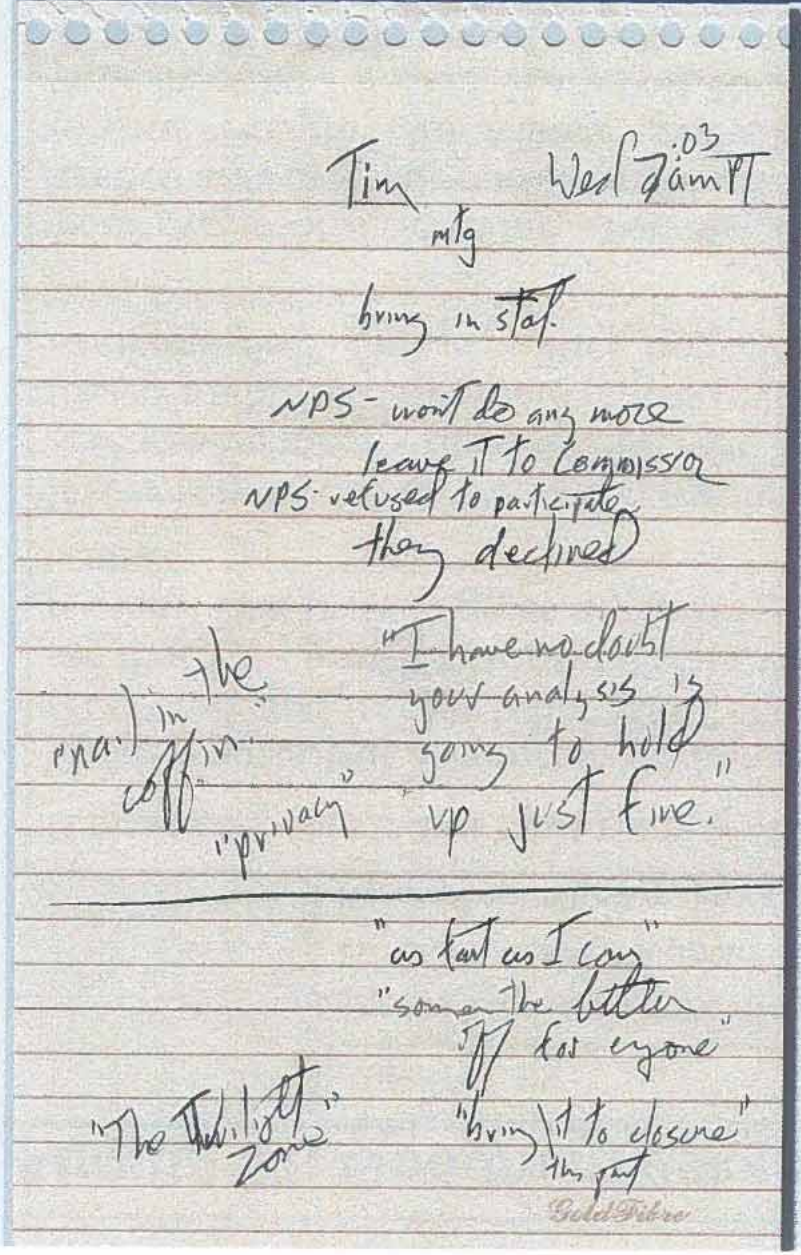
(5) Remarkably, Gordon and Neal have same recommendations.

Tim sounds weary. Overwhelmed. Does not have a plan. Not sure what to do next.

Said we shall talk again tomorrow.

We all smelled this one.

August 31: Ragen told Goodman reports "*nail in the coffin*"



On Wednesday August 31, Goodman and Ragen talked. Goodman's notes from that conversation are shown to the left. Ragen said "*NPS won't do any more, leave it to Commission; NPS refused to participate; they declined.*" He described his Tuesday August 30 discussions with NPS as reminiscent of "*The Twilight Zone.*" Ragen said that the Goodman and Harwood reports were the "*nail in the coffin*" for the Becker 2011 paper. Ragen stated: "*I have no doubt your analysis is going to hold up just fine.*" He said his plans were to get his report done "*as fast as I can – the sooner the better off for everyone – bring this part to closure.*" Unfortunately, within a few days, Ragen – having had his open process rejected by NPS – switched to a closed process with no public meeting, no open discussion, no open exchange, and no open dialogue. In doing so, he violated MMC policy.

August 31: Goodman asked Ragen why he was now excluded

August 31, 2011

To: Dr. Tim Ragen, Executive Director, Marine Mammal Commission

From: Dr. Corey Goodman

Re: analysis of Becker, Press, and Allen 2011

Whose idea was it that I not participate?

Three reports, but one author excluded – the only one who actually did what you requested, and frankly what MMC should have done from the outset. In fact, you tell me that I am prevented from discussing the science with Dr. Harwood until the process is over. This truly boggles my mind – refusing to allow two scientists discuss the science.

It seems from our conversation earlier today that MMC deems a National Academy of Sciences member – the only one who has critically analyzed and tested Becker 2011 -- unacceptable to participate in this review. Is this your proposal, or does it come from someone else? This is politics, not science. NPS and their supporters are manipulating your process.

Your proposal is troubling. You are setting a chilling precedent in letting a federal agency and their supporters manipulate your review of their science. My advice: return to your strength – the science. Invite the scientists from all four parties to participate in your meeting – Becker, Harwood, Richard, and Goodman. If NPS refuses to participate, as they apparently already have, then make that publicly known. That is their choice. Your goal should not be to please them, but to conduct a proper scientific review, as they initially asked you to do, and you accepted.

Sept 2: Harwood sent comments to Ragen, not shared

From: John Harwood [mailto:jh17@st-andrews.ac.uk]
Sent: Friday, September 02, 2011 11:46 AM
To: Tim Ragen
Subject: RE: Becker 2011

Not shared with Goodman until November 4 even though Goodman asked Ragen specifically if issues had arisen from others on September 12 and Ragen misled Goodman with his answer that he had no questions

Tim

Sorry you couldn't contact me when you phoned earlier. I'll be
time, but then I'll be driving to Edinburgh and will be uncontac
your time (when I'll be in a concert!). Apologies if none of those

In case we can't get in touch, here are my thoughts on the possible next steps:

1. Dr Richard's review focuses on the statistical methods used by Becker et al (GLMMs etc). He concludes, correctly in my opinion, that these are appropriate for the kinds of data used in the analyses and that they appear to have been implemented correctly. He does not consider the appropriateness of any of the response variables and covariates used in the analyses.

2. Dr Goodman and I agree that there are problems with the covariates used in the regional level analyses of Becker et al., in particular the way in which changes at Double Point are accounted for and the inclusion of survey results from 1982 and 1983. Dr Goodman has rerun these analyses using different covariates and a different analytical approach (simple multiple regression, as far as I can tell). He also provides more detailed information about the impact of the "rogue" elephant seal at Double Point in 2003, which suggest that its impact was greater than described in Becker et al (they simply describe it as "aggressive", not lethal!), and compelling arguments why the data points from 1982 and 1983 are not strictly comparable with those in the rest of the time series.

3. I think the statistical approach adopted by Becker et al is more robust than that used by Dr Goodman, so I suggest you ask Tim to rerun his regional level analyses for pups (as I have pointed out, I don't think the total count data are independently informative) using either the covariates proposed by me or those proposed by Dr Goodman, with and without the 1982 and 1983 values. If, as I suspect, this confirms Dr Goodman results, then I think the only valid conclusion is that there is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture.

4. Dr Goodman is also unimpressed by the results of the intra-colony analysis, mainly because he does not think oyster harvest is a good proxy for disturbance associated with the operation of the oyster farm. I'm not qualified to comment on this, but the magnitude of the effect documented by Becker et al is small and I think even this is an over-estimate. It's hard to see how it would have any measurable effect on the viability of the Drakes Estero colony.

I hope that helps a bit

Professor John Harwood
Sea Mammal Research Unit (see http://www.smru.st-and.ac.uk)
and Centre for Ecological and Environmental Modelling (see http:/
Scottish Oceans Institute
University of St Andrews, St Andrews, Fife KY16 8LB, Scotland.

Sept 9: Goodman cautioned Ragen about Becker analysis

From: Corey Goodman
Subject: **my analyses, data, and a comment on Becker's June 16 response to your request**
Date: September 9, 2011 9:12:12 AM PDT
To: Tim Ragen
Cc: David Weiman , Melissa Cichantek , Kevin Lunny
3 Attachments, 2.0 MB Save Quick Look

Tim,

I include three item here for your inspection.

(1) Included here is a folder with all of the regression analyses I ran to help in your review. I wanted you to have all of the data and analyses I used.

(2) Included here is a new page 56 (the analysis of subsite OB) simply without the text box so that you can see all of the numbers and analyses. Again, I wanted you to have all of the data and analyses I used.

(3) Included here is a 3 page PDF plus what is written below on the analysis Dr. Ben Becker ran at your request on June 16. I did this inspection of his analysis many weeks ago, and was wondering if you or any of the other statisticians picked up on it. It is a tip off as to the better models and the importance of the movement of pups away from Double Point in 2003 and 2004. Becker's answer to your request contained a key tip as to the superior models, and the important independent variables (i.e., those involving Double Point run as either counts or proportions).

You asked him to run OYST Hi/Low and to switch 2005 from "Hi" to "Low." He did not do that in its simplest form. Rather than running OYST Hi/Low as a single independent variable, he ran it as part of a multi-variate model (OYST Hi/Low + DP + A) and ran that with the 2005 switch. But he actually did not do it as he had done in Table 3.

In summary, there are three conclusions from this inspection of what Dr. Becker sent you on June 16.

First, Becker did not run the analysis you requested. He ran a different model than what was used in his paper.

Second, both on June 16 and in his paper, he ran models using an independent variable (here pups at subsite A, in the paper proportion of pups at A - - again, he switched variables) that had no significance and actually decreased overall significance of the model.

Third, by running Double Point pups instead of Double Point seals (on June 16 as compared to Table 3 in his paper), Becker produced the basis for a model which was actually superior to his paper's best model, and showed the significance of Double Point pups. From what Becker sent you on June 16, we can construct a model that is superior to the best model from Becker 2011.

Given that we are comparing analyses with different numbers of years, and different numbers of independent variables, I would encourage you to request that any test results be given to you as an adjusted R squared and not just R squared.

My major request to you from this inspection of Becker's June 16 run for you is that, if you ask Dr. Becker to run further analyses, please pay particular attention to the details, make sure he has done what you requested, and look at all of the numbers carefully. There were some interesting results hidden in his analysis of June 16.

I hope these comments are helpful. Please don't hesitate to turn to me with any questions or if you would like additional tests run. As you know, I did more analyses than I put in my report, but tried to focus my report on the key results and tests.

September 12: Lunny sent Ragen questions for Becker

From: Kevin Lunny [mailto:kevin@drakesbayoyster.com]
Sent: Monday, September 12, 2011 1:45 PM
To: 'Ragen, Tim '
Cc: Weiman, David; Melissa Cichantek; Lunny, Nancy
Subject: Becker 2011

Dear Dr. Ragen,

On Tuesday, 8/31/11, I sent Superintendent Muldoon an email after you told us that NPS informed the MMC that NPS would not provide a review of Dr. Goodman's analysis of NPS-Becker 2011 and further, would not participate in a MMC meeting to review the statistical analysis asking if this was true.

A day later, on Wednesday, I received a reply in which Muldoon said, ***"The NPS is looking at all three of the reviews of the statistical analysis that Tim sent to the group yesterday, as I expect all parties involved are. Just as he did during the review period, Ben (Becker) will continue to answer any remaining questions about the analysis that Tim asks as he works towards finalizing the Commission's report."***

Notwithstanding the challenges before all involved, I am encouraged that Muldoon is reassuring us that ***"Dr. Becker will continue to answer all additional questions..."*** asked by you. We ask that the MMC please submit the following questions pertaining to NPS-Becker 2011 to Dr. Becker:

NPS refused MMC's request to respond to Goodman's analysis on 8/30. Lunny asked Muldoon to respond on 8/31. She refused and said NPS would only respond to questions from Ragen. Lunny sent questions to Ragen on 9/12. He received response on 11/17.

Ragen did not respond until Nov 17, and then he indicated that he either did not ask, or NPS found inappropriate, many of Lunny's questions (a discussion that was exclusive between MMC and NPS and excluded us).

Sept 12: Goodman asked Ragen if any issues had arisen

From: Corey Goodman
Subject: **questions or errors?**
Date: September 12, 2011 10:43:55 AM PDT
To: Tim Ragen

Two weeks had been given for the initial reviews. Two weeks later, Ragen was asked if he received comments or criticisms of those reviews.

Hi Tim,

Its been two weeks since I submitted my analysis of Becker 2011 to you and it was forwarded to Dr. Harwood, Dr. Richard, and Dr. Becker. Have you, Dr. Harwood, or anyone else found any errors with my report, or require any clarification or additional analysis? Have any substantive issues for disagreement with the report emerged?

Thanks. I look forward to hearing from you.

Best,

Corey

Ragen responded four days later (see next page) saying he had no questions. Ragen never consulted with Goodman. Ragen never asked Goodman to run further analyses. Ragen never consulted with Goodman's collaborator, David Lewis. Ragen did not provide any questions or responses to Goodman's Aug 29 analysis until Nov 4 when he provided Harwood's Sept 2 comments, and on Nov 17 (on the eve of the release of the MMC report) when he provided Becker's Nov 7 response. If there is any statistical analysis other than Becker's Nov 7 response, it was not provided or discussed with Goodman or Lewis.

Sept 15: Bennett sent Ragen critique of Goodman's analysis

From: [redacted]
Sent: Thursday, September 15, 2011 2:50 PM
To: Tim Ragen
Cc: neal.desai.npca@gmail.com
Subject: Analyses of analyses of Becker's analysis

Not shared with Goodman until November 1; another version shared on October 7, over three weeks after initial critique submitted

Dr Ragen:: Save Our Seashore received the MMC requested reviews of Becker 2011 and we believed it appropriate to respond to both Dr. Harwood's and Dr. Goodman's analyses of Becker 2011, thus...

Attachment #1 is the review by SOS and Dr. Richard of the comments by Dr. Harwood, who we generally agree with....the significant exception being his statement about 1982/3 data; we have provided information that we believe supports our response.

Attachment # 2 is our review of the comments by Dr. Goodman, whose faulty analysis of unverifiable data and clearly incorrect data we strongly disagree with. Attachment #3 is the Exhibit to this Review.

Attachment #4 is Dr. Richard's technical review of Dr. Goodman's statistical methods, which Dr. Richard finds fundamentally flawed because Dr. Goodman's "best" models depend on his introducing a dependent variable as a covariant (thus making them meaningless tautologies) and use a simplistic R-squared analysis (vs AIC). Dr. Richard also contests the statistical basis for Dr. Goodman's claim that oyster harvest does not affect seal distribution and demonstrates that Dr. Goodman's claim about acreage mis-measurements actually supports Becker, not DBOC.

Gordon Bennett, Save Our Seashore

Sept 16: Ragen responded to Goodman with no comments

From: Tim Ragen
Subject: **RE: questions or errors?**
Date: September 16, 2011 9:22:40 AM PDT
To: Corey Goodman

Corey, sorry to be slow responding. I don't have any questions at this time, but will contact you if I do have any. Thanks, Tim

---

Tim Ragen, Executive Director, U.S. Marine Mammal Commission
4340 East-West Highway, Room 700, Bethesda, MD 20814
Tel: 301.504.0101 Mobile: 301.233.9179 Email: tragen@mmc.gov

Ragen misled Goodman in his answer. He had comments on Goodman's analysis from Harwood and Bennett/ Richard, but refused to share them.

On September 16, in response to Goodman's request as to whether Harwood or anyone else had found errors, or had any substantive issues of disagreement with Goodman's analysis, or issues requiring further analysis, Ragen responded "*I don't have any questions at this time.*" Ragen never raised any issues with either Goodman or Lewis during the months of September and October. However, on September 16, Ragen already had Harwood's September 2 comments (provided on November 4), and had Bennett's and Richard's September 15 criticisms (provided on November 1). In contrast to his promise of an open process, Ragen failed to distribute these comments to Goodman in September and October. His process was anything but open.

Sept 15: Senate Commerce Subcommittee on Appropriations

Calendar No. 170

112TH CONGRESS *1st Session* | SENATE | REPORT 112–78

DEPARTMENTS OF COMMERCE AND JUSTICE, AND SCIENCE, AND RELATED AGENCIES APPROPRIATIONS BILL, 2012

Independent Report.—The Committee appreciates the Marine Mammal Commission's willingness to assess the 2011 statistical analysis prepared by the National Park Service [NPS] regarding the potential displacement of breeding and pupping harbor seals by shellfish aquaculture at Point Reyes National Seashore. As part of this on-going review, the Committee urges the Commission to thoroughly examine the reviews and analyses prepared by other statisticians on the NPS study to ensure a comprehensive assessment of all viewpoints. This should include a response to criticisms that the study: (1) should not have used data points for 1982–1983; (2) did not account fully for the impact of an aggressive elephant seal in the Double Point area on 2003 and 2004 harbor seal populations in Drake's Estero; and (3) did not accurately interpret aerial photographs and public health records when converting oyster harvest records to high/low values for further analysis. It also should include an analysis of the study's statistical significance if the 1982–1983 and/or 2003–2004 data are removed.

NPS Becker did not test the Becker 2011 statistical analysis; he changed parameters. Becker did not account fully for the impact of the aggressive elephant seal at Double Point; his analysis was flawed. Becker did not include analysis of the Becker 2011 models if 2003-2004 data are removed; MMC Ragen excused Becker from doing that test because he said there was no legitimate reason to do it. Thus Becker did not do what the Subcommittee directed.

Oct 24 & Nov 1: Lewis offered to discuss analysis with Ragen

From: David Lewis
Subject: **RE: response to Dr. Richard's rebuttal of Dr. Goodman's analysis of NPS Becker 2011 paper**
Date: November 1, 2011 7:17:07 AM PDT
To: Tim Ragen , Corey Goodman
Cc: David Weiman , Melissa Cichantek , Kevin Lunny

I am in the office all day today. It would be beneficial to discuss the science and statistic issues and questions you and the MMC may have.

From: Tim Ragen [tragen@mmc.gov]
Sent: Monday, October 24, 2011 3:43 PM
To: David Lewis; Corey Goodman
Cc: David Weiman; Melissa Cichantek; Kevin Lunny
Subject: RE: response to Dr. Richard's rebuttal of Dr. Goodman's analysis of NPS Becker 2011 paper

Thanks, David – I'll wait until you return. Best, Tim

Tim Ragen, Executive Director, U.S. Marine Mammal Commission
4340 East-West Highway, Room 700, Bethesda, MD 20814
Tel: 301.504.0101 Mobile: 301.233.9179 Email: tragen@mmc.gov

From: David Lewis [mailto:djllewis@ucdavis.edu]
Sent: Monday, October 24, 2011 8:36 AM
To: Corey Goodman; Tim Ragen
Cc: David Weiman; Melissa Cichantek; Kevin Lunny
Subject: Re: response to Dr. Richard's rebuttal of Dr. Goodman's analysis of NPS Becker 2011 paper

Tim,

I am traveling this week but can make time to talk between 11:00 am and 2:00 pm PST.

Thank you,

David Lewis

Lewis offered to discuss the statistical analysis with Ragen on October 24. He then offered again on November 1. Ragen never responded to his second offer. Ragen never contacted Lewis to discuss the statistical analysis.

November 4: Ragen shared Harwood's Sept 2 comments

From: Tim Ragen [mailto:tragen@mmc.gov]
Sent: Friday, November 04, 2011 12:40 PM
To: David Weiman
Subject: FW: Becker 2011

Shared two months & two days after it was sent to Ragen, and just weeks before the MMC report was released.

David, - this is another email that I couldn't find in my sent files. If I haven't sent, you should have it. Tim

---

Tim Ragen, Executive Director, U.S. Marine Mammal Commission
4340 East-West Highway, Room 700, Bethesda MD 20814 U.S.A.
Tel: 301.504.0101, Cell: 301.233.9179, Email: tragen@mmc.gov

What else was not shared with us? What other communications with NPS were withheld?

From: John Harwood [mailto:jh17@st-andrews.ac.uk]
Sent: Friday, September 02, 2011 11:46 AM
To: Tim Ragen
Subject: RE: Becker 2011

Goodman & Lewis responded to Harwood's comments on Nov 6, within two days of receiving them – two months & two days after he sent them.

Tim

Sorry you couldn't contact me when you phoned earlier. I'll be at the same number (+44 (0) 787 241 5064) until 12:30 your time, but then I'll be driving to Edinburgh and will be uncontactable until about 13:30 your time. After that, I'm free until 14:30, your time (when I'll be in a concert!). Apologies if none of those time are convenient.

In case we can't get in touch, here are my thoughts on the possible next steps:

November 4: Ragen shared Harwood's Sept 2 comments

2. Dr Goodman and I agree that there are problems with the covariates used in the regional level analyses of Becker et al., in particular the way in which changes at Double Point are accounted for and the inclusion of survey results from 1982 and 1983. Dr Goodman has rerun these analyses using different covariates and a different analytical approach (simple multiple regression, as far as I can tell). He also provides more detailed information about the impact of the "rogue" elephant seal at Double Point in 2003, which suggest that its impact was greater than described in Becker et al (they simply describe it as "aggressive", not lethal!), and compelling arguments why the data points from 1982 and 1983 are not strictly comparable with those in the rest of the time series.

See Nov 6 response by Goodman & Lewis

3. I think the statistical approach adopted by Becker et al is more robust than that used by Dr Goodman, so I suggest you ask Tim to rerun his regional level analyses for pups (as I have pointed out, I don't think the total count data are independently informative) using either the covariates proposed by me or those proposed by Dr Goodman, with and without the 1982 and 1983 values. If, as I suspect, this confirms Dr Goodman results, then I think the only valid conclusion is that there is no evidence for long-term displacement of seals from Drakes Estero that can be related to shellfish aquaculture.

4. Dr Goodman is also unimpressed by the results of the intra-colony analysis, mainly because he does not think oyster harvest is a good proxy for disturbance associated with the operation of the oyster farm. I'm not qualified to comment on this, but the magnitude of the effect documented by Becker et al is small and I think even this is an over-estimate. It's hard to see how it would have any measurable effect on the viability of the Drakes Estero colony.

I hope that helps a bit

all the best

J

Professor John Harwood
Sea Mammal Research Unit (see http://www.smru.st-and.ac.uk)
and Centre for Ecological and Environmental Modelling (see http://
Scottish Oceans Institute
University of St Andrews, St Andrews, Fife KY16 8LB, Scotland.

Nov. 17: Ragen responded to Lunny's Sept 12 questions

From: Tim Ragen <tragen@mmc.gov>
Date: November 17, 2011 3:13:32 PM PST
To: Kevin Lunny <kevin@drakesbayoyster.com>
Cc: David Weiman <agresources@erols.com>, Melissa Cichantek <[redacted]>, Nancy Lunny <nancy@drakesbayoyster.com>
Subject: FW: Becker 2011

Goodman was initially given 2 weeks to review Becker 2011. Becker was given 2 months and 9 days to respond, and he did so on the eve of release of the MMC report.

Kevin et al.,

I've inserted responses to your questions below and attached documents showing the results from analyses I requested from the Park Service.

Goodman & Lewis were never given an opportunity to respond to Becker's bait and switch analysis. The MMC report was already written and on the eve of release.

Tim

On September 12, Lunny sent Ragen a set of seven questions and asked Ragen to forward them to Becker, since NPS had refused to accept questions directly from Lunny. Ragen did not respond until November 17, and then he indicated that he either did not ask, or NPS found inappropriate, many of Lunny's questions (a discussion that was exclusive between MMC and NPS and excluded Goodman and Lewis).

Nov. 17: Ragen responded to Lunny's Sept 12 questions

From: Tim Ragen <tragen@mmc.gov>
Date: November 17, 2011 3:13:32 PM PST
To: Kevin Lunny <kevin@drakesbayoyster.com>
Cc: David Weiman <agresources@erols.com>, Melissa Cichantek <[redacted]>, Nancy Lunny <nancy@drakesbayoyster.com>
Subject: FW: Becker 2011

Here is an example of Ragen's 11/17 response to Lunny's 9/12 questions (full text available). Ragen got it wrong.

(6) Would you please replicate Dr. Goodman's top six models and let us know if you agree or disagree that they are far superior to your best model in terms of both the adjusted R squared and the P-value. In light of Dr. Goodman's and Dr. Harwood's reports, please provide us with a corrected ranking of best models.

I have asked the Park Service to replicate Dr. Goodman's top six models and they have done so. I do not believe it is appropriate to ask the Park Service to form a conclusion until they have seen the results of the Commission's analysis.

Ragen wrote: *"I have asked the Park Service to replicate Dr. Goodman's top six models and they have done so."* Perhaps they told Ragen they had done so. Perhaps Ragen believed they had done so. But they had not. In Becker's 11/7/11 analysis, he did not correctly represent a single one of Goodman's covariates or models, and his tests switched the dependent variable from Becker 2011. It was a bait and switch. But Ragen accepted it, without discussing it with either Goodman or Lewis.

Analysis of Becker, Press, and Allen 2011
Part 2: Maps, Claims, and Inferences

Corey S. Goodman, PhD

Analysis of Becker et al. 2011: conclusions part 2

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

1. Annual oyster harvest is not surrogate for UEN/OB pupping season

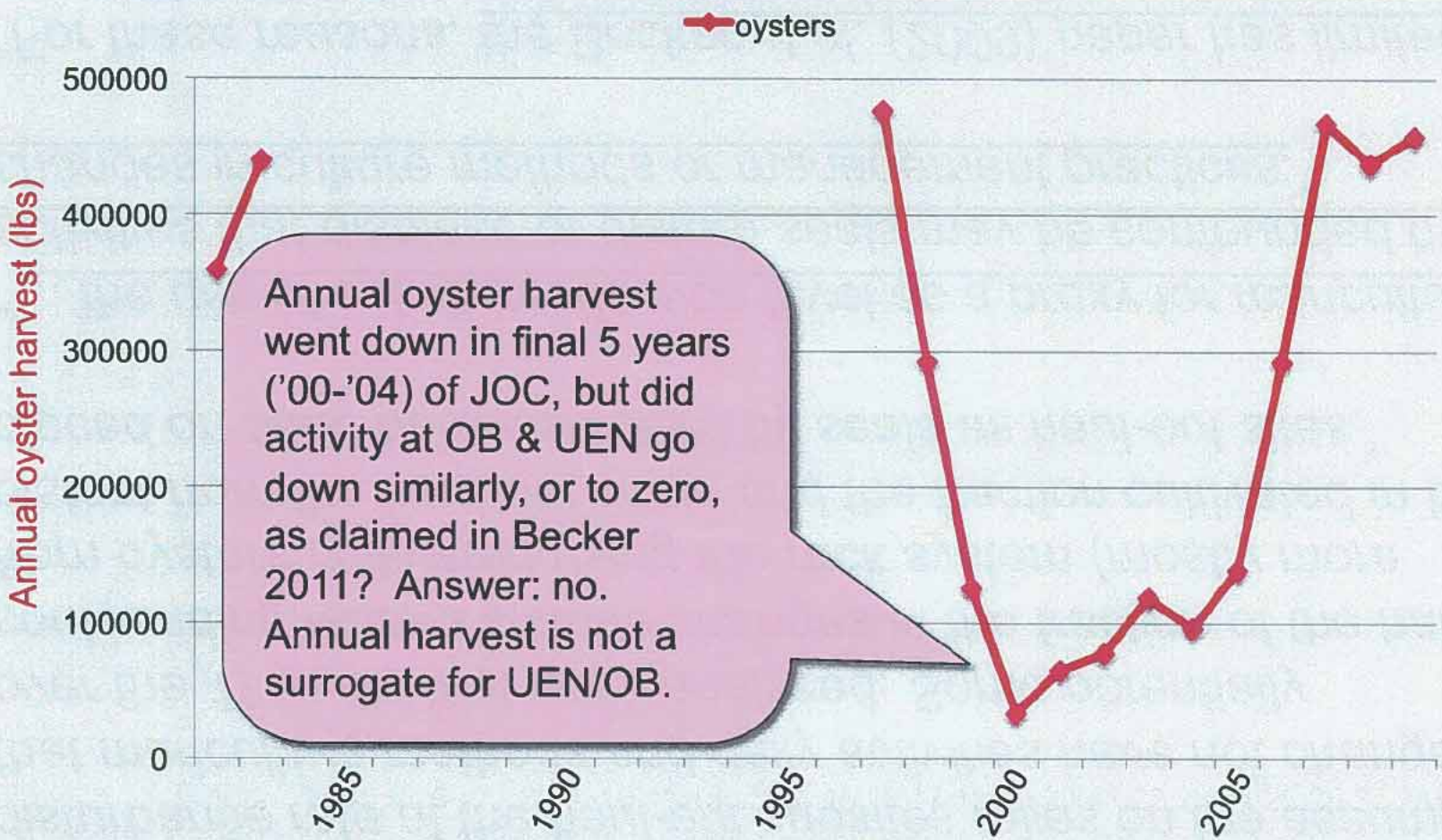
2. Seal haul-out map is misleading: seals and oysters do not overlap

3. Claims and maps of oyster bags in pupping areas are incorrect

4. Claims of zero oyster bags at OB/UEN from 2000-2004 are incorrect
   CDPH records show JOC continued to harvest from UEN & OB

5. Inferences that drove OYST Hi/Low categorical model are incorrect
   NPS did not provide conclusive data to support major model in paper

Is annual oyster harvest a surrogate for oyster activity at OB/UEN during pupping season? A: No



annual oyster harvest

Quotes from NAS/NRC panel report, May 5, 2009

"More generally, the use of annual oyster harvest as a proxy for disturbance rate at the haul-out subsites relies on the assumption that mariculture methods and daily activities have not changed over the 11 years that were analyzed. Some potentially confounding factors include changes in the fraction of the harvest from oysters cultivated using the rack system (mostly more distant from the haul-out sites) and the fraction cultivated in bags placed on sand bars also used by seals as haul-out sites."

"... the use of oyster production level as a proxy for mariculture activities that displace or disturb seals may be confounded by changes in culture methods or management practices."

"For these reasons, the Becker et al. (2009) paper has limited value for understanding the long-term trends in seal counts in Drakes Estero."

Quotes from MMC panel meeting, February 23, 2010

Kevin Lunny:

"I of course have given it a lot of thought, because Becker I, II, and III are all based on annual production rates. I think this really points to a core issue that's behind this whole discussion. The core issue is communication. The core issue is working together so we understand how these things might affect the marine mammals. We have lots of different influences, really the single one that was focused on was production for the Becker et al papers. We were never contacted and so we've never had any input, we've never had a part, we've never had a seat at the table. We've never been asked a single question. And those data are all available."

Lunny offered his data on February 23, 2010. Becker, Press, and Allen submitted their paper on October 14, 2010. Between those two dates, Becker never asked Lunny for the DBOC data.

Quotes from MMC panel meeting, February 23, 2010

Ben Becker:

"I fully agree with Kevin that it would be great if we had better measurements, right time period, and all this other stuff. But we also need to think about, we need a dataset that we can go all the way back to '97, or '82 in the case of the new analysis, that is consistent. Sometimes there's a trade-off between accuracy and consistency."

Gordon Bennett:

"… what strikes me is that the information that's been revealed that exists today is really important and could have really informed Ben's papers. We're only hearing it revealed today, for the last over a year we've heard criticisms of the use of the annual production harvest number, but only criticisms, without knowing that the helpful information is actually there and could be used. …Ben could've used that information. This is great."

Quotes from MMC panel meeting, February 23, 2010

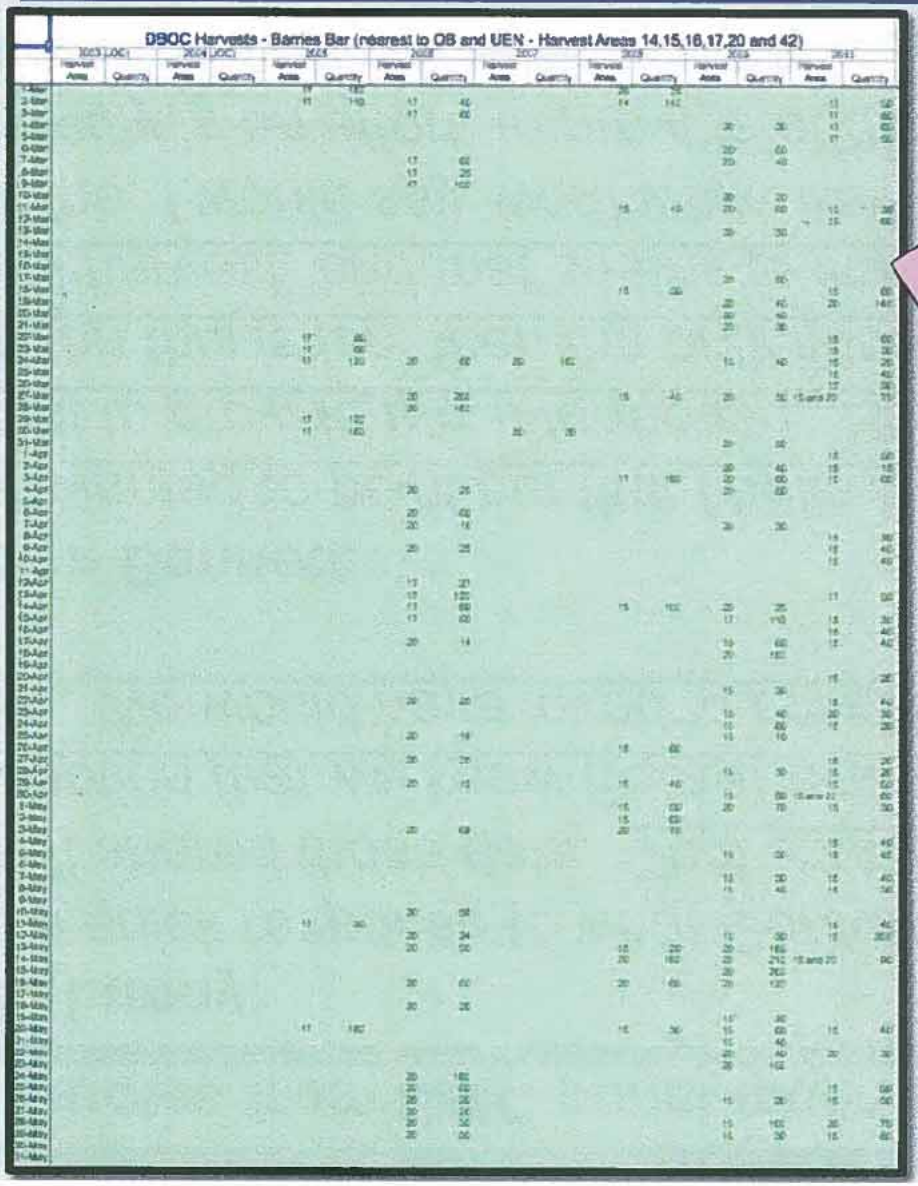
Kevin Lunny:

"Just a quick response to what Gordon said, that we somehow haven't shared those data. That sounds like there's an assumption that we knew Becker was working on another new report. We would have loved to collaborate."

Gordon Bennett:

"I just wanted to point out that I believe it's in Kevin's own best interest to provide this information. Because if we don't get better clarity on this issue, then the only information we have is the annual harvest, and that seems to imply a causation factor. So it would be, I would say, worthwhile Kevin's effort, even though it admittedly is an effort, to provide additional information if it could illuminate this process better. Maybe it would come out to the same result, we don't know. But the result now as it appears from Ben's paper is that there is a strong correlation."

DBOC data on oyster harvest & harvest boat trips to UEN/OB during pupping season March-May


DBOC Harvests - Barnes Bar (nearest to OB and UEN - Harvest Areas 14,15,16,17,20 and 42)

Oyster harvest boat trips during pupping season (March – May). Only two trips took place during pupping season in 2007 on March 24 and 30. The next oyster harvest trip to the west end of the lateral channel was not until August 7. The number of UEN/OB oyster harvest boat trips was highest in 2006, 2009, and 2010. Note oyster harvest from bed #17 (UEN) in 2005 (this is relevant for slide #40).

Annual oyster harvest is not a surrogate for oyster activity at UEN/OB during pupping season

year	Annual oyster harvest (lbs)	UEN/OB Mar-May oyster harvest	UEN/OB Mar-May boat harvest trips
2005	138958	8160	9
2006	291538	15184	33
2007	468000	1440	2
2008	438000	9080	16
2009	458000	22280	44

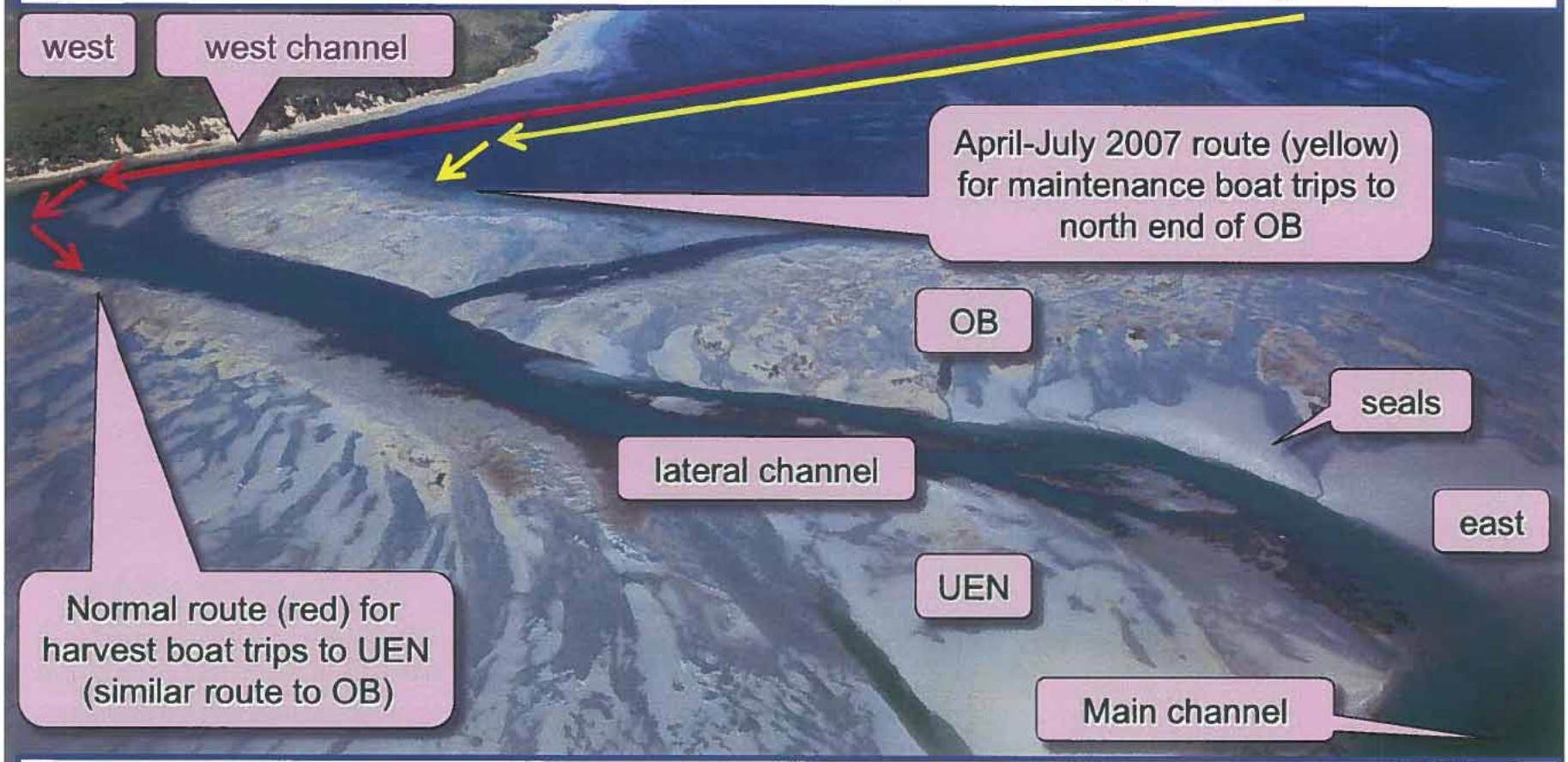
model	P-value	Adj R^2
UEN/OB Mar-May oyster harvest vs. UEN/OB Mar-May harvest boat trips	0.005	0.984
Annual oyster harvest vs. UEN/OB Mar-May boat harvest trips	0.650	- 0.317
Annual oyster harvest vs. UEN/OB Mar-May oyster harvest (lbs)	0.737	- 0.396

In April '07, DBOC stopped harvesting at UEN/OB until August (details on next page)

The data are clear – there is no relationship between annual oyster harvest vs. activity at UEN/OB during pupping season.

UEN/OB pupping season (Mar-May) harvest & harvest boat trip data have been collected by DBOC since 2005. The Marine Mammal Commission encouraged Becker in Feb 2010 to obtain these data, but he did not.

In early April 2007, after Superintendent Neubacher told Supervisor Kinsey that NPS had overwhelming data that DBOC was disturbing the harbor seals and was considering criminal charges, Lunny told Jorge Mata to stop entering the west end of lateral channel and stop accessing UEN during pupping season



DBOC workers made two harvest trips to bed #20 (OB) on March 24 & 30, 2007 and did not go back to the lateral channel to harvest from bed #20 (OB) until August 7. In the intervening months, DBOC workers report having made a few maintenance trips to north end of OB but did not enter the lateral channel.

Analysis of Becker et al. 2011: conclusions part 2

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
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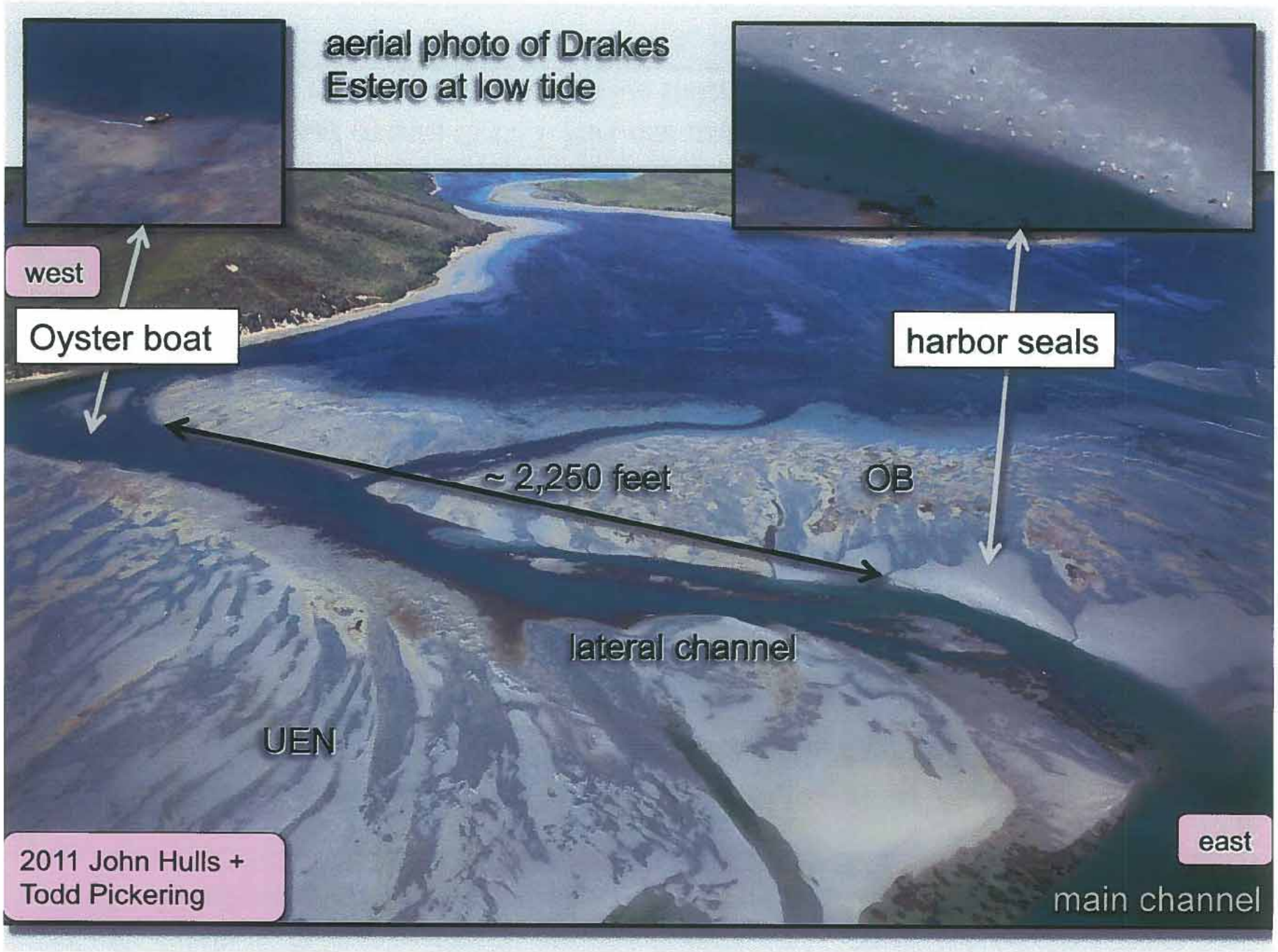

aerial photo of Drakes Estero at low tide
west
Oyster boat
harbor seals
~ 2,250 feet
OB
lateral channel
UEN
2011 John Hulls + Todd Pickering
east
main channel

Quotes from MMC panel meeting, February 23, 2010

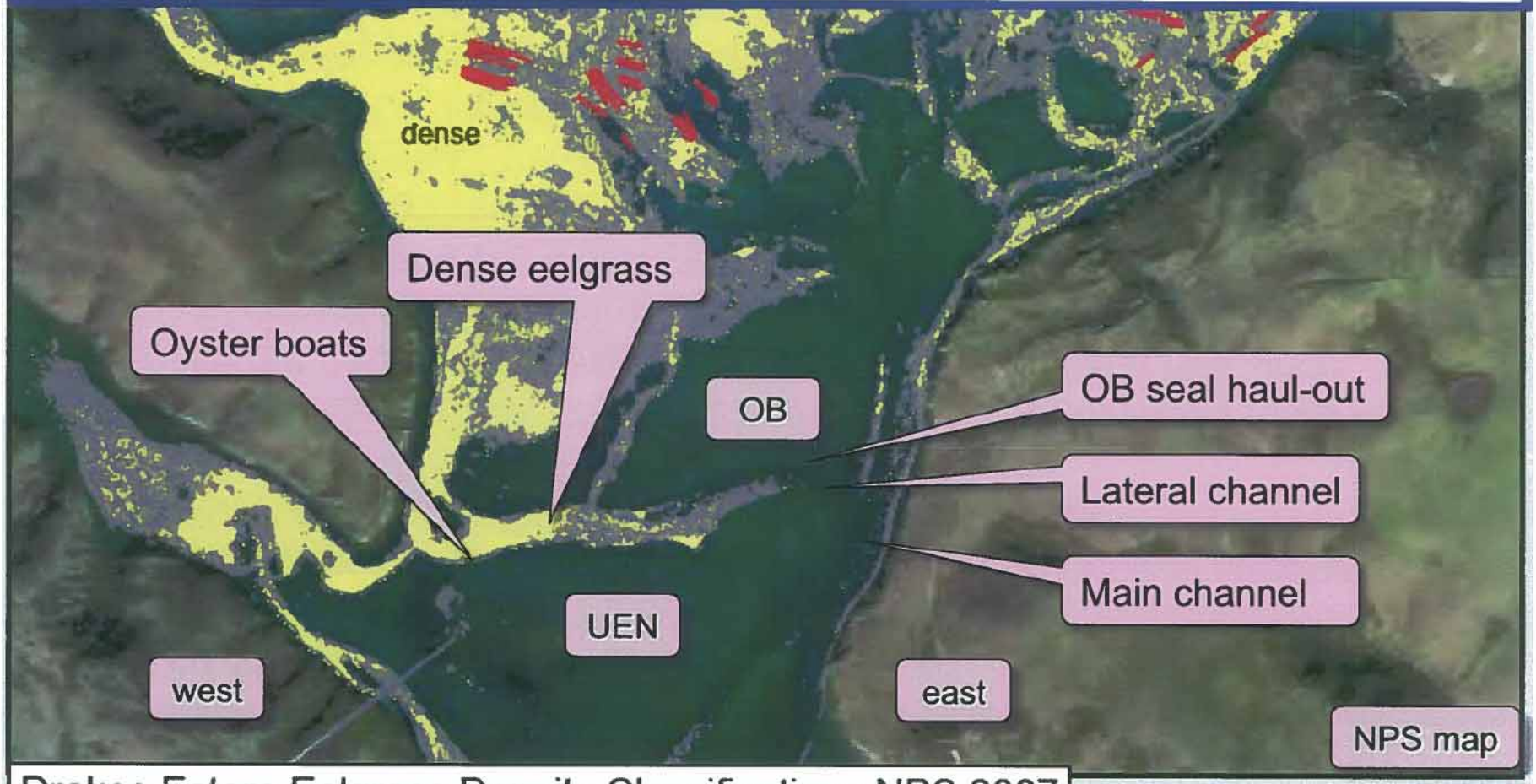
Dr. Sarah Allen: *"... in fact, they* [the harbor seals] *used to go up into Barries Bay when that channel was deeper. That channel* [i.e., the lateral channel] *has narrowed so they can't access it. But there aren't high enough sandbars and deep enough channels other than the ones they're using."*

Kevin Lunny: *"Sarah's exactly correct, the lateral channel used to be deeper and it gave the harbor seals access to Barries Bay. And that has since completely closed off. The lateral channel is far shallower now. You'll look at the eelgrass maps and you'll see that in the past decade or so, eelgrass has filled in the lateral channel and we don't see the harbor seals hauling out along the lateral channel now. You know, the concern is that because of the shellfish aquaculture, or not, I just wanted to bring that out, because that has dynamically changed and shut off that access at the end of the lateral channel into Barries Bay. ... as we saw yesterday on the tour, it's very very shallow."*

Sarah Allen: *"I concur with what Kevin's noted about changes to the lateral channel, but the seals are still using the lateral channel to that one little side channel that cuts across the north top. ...I agree, there is eelgrass there and certainly some morphological changes."*

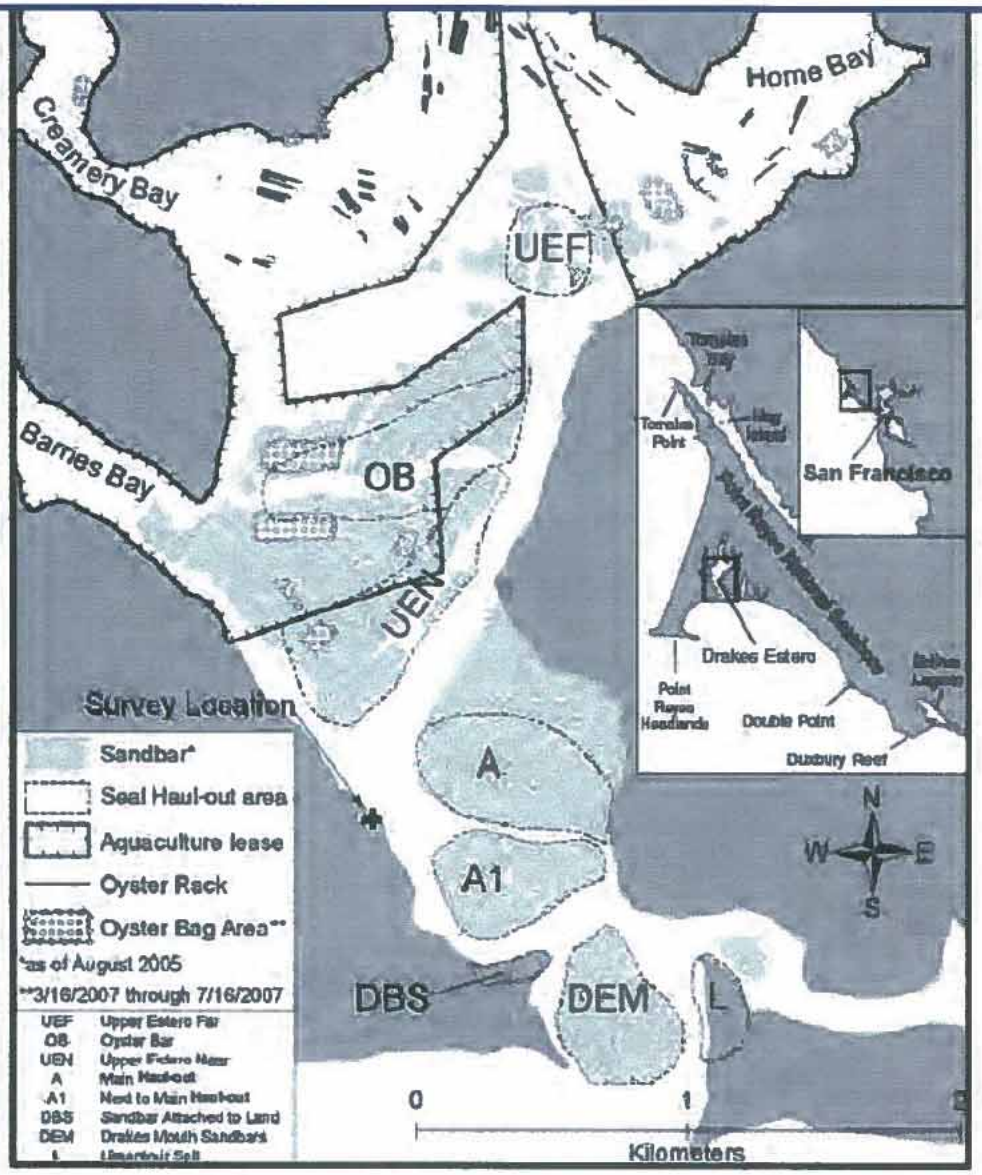
Kevin Lunny: *"… You'll look at the eelgrass maps and you'll see that in the past decade or so, eelgrass has filled in the lateral channel and we don't see the harbor seals hauling out along the lateral channel now."*

Sarah Allen: *"I concur with what Kevin's noted about changes to the lateral channel … I agree, there is eelgrass there ..."*



Drakes Estero Eelgrass Density Classifications NPS 2007

Becker's Figure 1 gave false impression that oyster bags are within seal haul-outs – map is inaccurate and misleading



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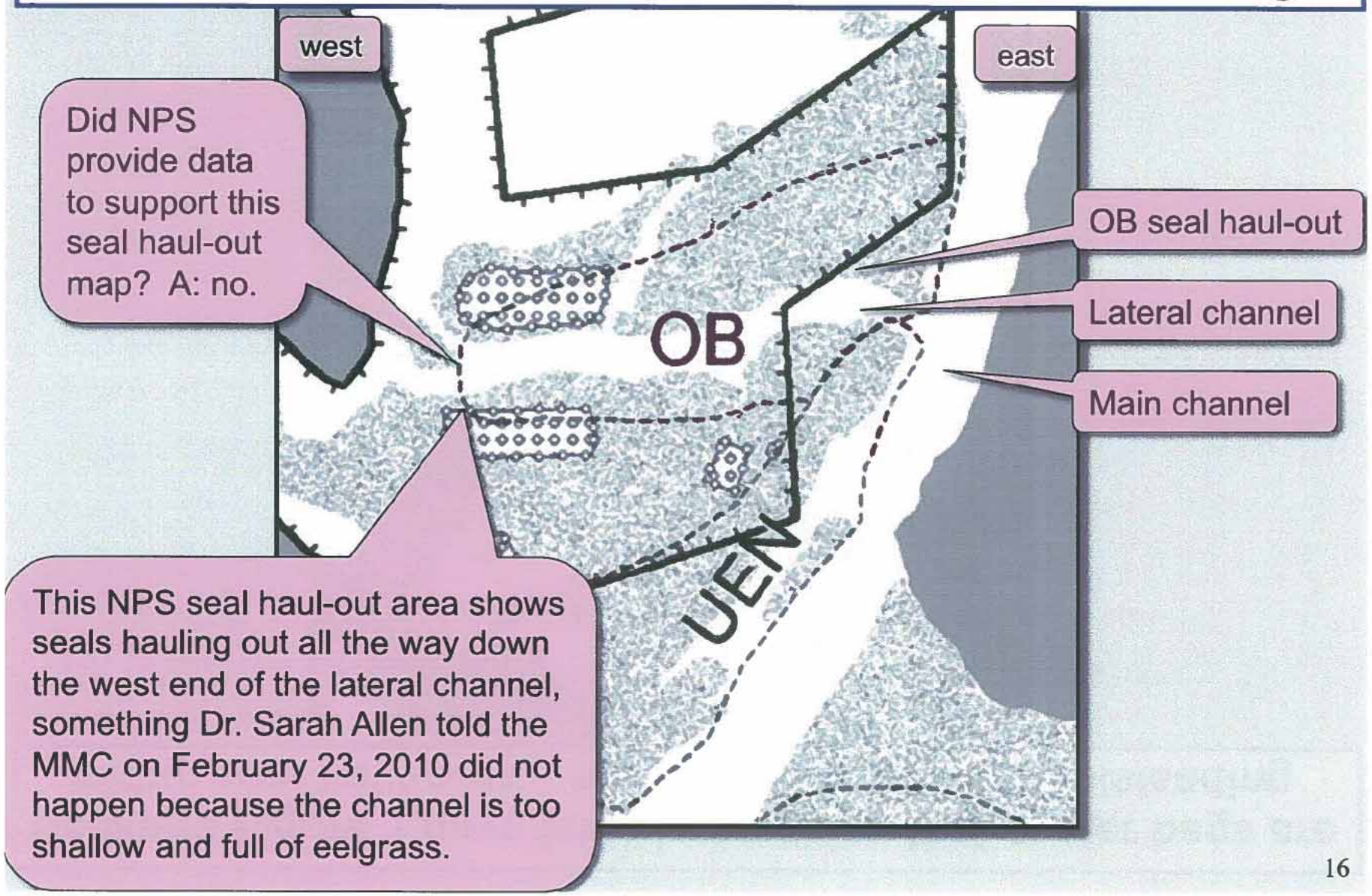

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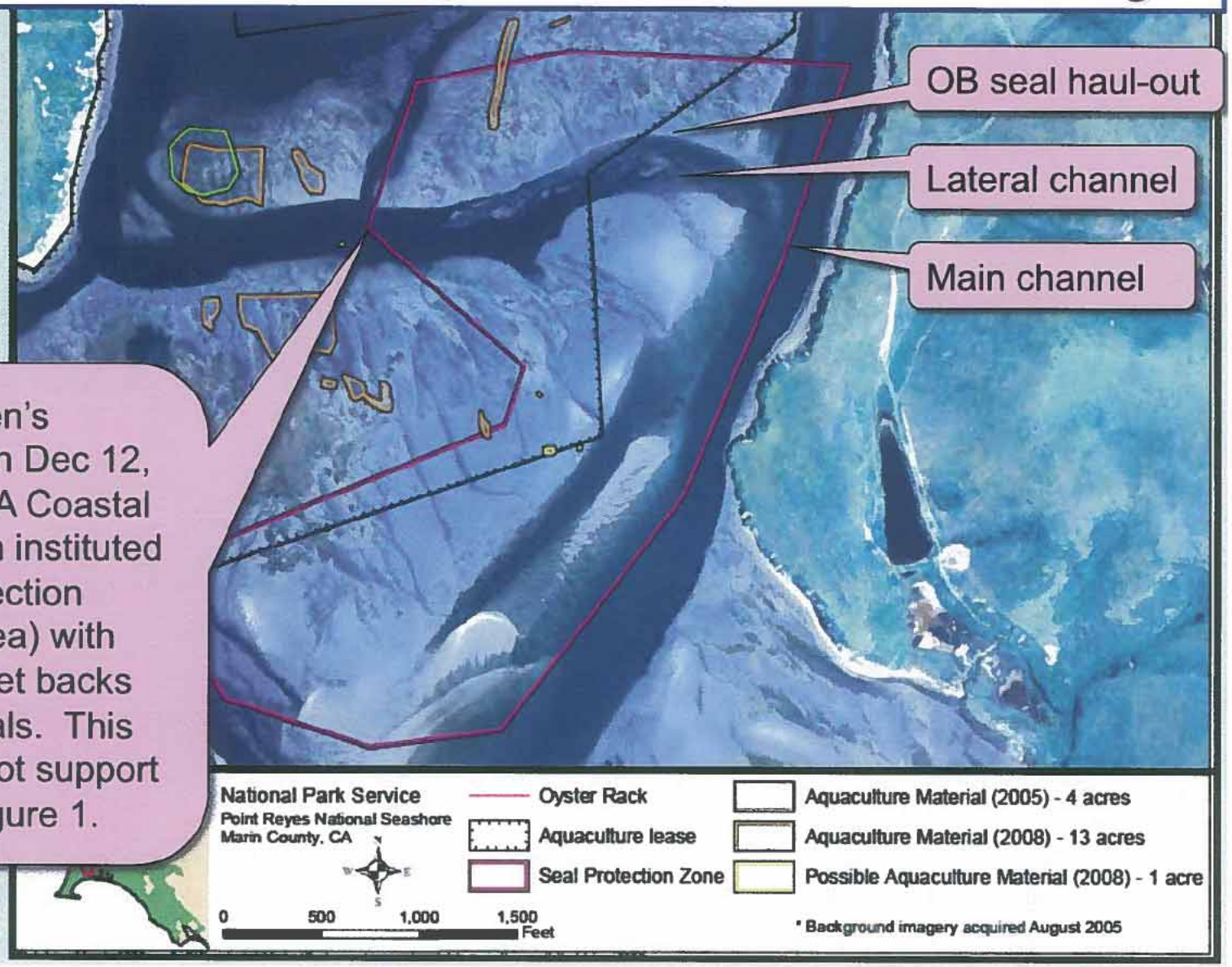
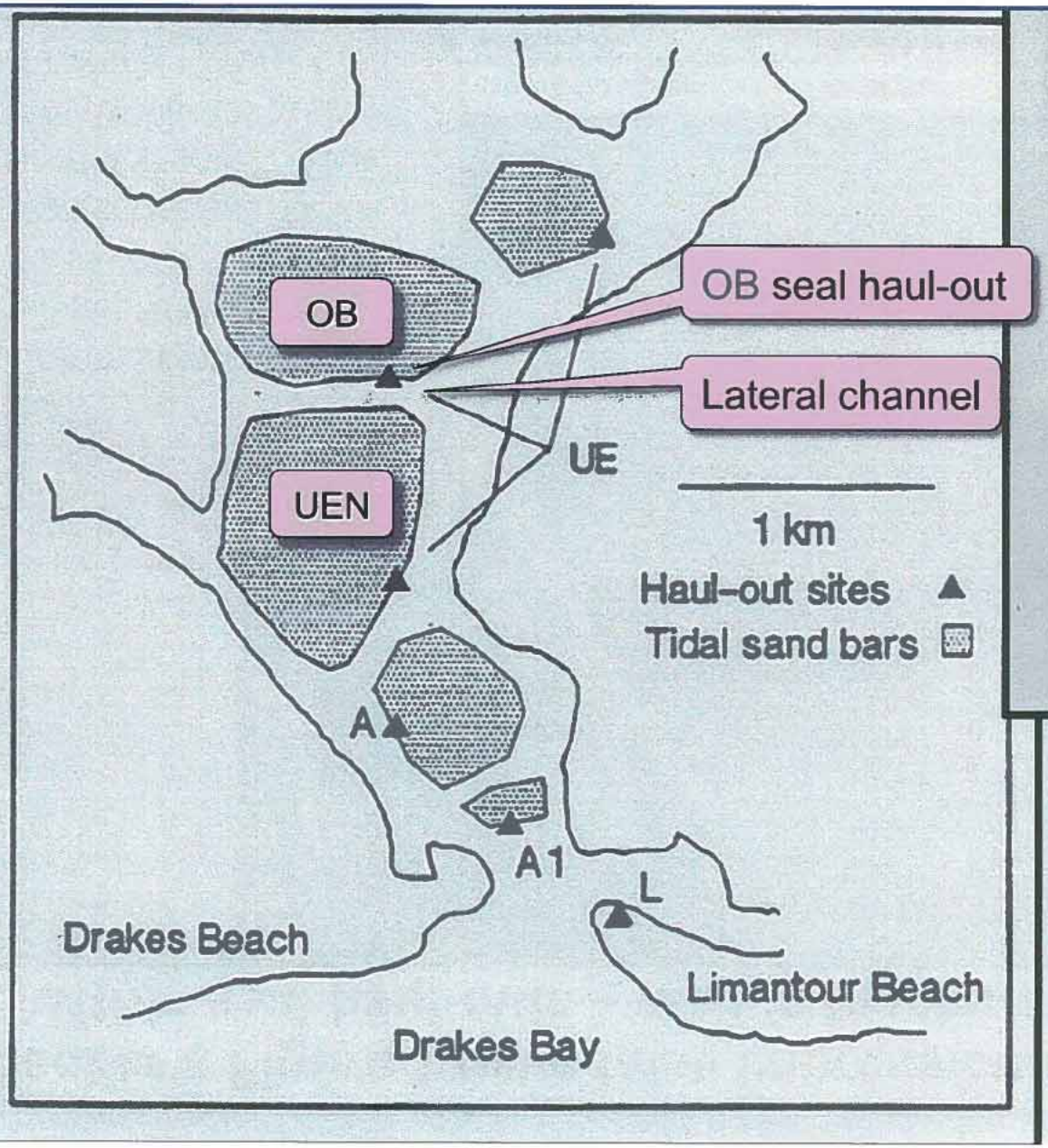
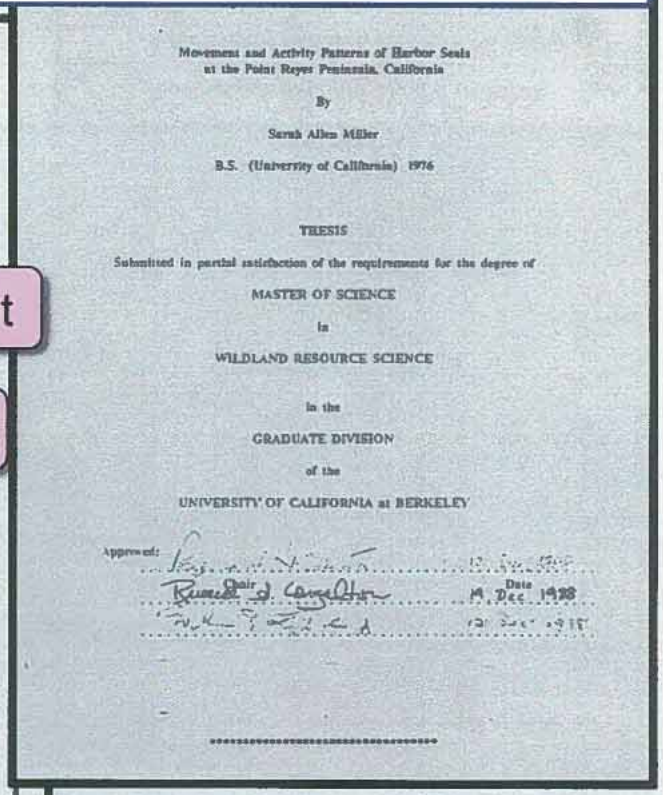


With Dr. Allen's guidance, on Dec 12, 2007, the CA Coastal Commission instituted a Seal Protection Zone (or Area) with significant set backs from the seals. This map does not support Becker's Figure 1.

Harbor seal haul-out sites from Sarah Allen's thesis in 1988





Movements and Activity Patterns of Harbor Seals
at the Point Reyes Peninsula, California

By

Sarah Allen Miller

B.S. (University of California) 1976

THESIS

Submitted in partial satisfaction of the requirements for the degree of

MASTER OF SCIENCE

in

WILDLAND RESOURCE SCIENCE

in the

GRADUATE DIVISION

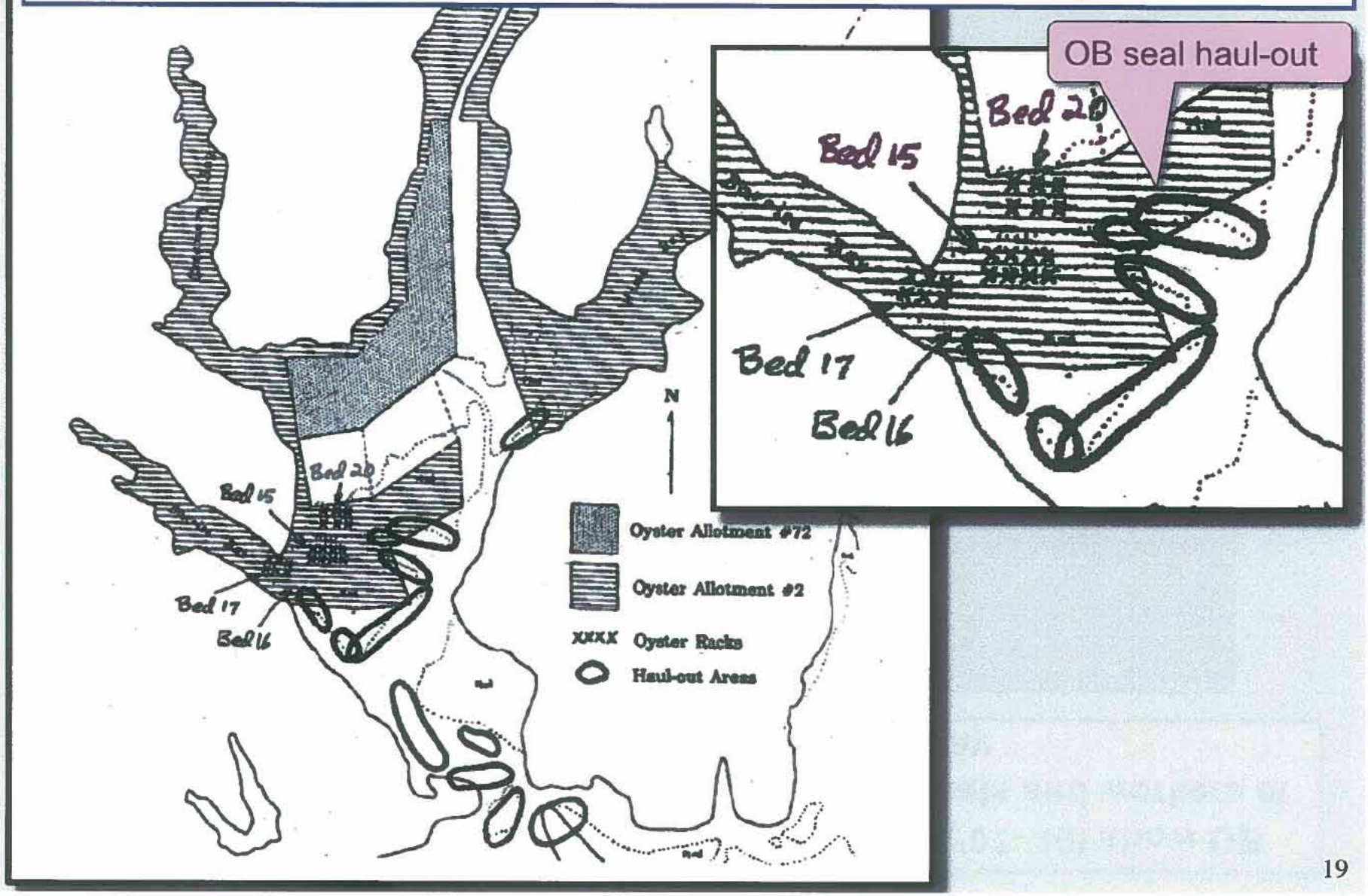
of the

UNIVERSITY OF CALIFORNIA at BERKELEY

Approved:

Chair Date 14 Dec 1988

Harbor seal haul-out areas map used by Tom Moore (CDFG) on May 20,1991, and by 1992 Federal-State agreement



281,000 photographs from NPS secret cameras ('07-'10) show OB seals at east end of lateral channel, and oyster boats and workers at west end, well over 600 yards away

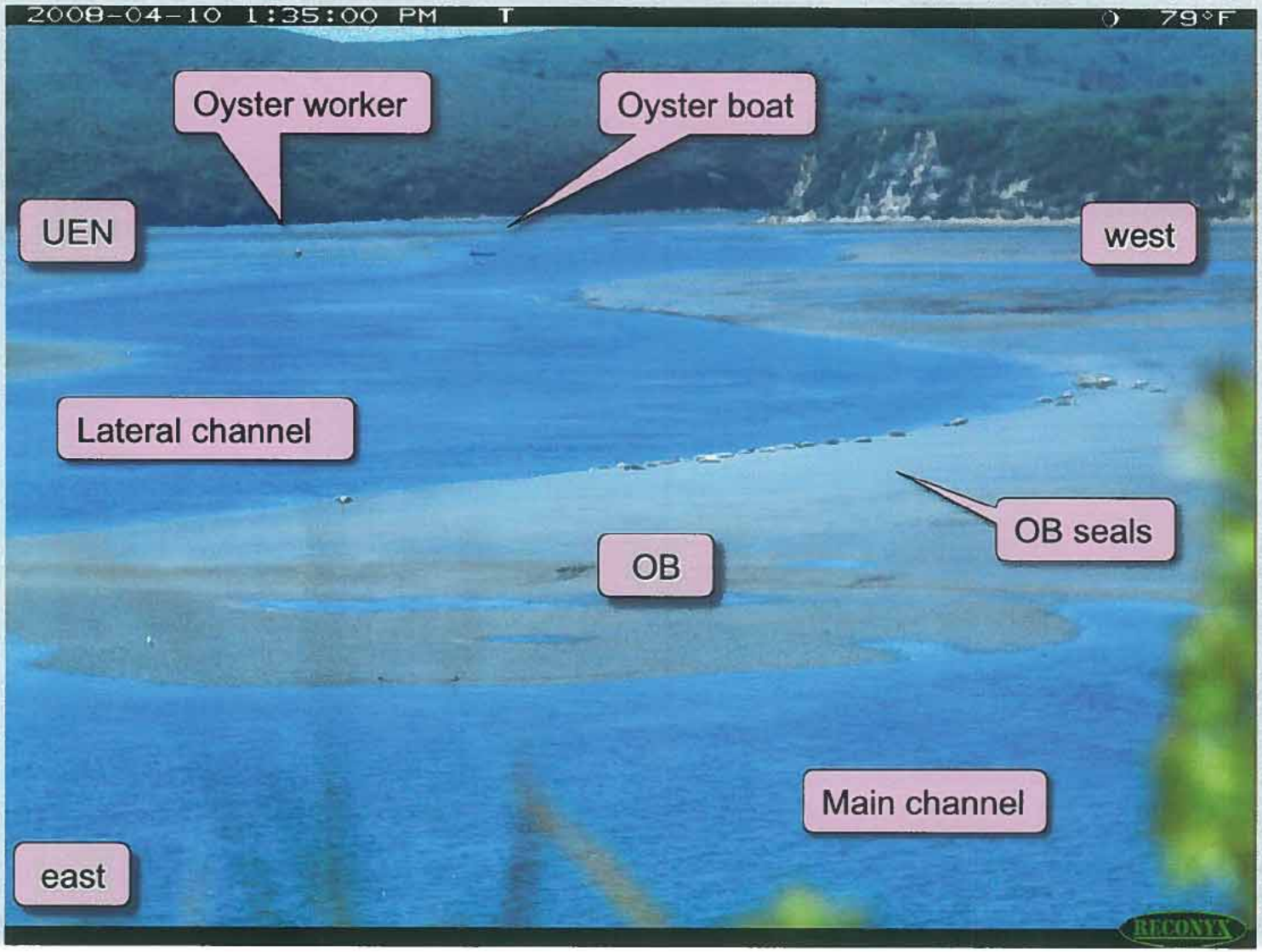
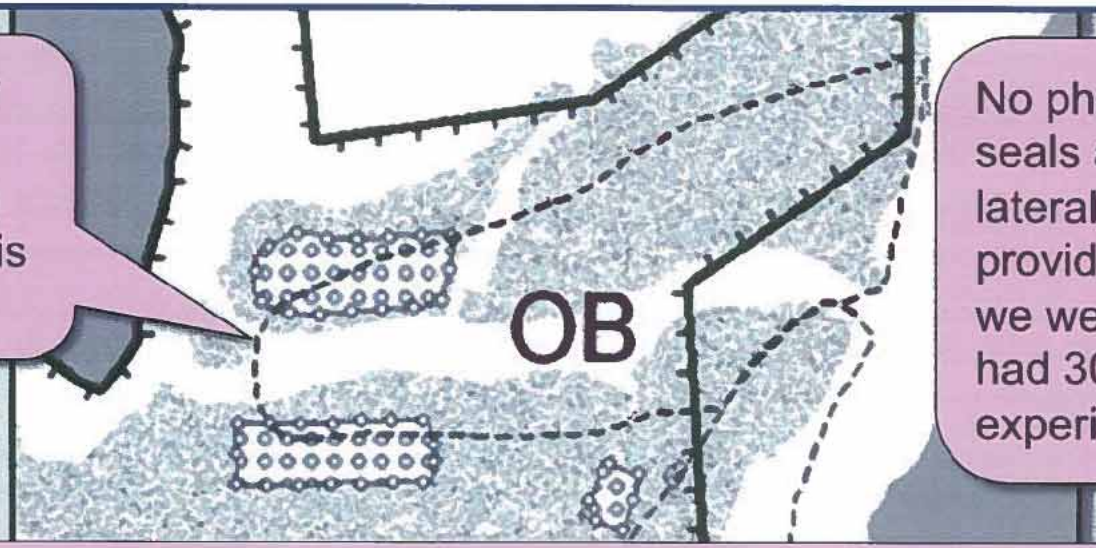


Figure 1 in Becker 2011 gives false impression that oyster bags are within seal haul-outs – map is inaccurate

We asked for data (i.e. photographs) supporting this boundary.



No photographs of seals at west end of lateral channel were provided. Rather, we were told authors had 30 years of experience.

We asked Dr. Becker:

"Please provide the aerial photographs and other documents, and data that were used to derive the "seal haul-out area" line drawn in Figure 1. If any of the data used to derive the "seal haul-out area" line drawn on Figure 1 is a decade or older, provide photographs showing the extent of eelgrass coverage of the lateral channel at that time."

Dr. Becker responded:

"Layer created by Author's personal experience over 30 years and writing several reports on harbor seals in Drakes Estero. Some additional DFG and NOAA reports on MMC website include maps of haul out areas."

Analysis of Becker et al. 2011: conclusions part 2

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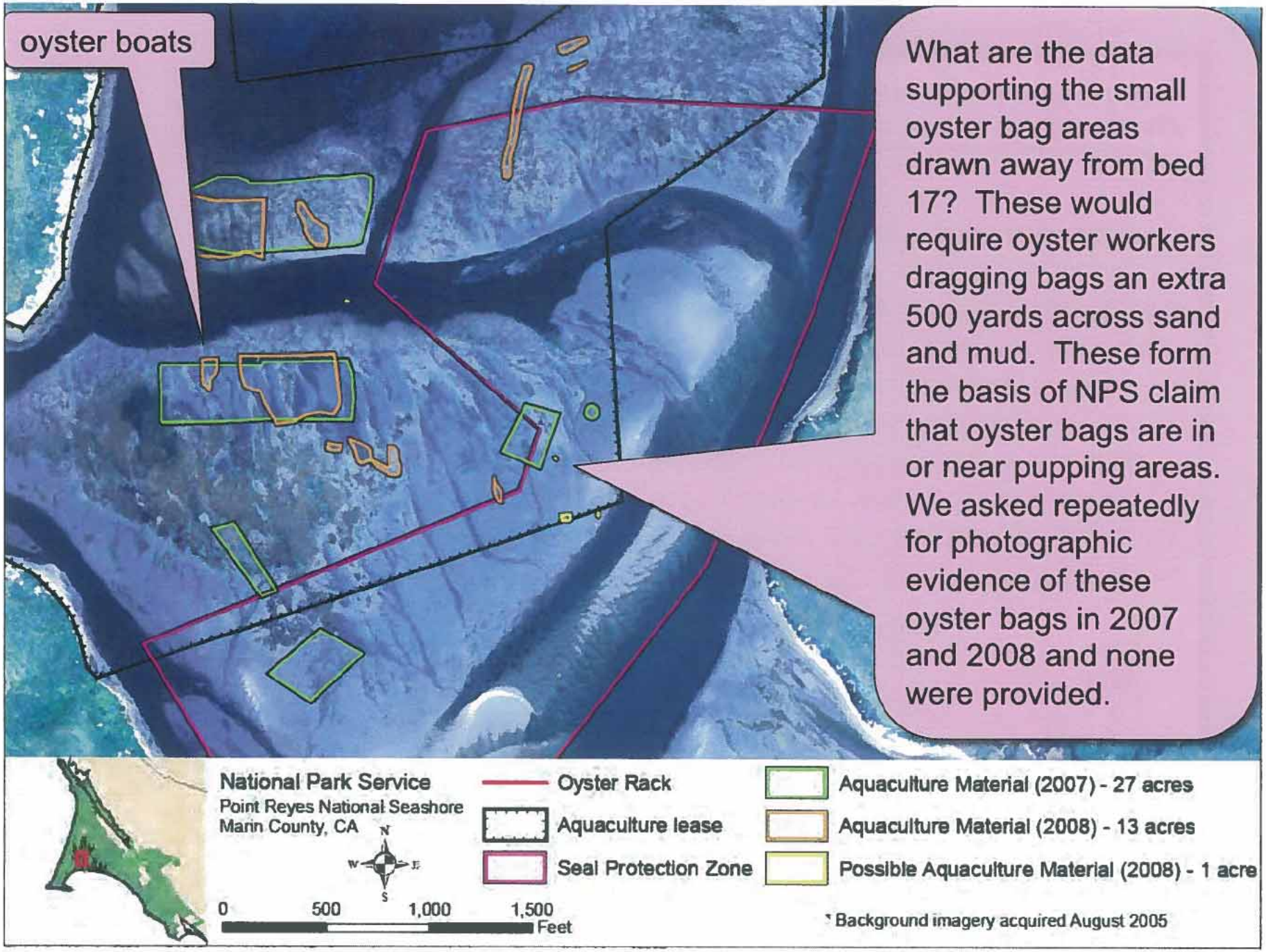
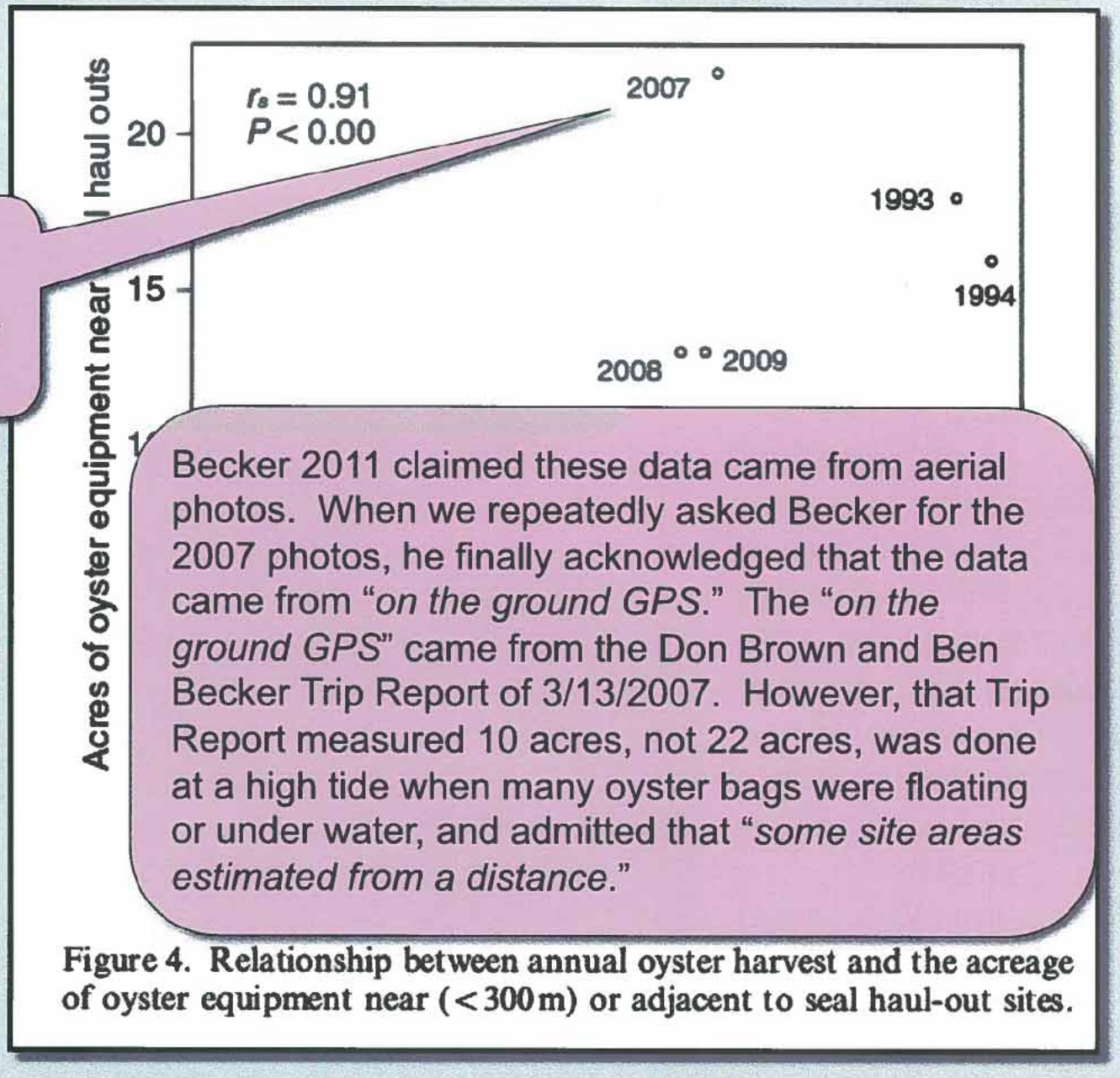

oyster boats
What are the data supporting the small oyster bag areas drawn away from bed 17? These would require oyster workers dragging bags an extra 500 yards across sand and mud. These form the basis of NPS claim that oyster bags are in or near pupping areas. We asked repeatedly for photographic evidence of these oyster bags in 2007 and 2008 and none were provided.
National Park Service
Point Reyes National Seashore
Marin County, CA
N
W
E
S
0
500
1,000
1,500
Feet
Oyster Rack
Aquaculture lease
Seal Protection Zone
Aquaculture Material (2007) - 27 acres
Aquaculture Material (2008) - 13 acres
Possible Aquaculture Material (2008) - 1 acre
* Background imagery acquired August 2005

Becker 2011 claimed 22 acres of oyster bags in 2007.

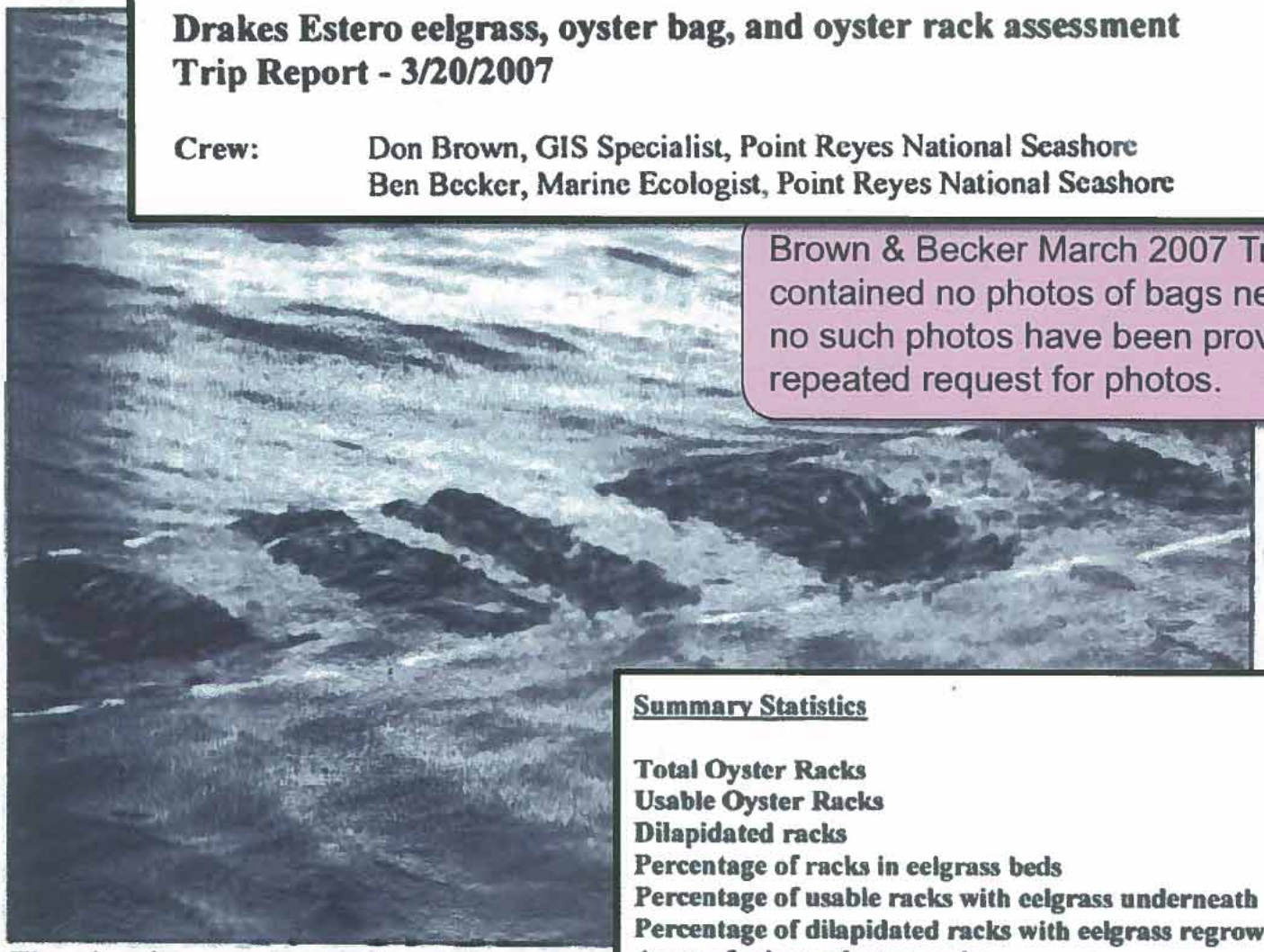


Becker 2011 claimed these data came from aerial photos. When we repeatedly asked Becker for the 2007 photos, he finally acknowledged that the data came from "*on the ground GPS*." The "*on the ground GPS*" came from the Don Brown and Ben Becker Trip Report of 3/13/2007. However, that Trip Report measured 10 acres, not 22 acres, was done at a high tide when many oyster bags were floating or under water, and admitted that "*some site areas estimated from a distance*."

Figure 4. Relationship between annual oyster harvest and the acreage of oyster equipment near (<300 m) or adjacent to seal haul-out sites.

Drakes Estero eelgrass, oyster bag, and oyster rack assessment
Trip Report - 3/20/2007

Crew: Don Brown, GIS Specialist, Point Reyes National Seashore
Ben Becker, Marine Ecologist, Point Reyes National Seashore



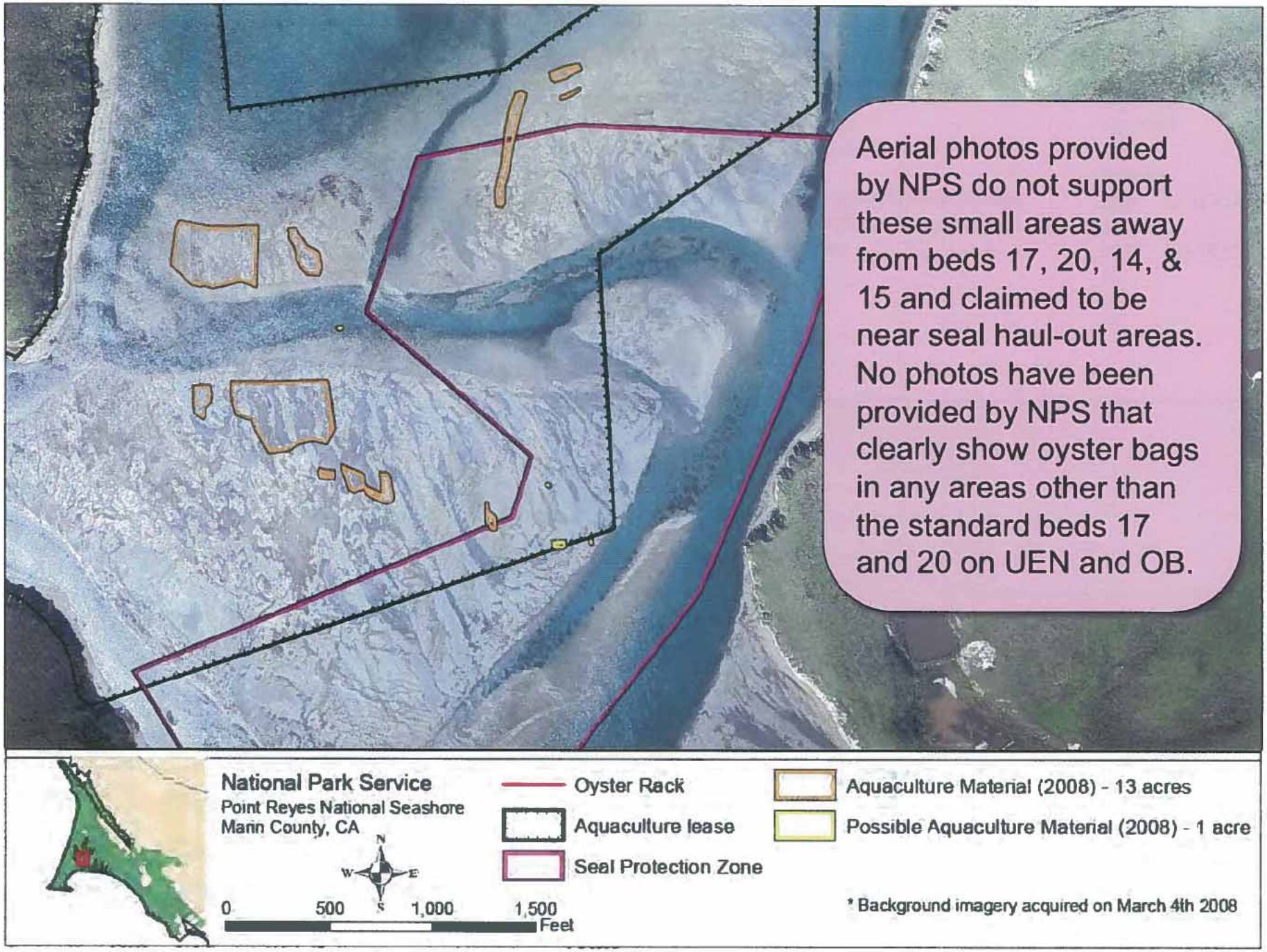
Floating bag system tethered by ropes.

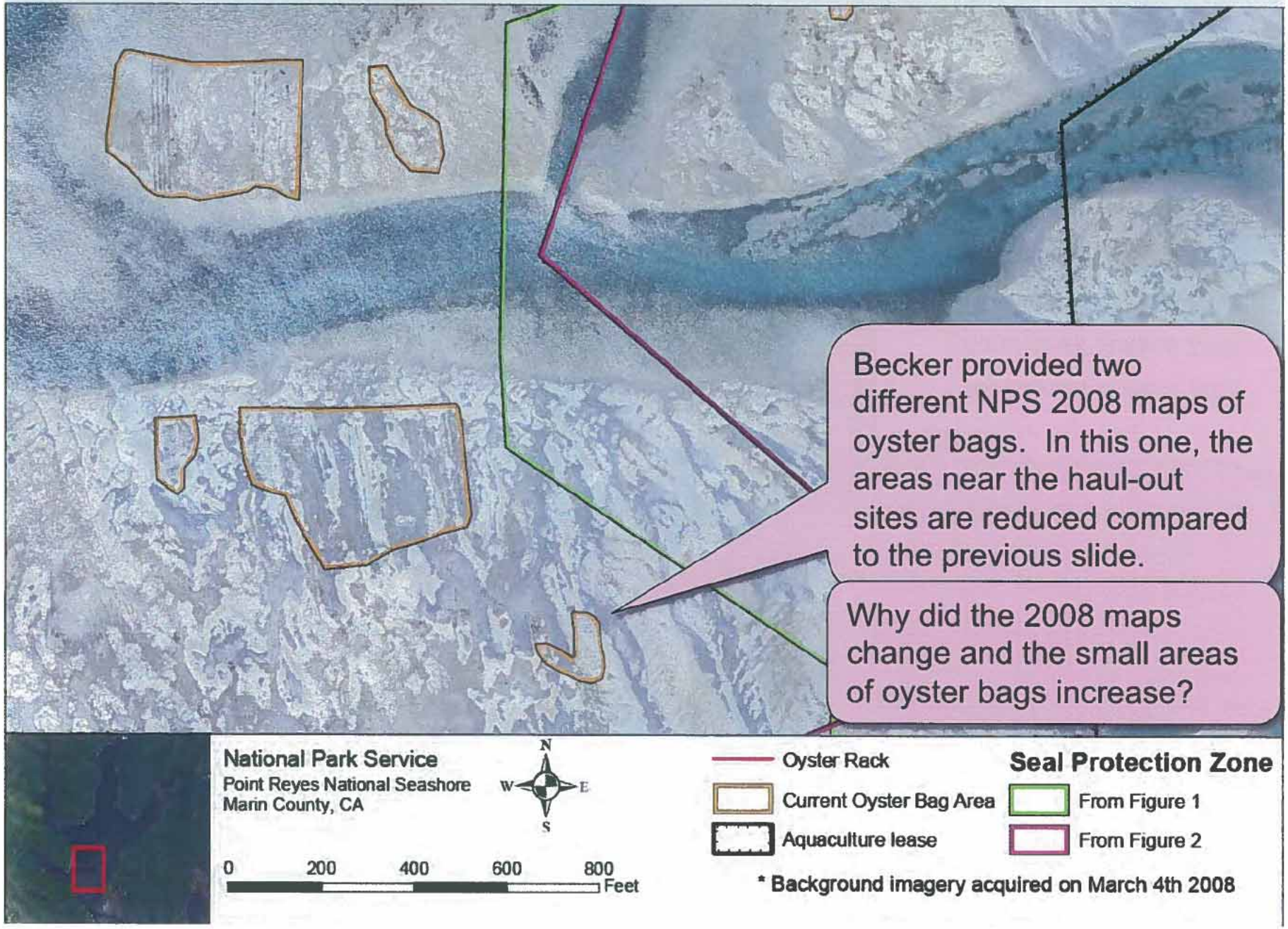
Brown & Becker March 2007 Trip Report contained no photos of bags near pupping areas; no such photos have been provided by NPS after repeated request for photos.

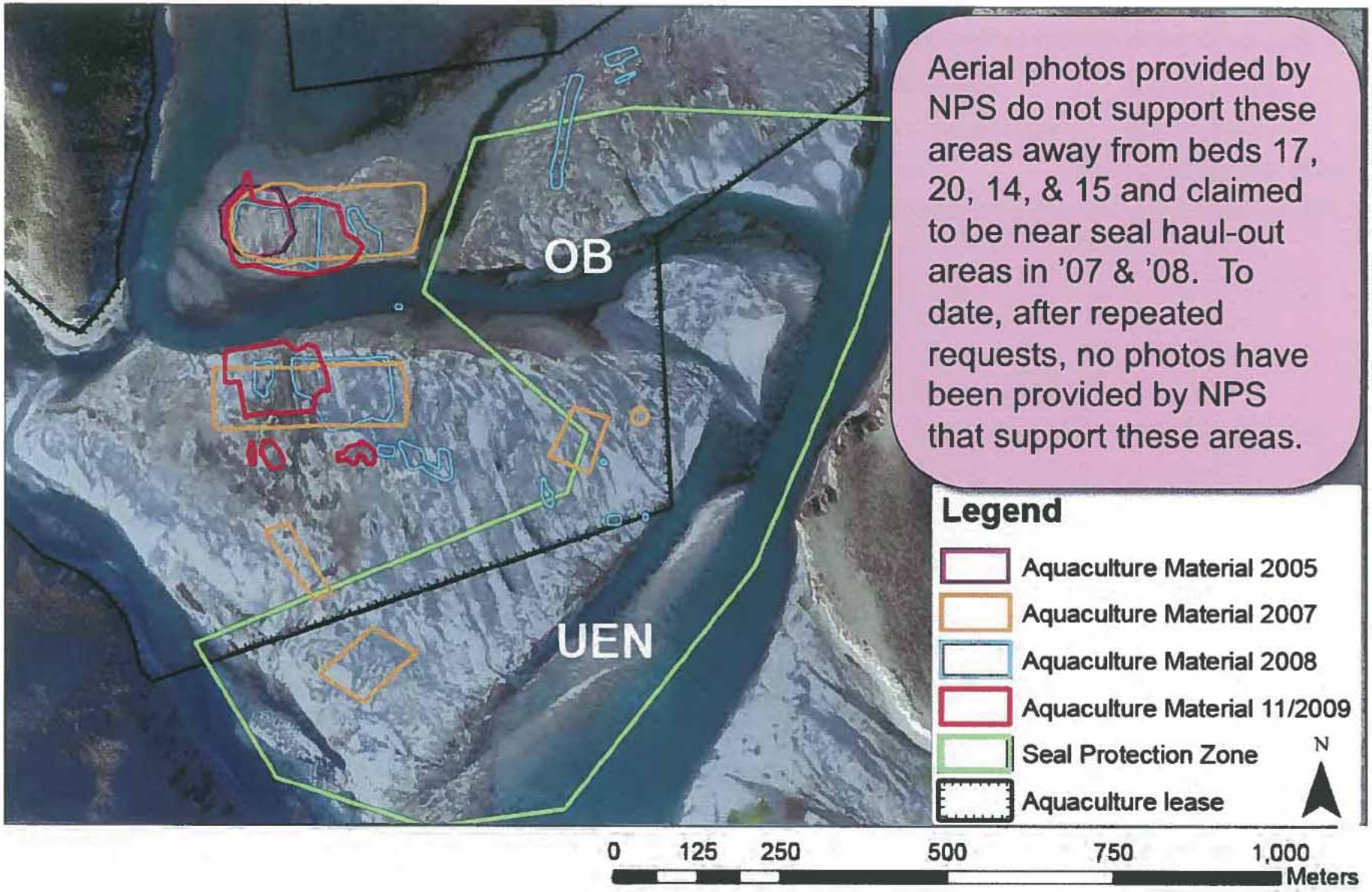
Summary Statistics

Total Oyster Racks	**93**
Usable Oyster Racks	**66**
Dilapidated racks	**27**
Percentage of racks in eelgrass beds	**96% (89 of 93)**
Percentage of usable racks with eelgrass underneath	**0%**
Percentage of dilapidated racks with eelgrass regrowth	**26% (7 of 27)**
Acres of eelgrass lost to racks	**8 acres**
Number of intertidal oyster bag areas	**12**
Acreage of intertidal oyster bag sites	**10 acres**
Total eelgrass acreage in the Estero	**740 acres**

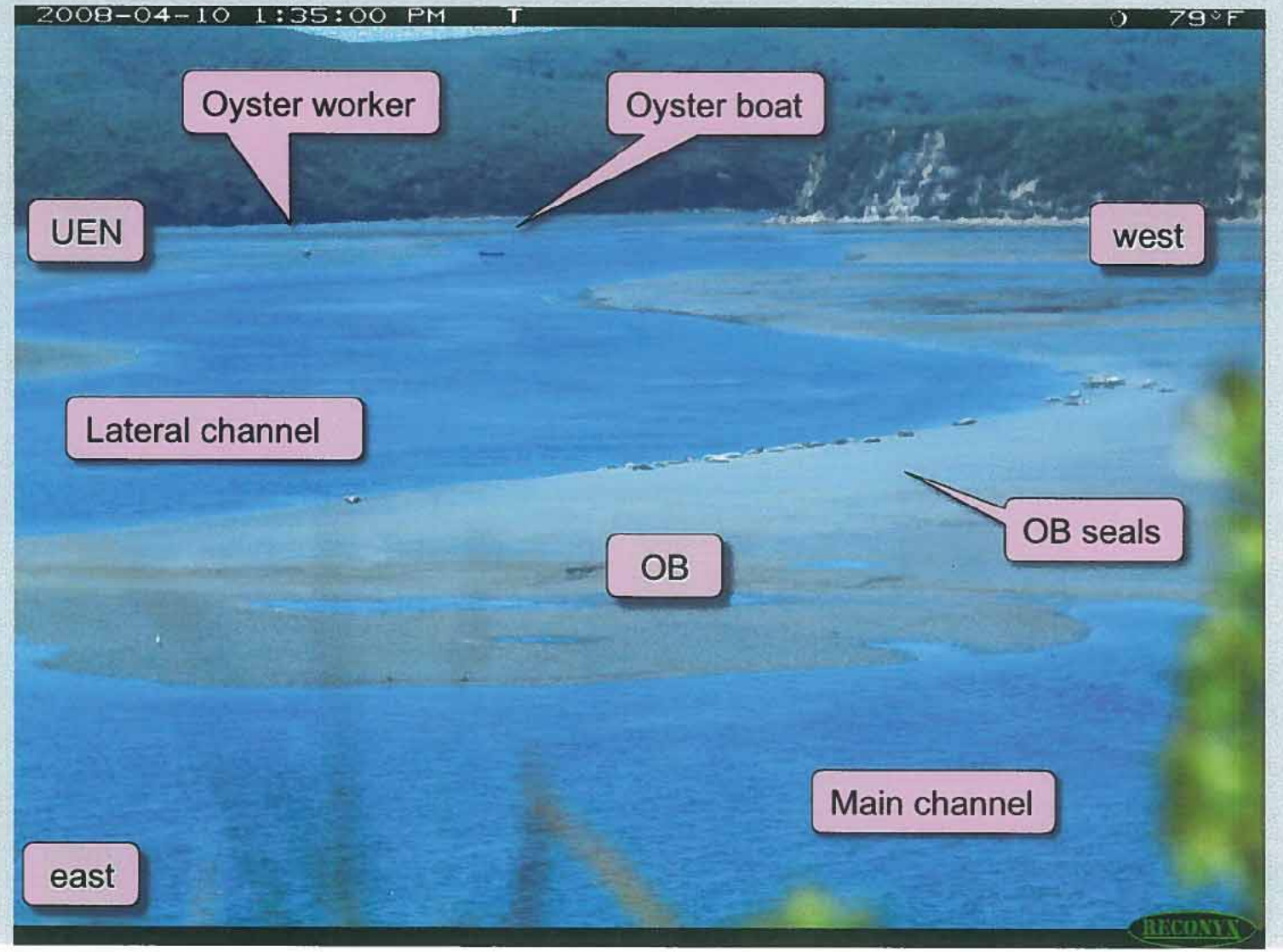
There were 12 areas where oyster bags are scattered in intertidal areas covering a total of approximately 10 acres (some site areas estimated from a distance). Since eelgrass does

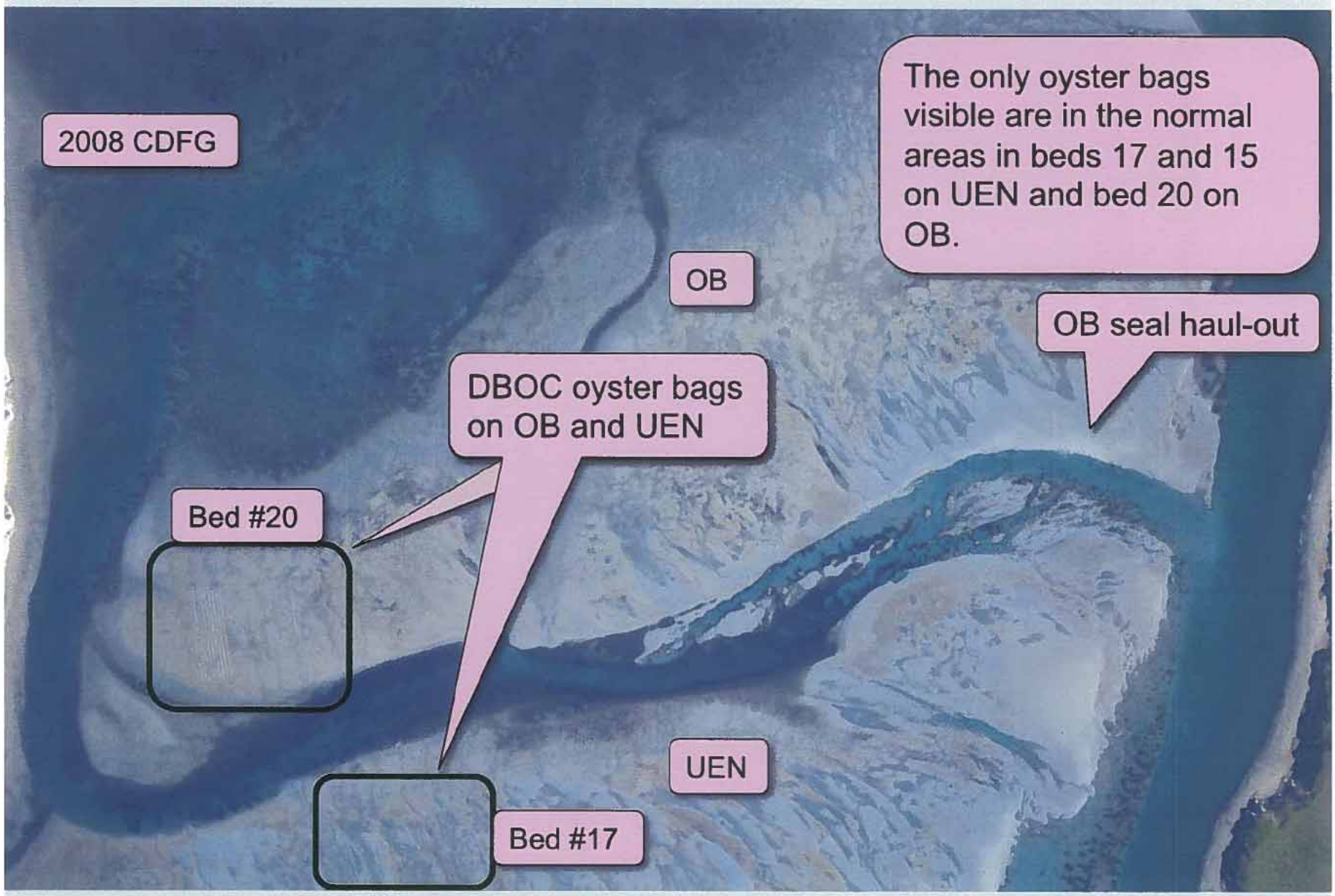

Aerial photos provided by NPS do not support these small areas away from beds 17, 20, 14, & 15 and claimed to be near seal haul-out areas. No photos have been provided by NPS that clearly show oyster bags in any areas other than the standard beds 17 and 20 on UEN and OB.
National Park Service
Point Reyes National Seashore
Marin County, CA
N
W
E
S
0
500
1,000
1,500
Feet
Oyster Rack
Aquaculture lease
Seal Protection Zone
Aquaculture Material (2008) - 13 acres
Possible Aquaculture Material (2008) - 1 acre
* Background imagery acquired on March 4th 2008

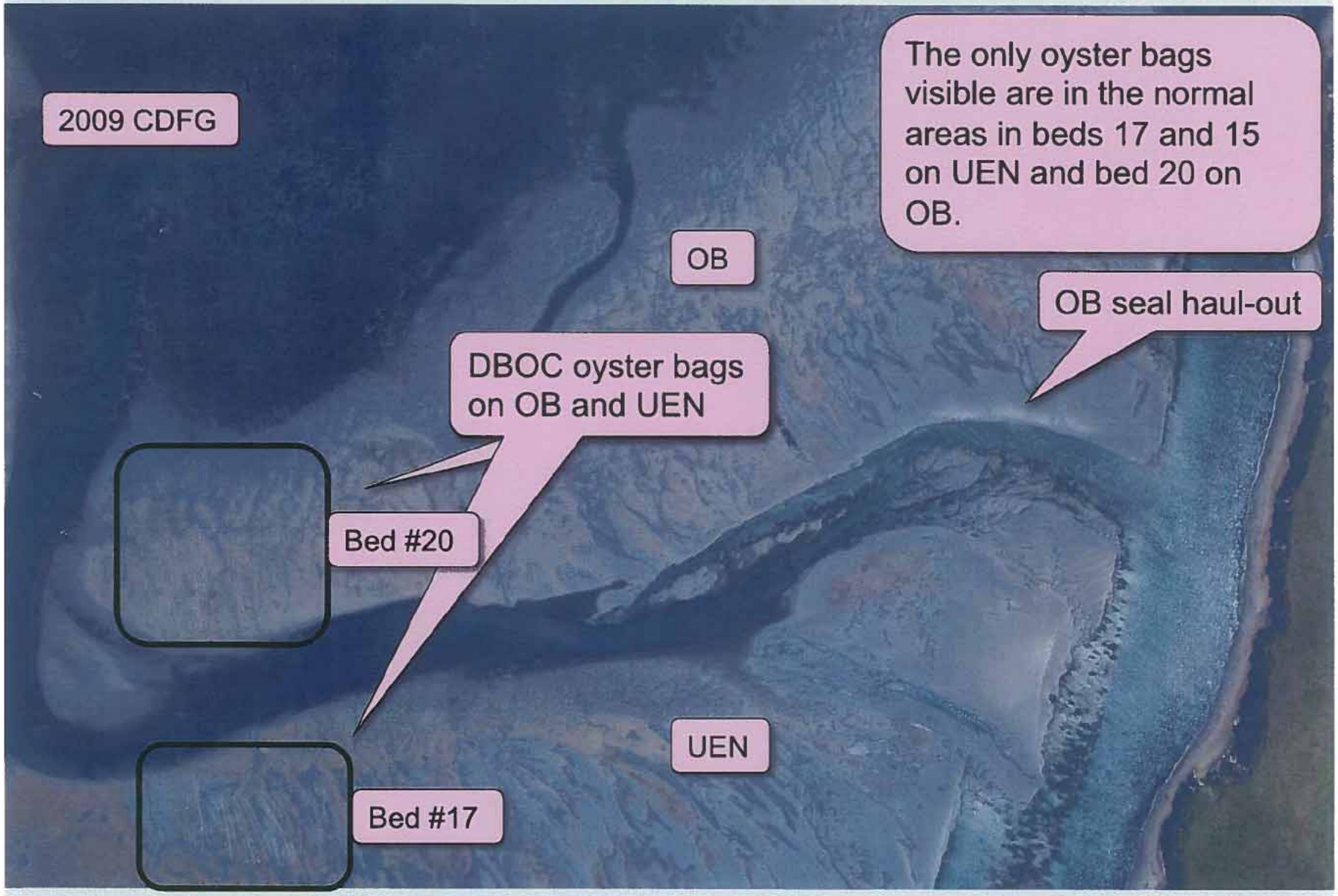

Becker provided two different NPS 2008 maps of oyster bags. In this one, the areas near the haul-out sites are reduced compared to the previous slide.
Why did the 2008 maps change and the small areas of oyster bags increase?
National Park Service
Point Reyes National Seashore
Marin County, CA
N
W
E
S
0
200
400
600
800
Feet
Oyster Rack
Current Oyster Bag Area
Aquaculture lease
Seal Protection Zone
From Figure 1
From Figure 2
* Background imagery acquired on March 4th 2008

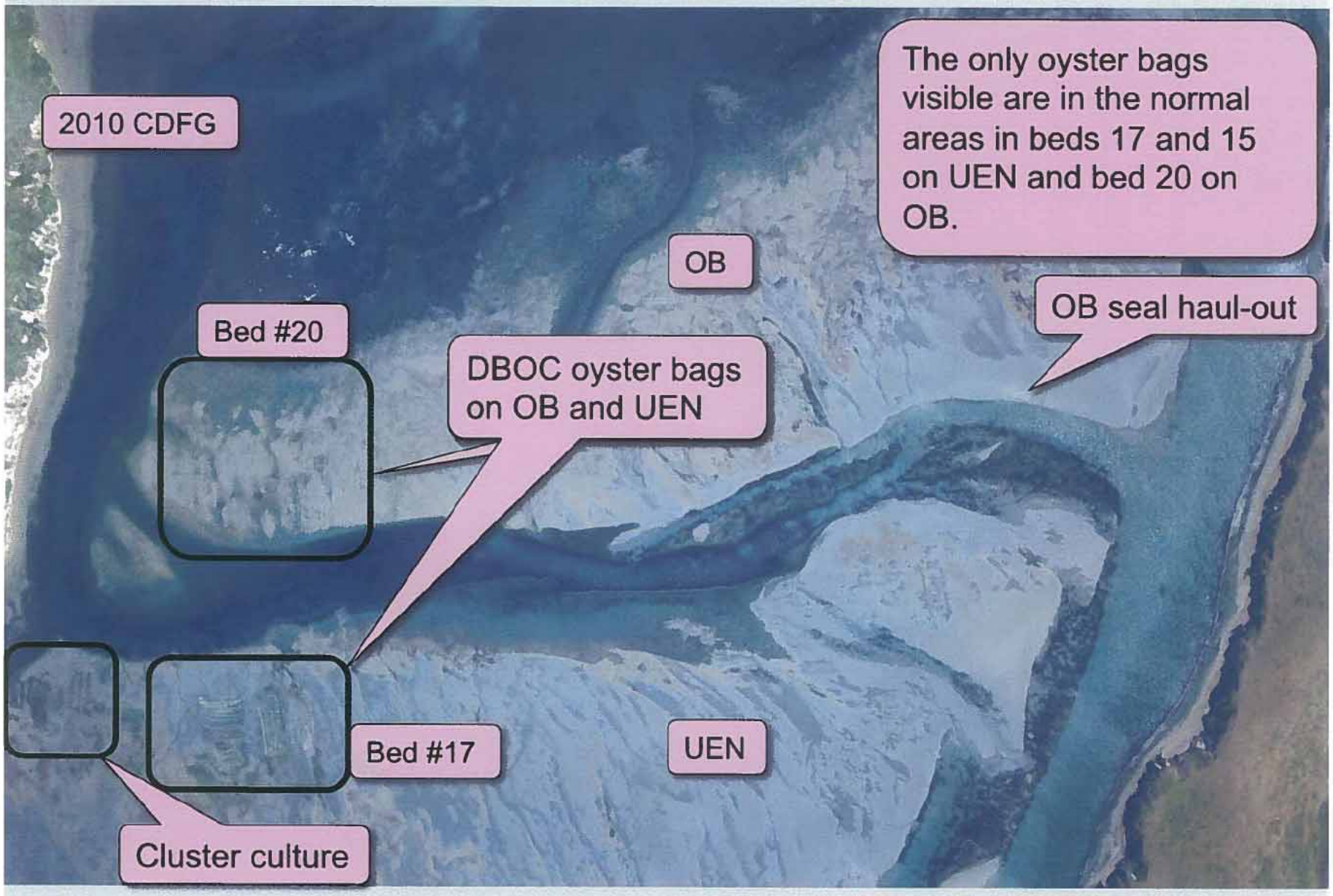

OB
UEN
Aerial photos provided by NPS do not support these areas away from beds 17, 20, 14, & 15 and claimed to be near seal haul-out areas in '07 & '08. To date, after repeated requests, no photos have been provided by NPS that support these areas.
Legend
Aquaculture Material 2005
Aquaculture Material 2007
Aquaculture Material 2008
Aquaculture Material 11/2009
Seal Protection Zone
Aquaculture lease
N
0
125
250
500
750
1,000
Meters

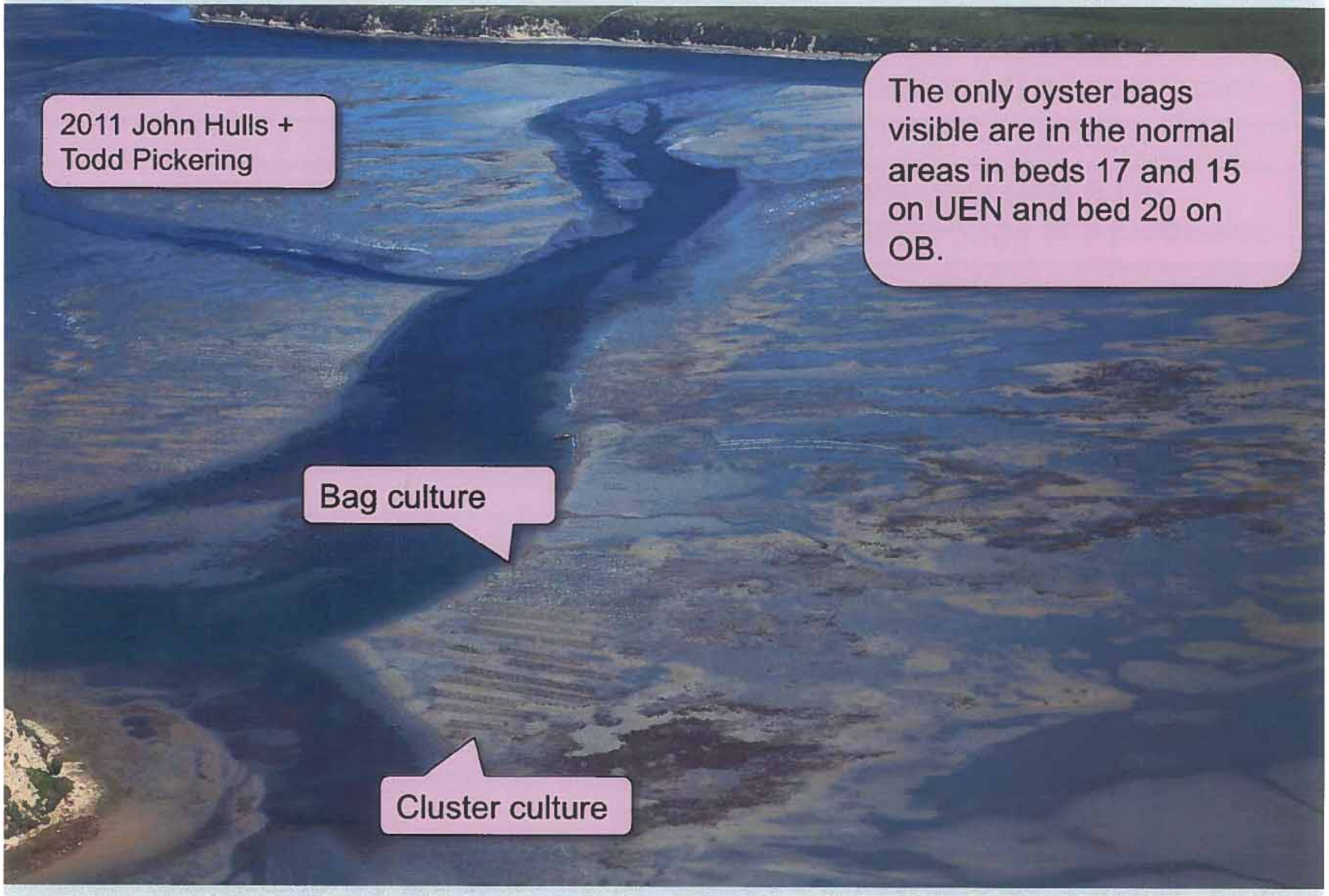
281,000 photos from NPS secret cameras ('07-'10) show oyster boats & workers at west end tending beds #17 (UEN) & #20 (OB), nowhere near eastern oyster bag areas drawn on NPS 2007 & 2008 maps




2008 CDFG
The only oyster bags visible are in the normal areas in beds 17 and 15 on UEN and bed 20 on OB.
OB
OB seal haul-out
DBOC oyster bags on OB and UEN
Bed #20
UEN
Bed #17


2009 CDFG
The only oyster bags visible are in the normal areas in beds 17 and 15 on UEN and bed 20 on OB.
OB
OB seal haul-out
DBOC oyster bags on OB and UEN
Bed #20
UEN
Bed #17


2010 CDFG
The only oyster bags visible are in the normal areas in beds 17 and 15 on UEN and bed 20 on OB.
OB
OB seal haul-out
Bed #20
DBOC oyster bags on OB and UEN
Bed #17
UEN
Cluster culture


2011 John Hulls +
Todd Pickering
The only oyster bags visible are in the normal areas in beds 17 and 15 on UEN and bed 20 on OB.
Bag culture
Cluster culture

Analysis of Becker et al. 2011: conclusions part 2

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

1. Annual oyster harvest is not surrogate for UEN/OB pupping season

2. Seal haul-out map is misleading: seals and oysters do not overlap

3. Claims and maps of oyster bags in pupping areas are incorrect

4. **Claims of zero oyster bags at OB/UEN from 2000-2004 are incorrect**
   CDPH records show JOC continued to harvest from UEN & OB

5. Inferences that drove OYST Hi/Low categorical model are incorrect
   NPS did not provide conclusive data to support major model in paper

We asked for all data (i.e. photographs & notebooks) supporting the numbers in this Figure.

What is basis for Becker 2011 claim that JOC had no oyster activity at UEN/OB in 2000-2004?

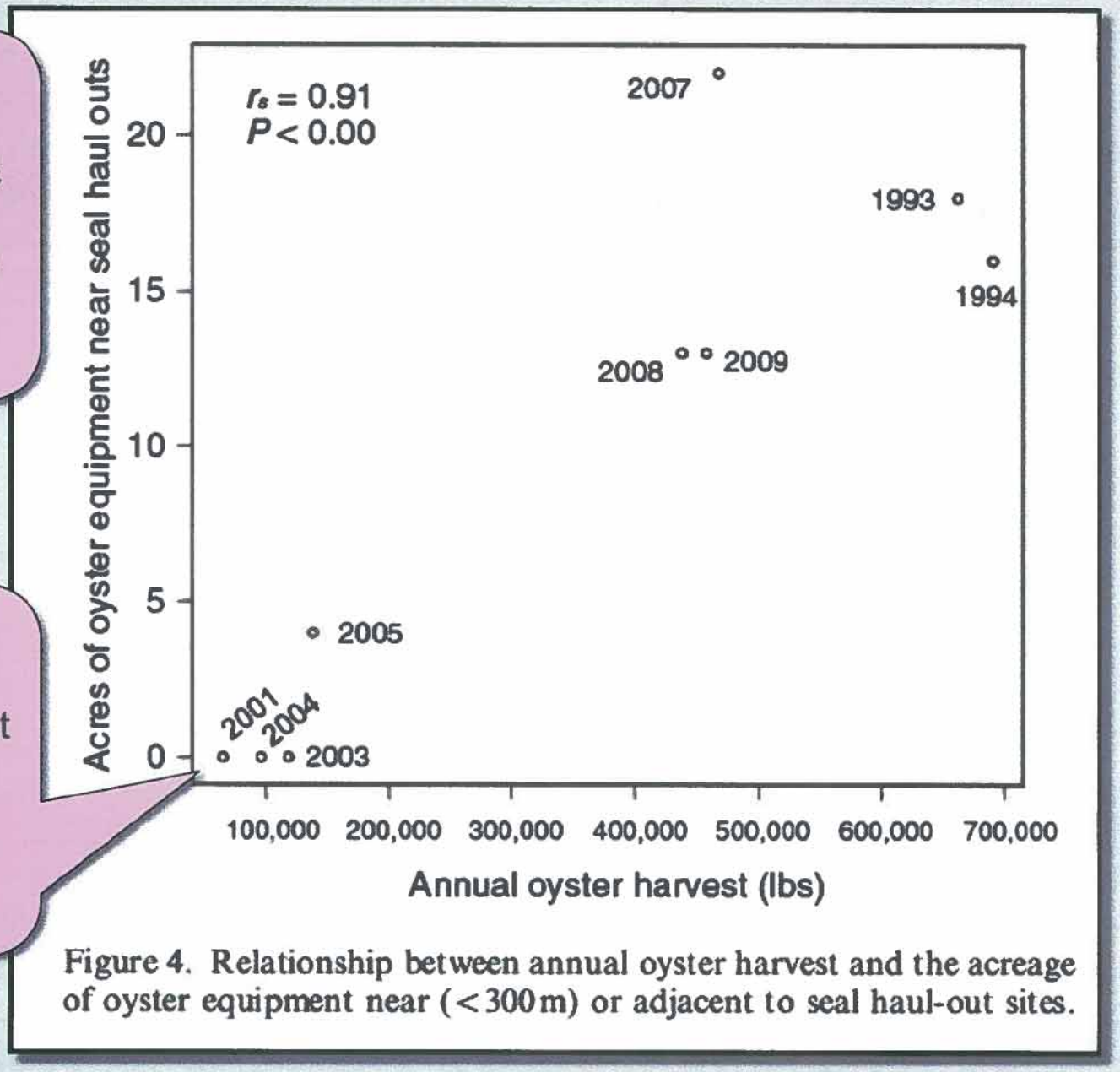


Figure 4. Relationship between annual oyster harvest and the acreage of oyster equipment near (<300 m) or adjacent to seal haul-out sites.

Becker 2011 made incorrect inferences in Table A1

Table A1.

Year	Oyster harvest (lbs)	Inferred level of mariculture use of sandbars near seals	Source(s) of inference	Analysis scale			
				Haul-out site	Intra-colony	Regional	Seal data source
1982	360,004	high	harvest data		x	x	SGA/A&H
1983	440,139	high	harvest data		x	x	SGA/A&H
1986	437,043	high	harvest data		x		SGA
1987	634,869	high	harvest data, oblique image of bags		x		SGA
1989	549,953	high	harvest data		x		SGA
1991	442,745	high	harvest data		x		SGA
1992	606,484	high	harvest data		x		SGA
1993	662,388	high	aerial image of bags		x		SGA
1997	476,791	high	harvest data	x	x	x	NPS
1998	292,188	high	harvest data, higher than 2005	x	x	x	NPS
1999	125,749	modelled high & low	slightly higher than 2000-2004, declining	x	x	x	NPS
2000	34,094	low	lower than 2002-2004	x	x	x	NPS
2001	65,676	low	aerial image of absence of bags	x	x	x	NPS
2002	78,064	low	DTP, pers. obs, harvest data	x	x	x	NPS
2003	118,643	low	aerial image of absence of bags	x	x	x	NPS
2004	96,754	low	DTP, pers. obs, harvest data	x	x	x	NPS
2005	138,958	high	aerial image of bags, increasing harvest	x	x	x	NPS
2006	291,538	high	increasing harvest, bags in '05	x	x	x	NPS
2007	468,000	high	aerial image of bags	x	x	x	NPS
2008	438,000	high	aerial image of bags	x	x	x	NPS
2009	458,000	high	aerial image of bags	x	x	x	NPS

Becker 2009 had been criticized by the NAS for using annual oyster harvest as a surrogate for oyster activity at UEN/OB during pupping season (March-May). Becker 2011 used a series of "inferences" to claim that they could infer oyster activity at UEN/OB during pupping season. This was used to drive OYST Hi/Low model. However, the inferences were incorrect.

Becker 2011 made incorrect inferences in Table A1

Table A1.

Year	Oyster harvest (lbs)	Inferred level of mariculture use of sandbars near seals	Source(s) of inference
1997	476,791	high	harvest data
1998	292,188	high	harvest data, higher than 2005
1999	125,749	modelled high & low	slightly higher than 2000-2004, declining
2000	34,094	low	lower than 2002-2004
2001	65,676	low	aerial image of absence of bags
2002	78,064	low	DTP, pers. obs, harvest data
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2007	468,000	high	aerial image of bags
2008	438,000	high	aerial image of bags
2009	458,000	high	aerial image of bags

OYST Hi/Low is based upon this "inferred" level of activity at UEN/OB during pupping season

Becker's "inferences" for UEN/OB pupping season activity came from aerial photos, harvest data, and David Press observations

Table A1.

Year	Oyster harvest (lbs)	Inferred level of mariculture use of sandbars near seals	Source(s) of inference
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2007	468,000	high	aerial image of bags
2008	438,000	high	aerial image of bags
2009	458,000	high	aerial image of bags

INFERENCES:

(1) Annual oyster harvest: irrelevant to UEN/OB during pupping season (Mar-May)

(2) Aerial photos: NPS misinterpreted the photos, seeing oyster bags where they were not and not seeing oyster bags where they were

(3) Personal observations: memories were incorrect or observer had not visited area

(4) Becker failed to obtain key data from CDPH, CDFG, JOC, and DBOC

Three types of oyster culture at UEN/OB: aerial photos show stick culture & cluster culture, but usually not bag culture

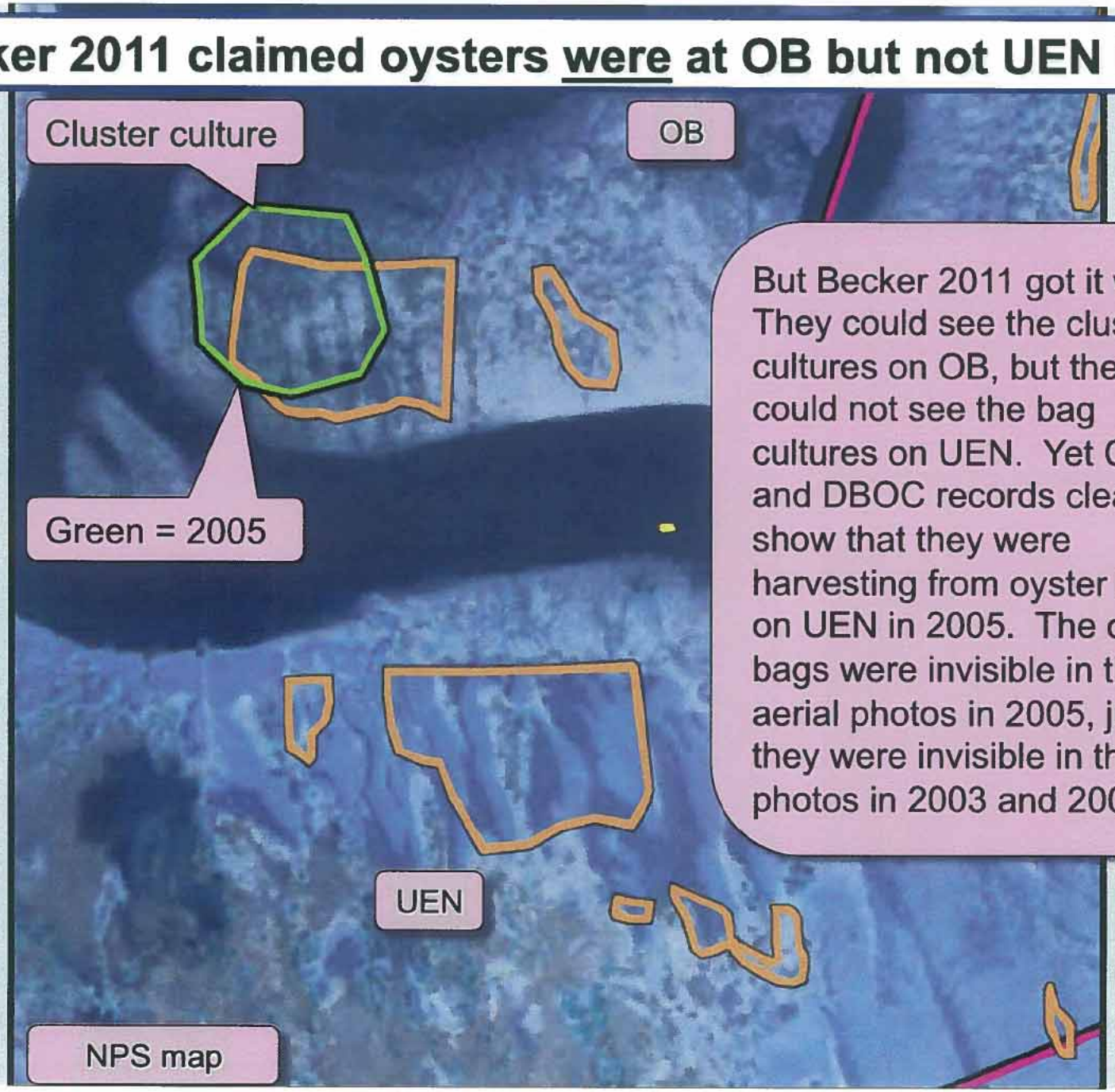
Three types of oyster culture systems used over the years at OB & UEN:

(1) **Stick culture**: sticks protruding from sand by several feet with hanging clusters; very visible in 1993 & 1994 photos; used by JOC; phased out in mid to late '90's

(2) **Cluster culture**: cluster of oysters not in bags but lying on sandbar; just visible in 2003-2005 photos on OB; largely replaced by bags and used sparingly today

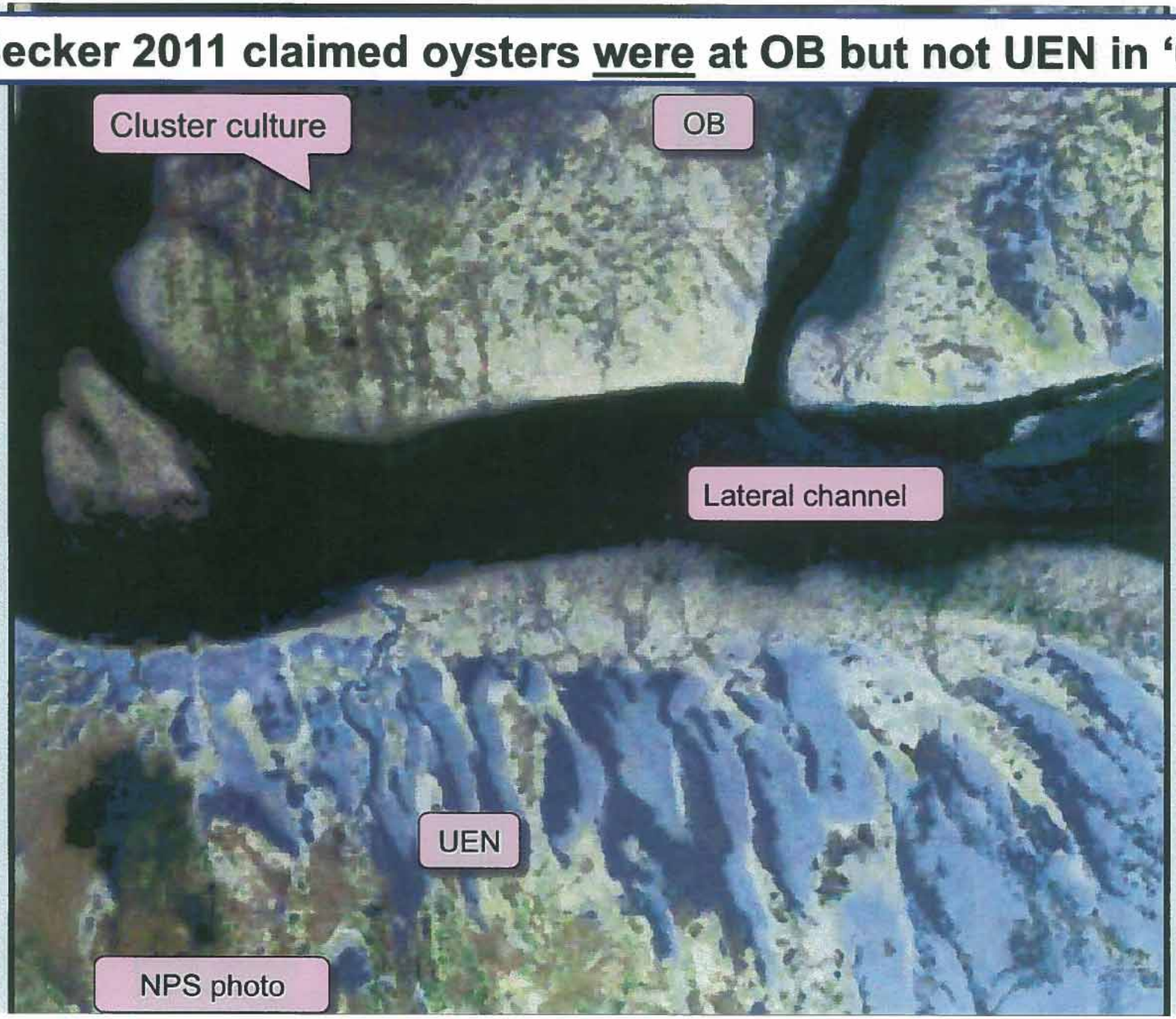
(3) **Bag culture**: oysters in bags on sandbar; least visible in aerial photos (only with high resolution and right light angle); prevalent but not seen in earlier photos

Becker 2011 claimed oysters were at OB but not UEN in '05

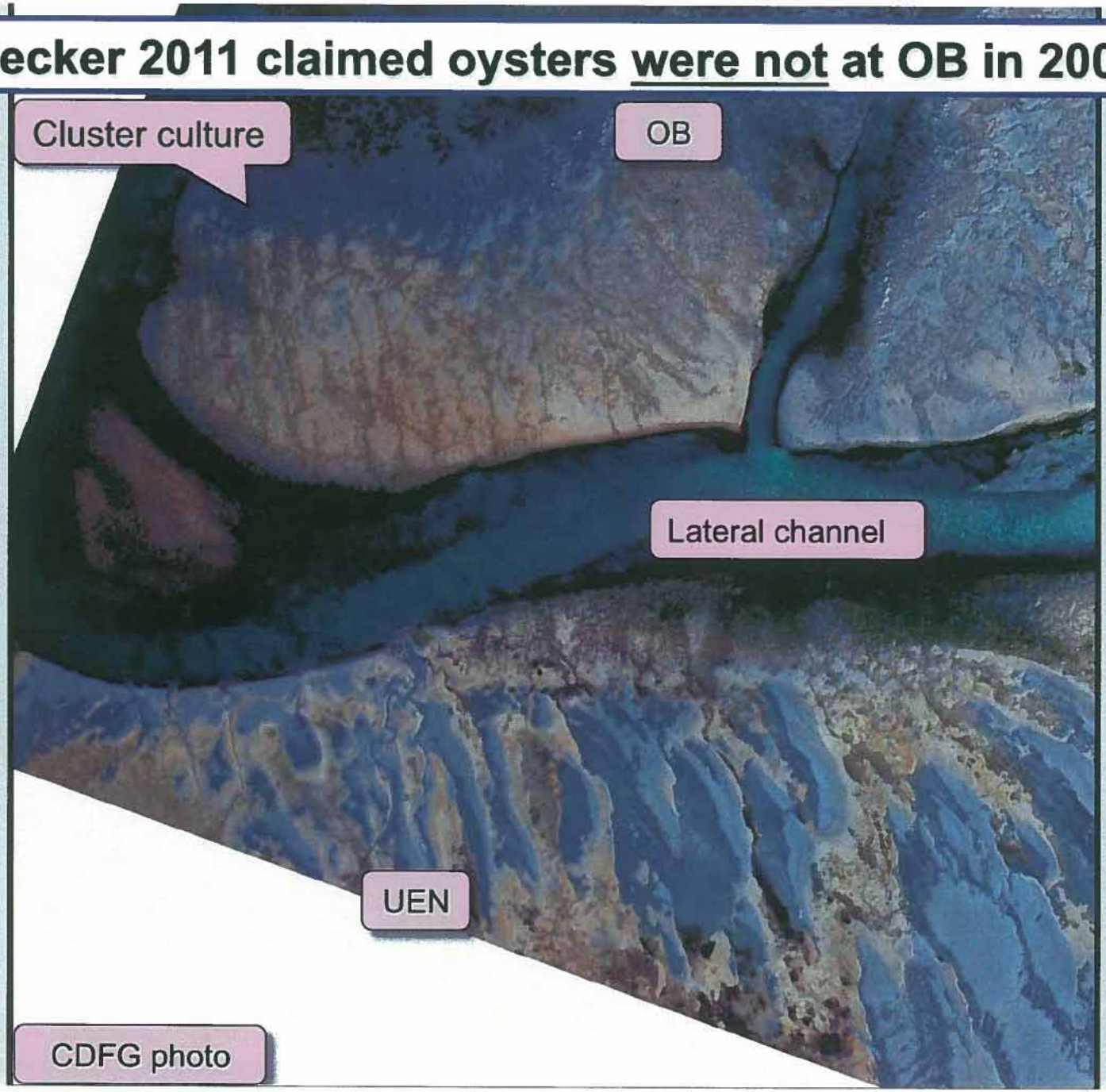


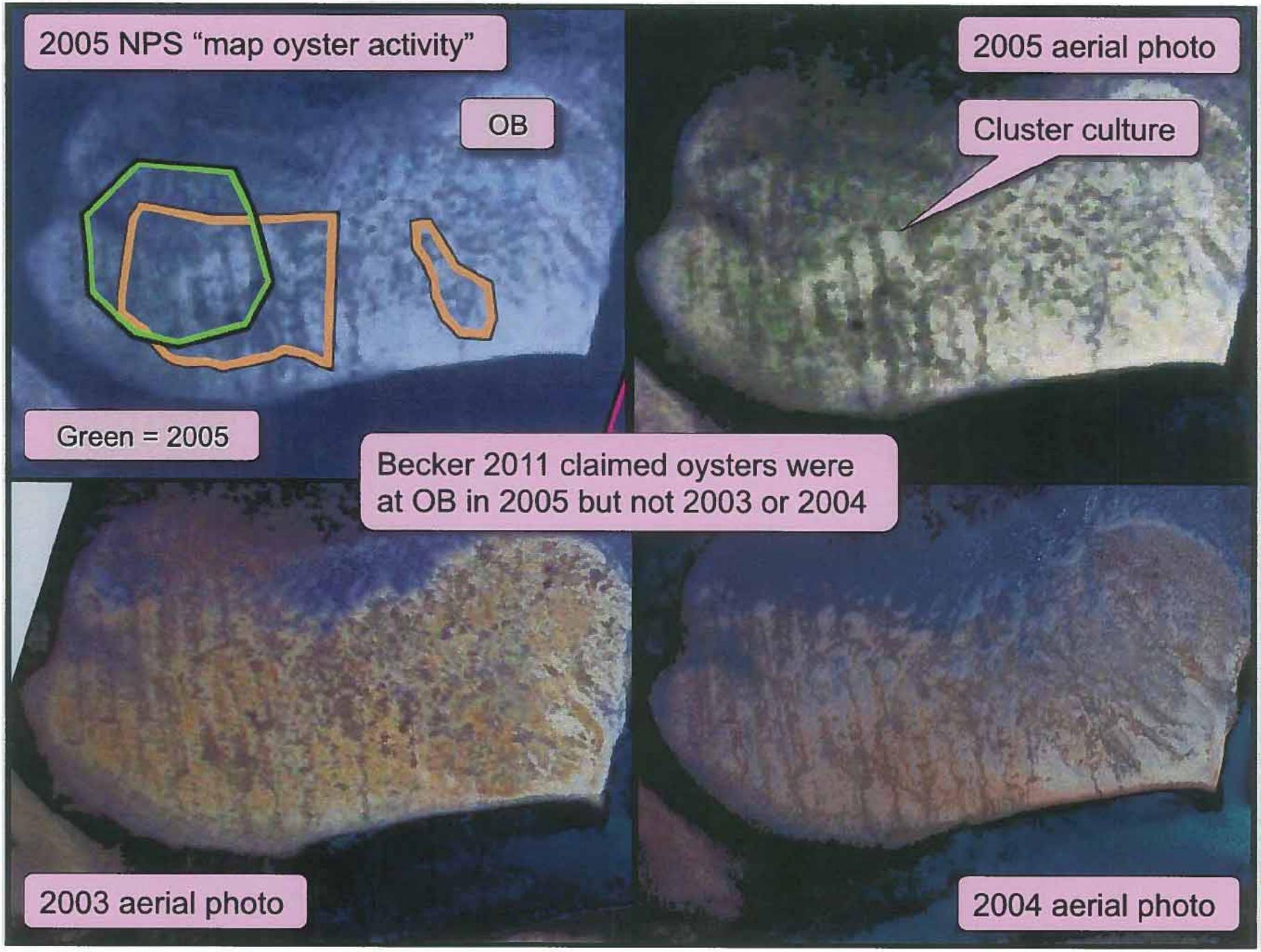
But Becker 2011 got it wrong. They could see the cluster cultures on OB, but they could not see the bag cultures on UEN. Yet CDPH and DBOC records clearly show that they were harvesting from oyster bags on UEN in 2005. The oyster bags were invisible in the aerial photos in 2005, just as they were invisible in the photos in 2003 and 2004.

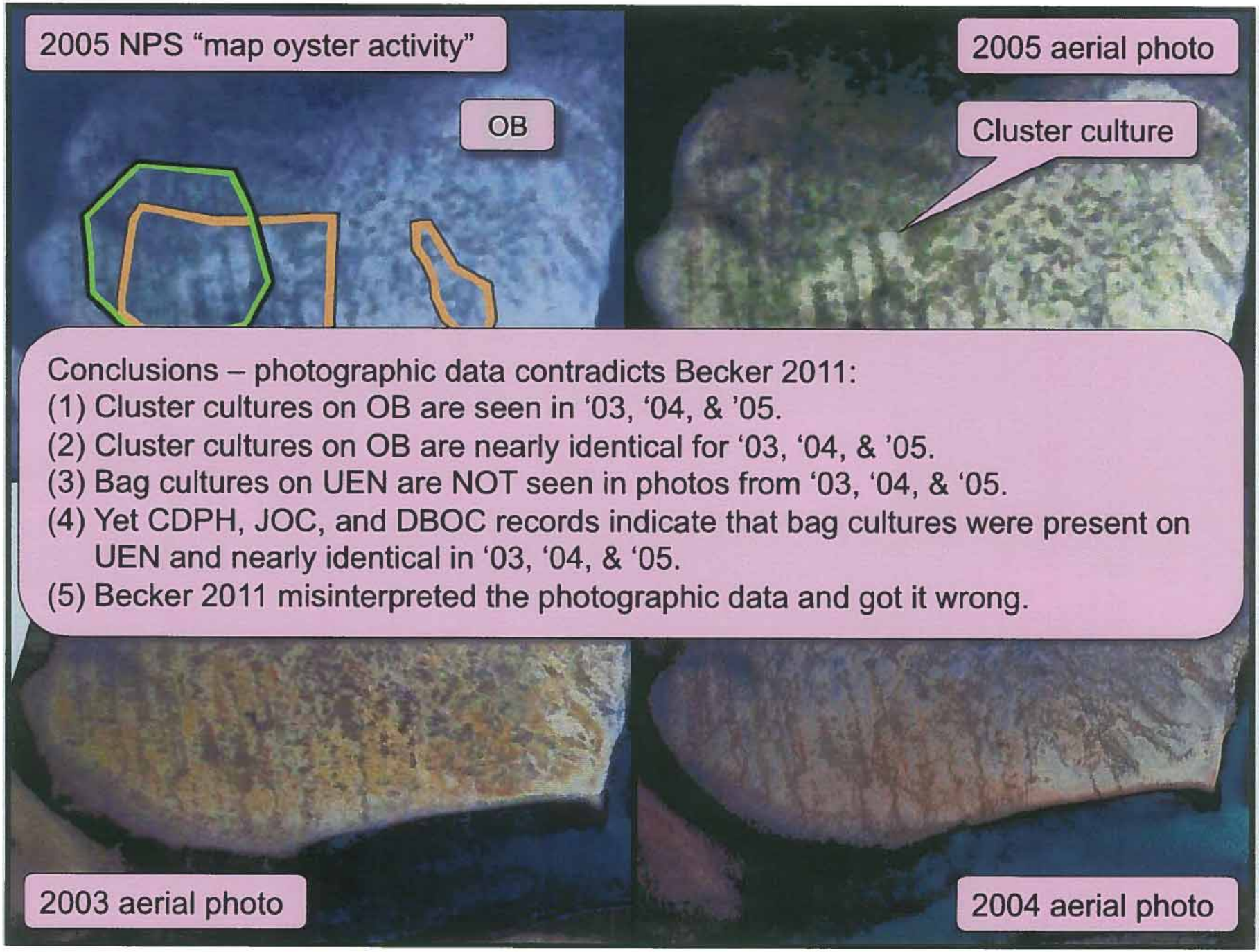
Becker 2011 claimed oysters <u>were</u> at OB but not UEN in '05



Becker 2011 claimed oysters were not at OB in 2004



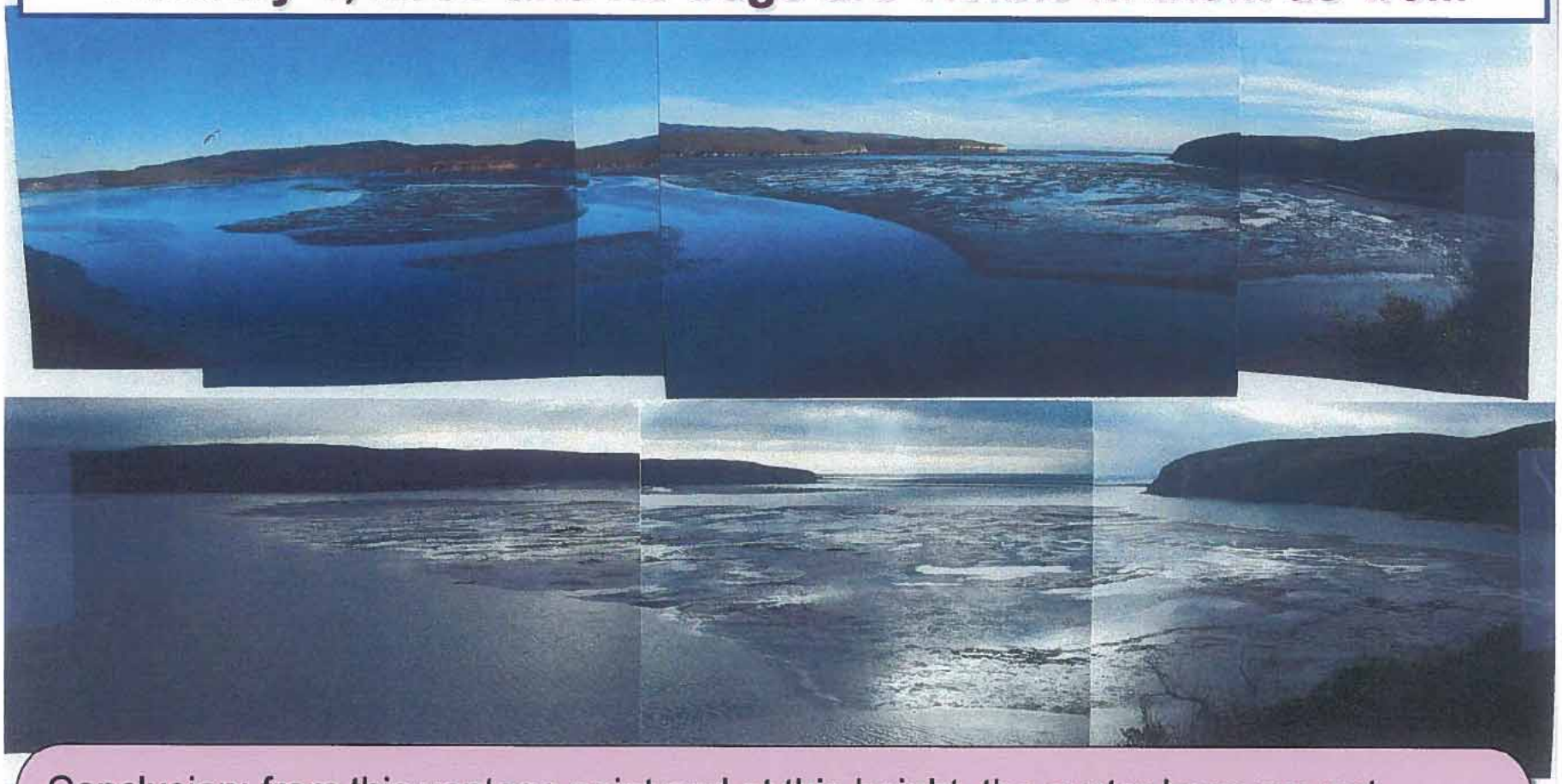

2005 NPS "map oyster activity"
OB
Green = 2005
2005 aerial photo
Cluster culture
Becker 2011 claimed oysters were at OB in 2005 but not 2003 or 2004
2003 aerial photo
2004 aerial photo


2005 NPS "map oyster activity"
OB
2005 aerial photo
Cluster culture
Conclusions – photographic data contradicts Becker 2011:
(1) Cluster cultures on OB are seen in '03, '04, & '05.
(2) Cluster cultures on OB are nearly identical for '03, '04, & '05.
(3) Bag cultures on UEN are NOT seen in photos from '03, '04, & '05.
(4) Yet CDPH, JOC, and DBOC records indicate that bag cultures were present on UEN and nearly identical in '03, '04, & '05.
(5) Becker 2011 misinterpreted the photographic data and got it wrong.
2003 aerial photo
2004 aerial photo

Becker 2011 Relied on David Press "pers. obs." and 2003 photos while UC Davis student working at Barries Bay …

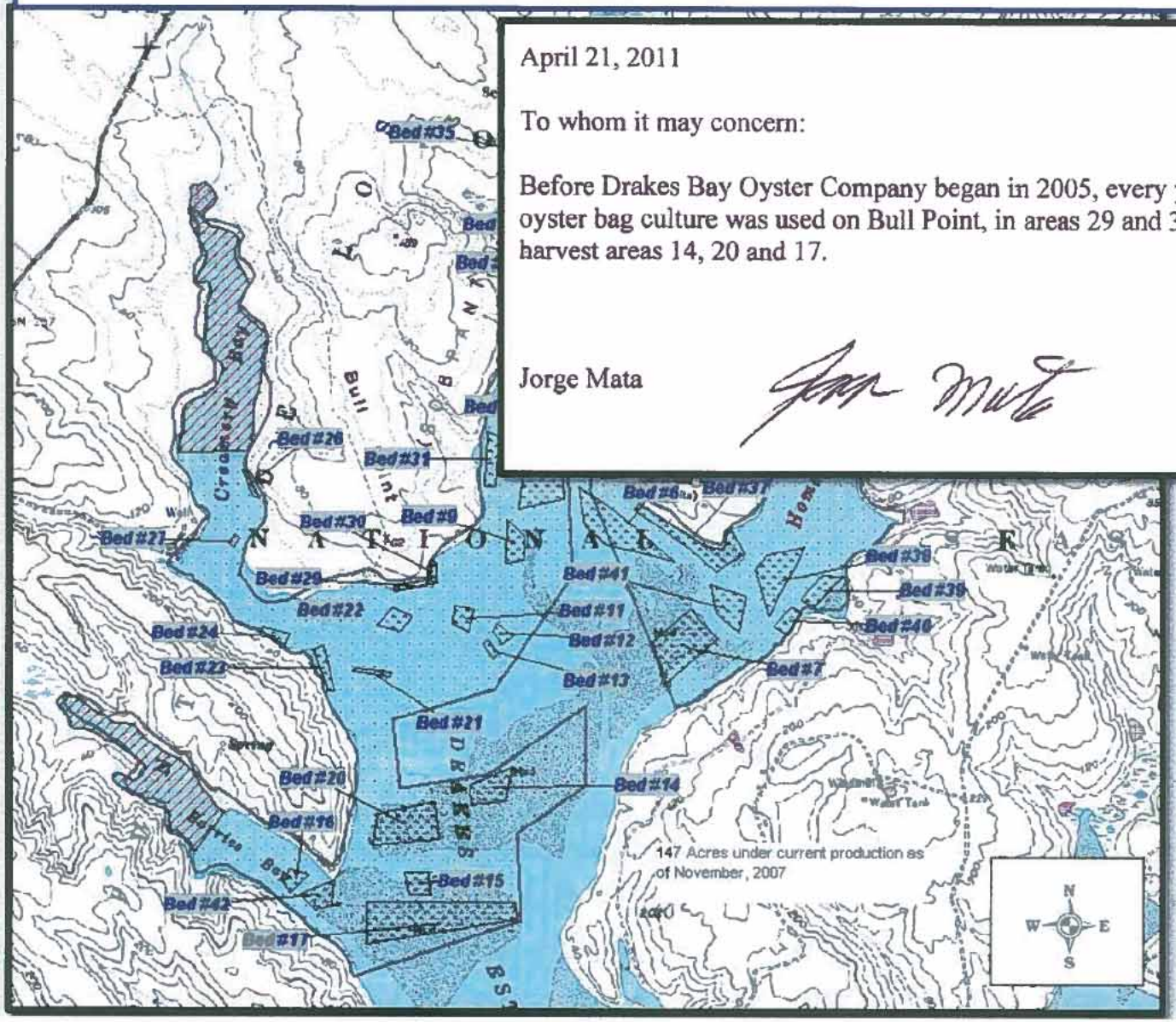
Photos of lower Drakes Estero taken from western shore. Photos begin to the east, facing down lateral channel, and then sweep south to the mouth of Barries Bay. Photos taken by David Press in spring of 2003 sometime between April 18 and May 19. Exact date is not known.

… but Kevin Lunny has photos from same location on January 1, 2009 and no bags are visible in them as well.



Conclusion: from this vantage point and at this height, the oyster bags are not visible. NPS and CDFG aerial photos show large numbers of oyster bags in 2009 when Kevin Lunny took his photo, but they are not seen in these photos. Thus the David Press photographic data are inconclusive, and are contradicted, as shown here, by CDPH records, JOC employee statements, and aerial photographs.

Former Johnson's Oyster Company owner, manager, and foreman claim JOC harvested from OB & UEN until the end



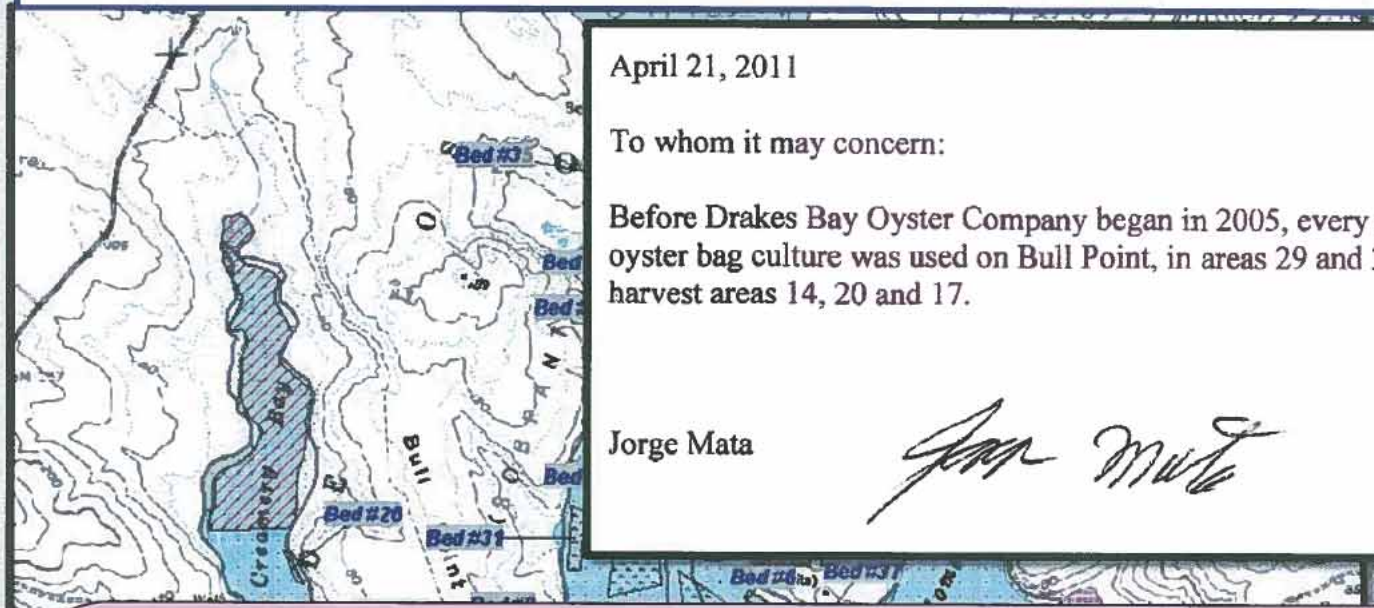
April 21, 2011

To whom it may concern:

Before Drakes Bay Oyster Company began in 2005, every year since 1984 to the present, oyster bag culture was used on Bull Point, in areas 29 and 30 and on Berries Bar in harvest areas 14, 20 and 17.

Jorge Mata

Former Johnson's Oyster Company owner, manager, and foreman claim JOC harvested from OB & UEN from '00 to '04



April 21, 2011

To whom it may concern:

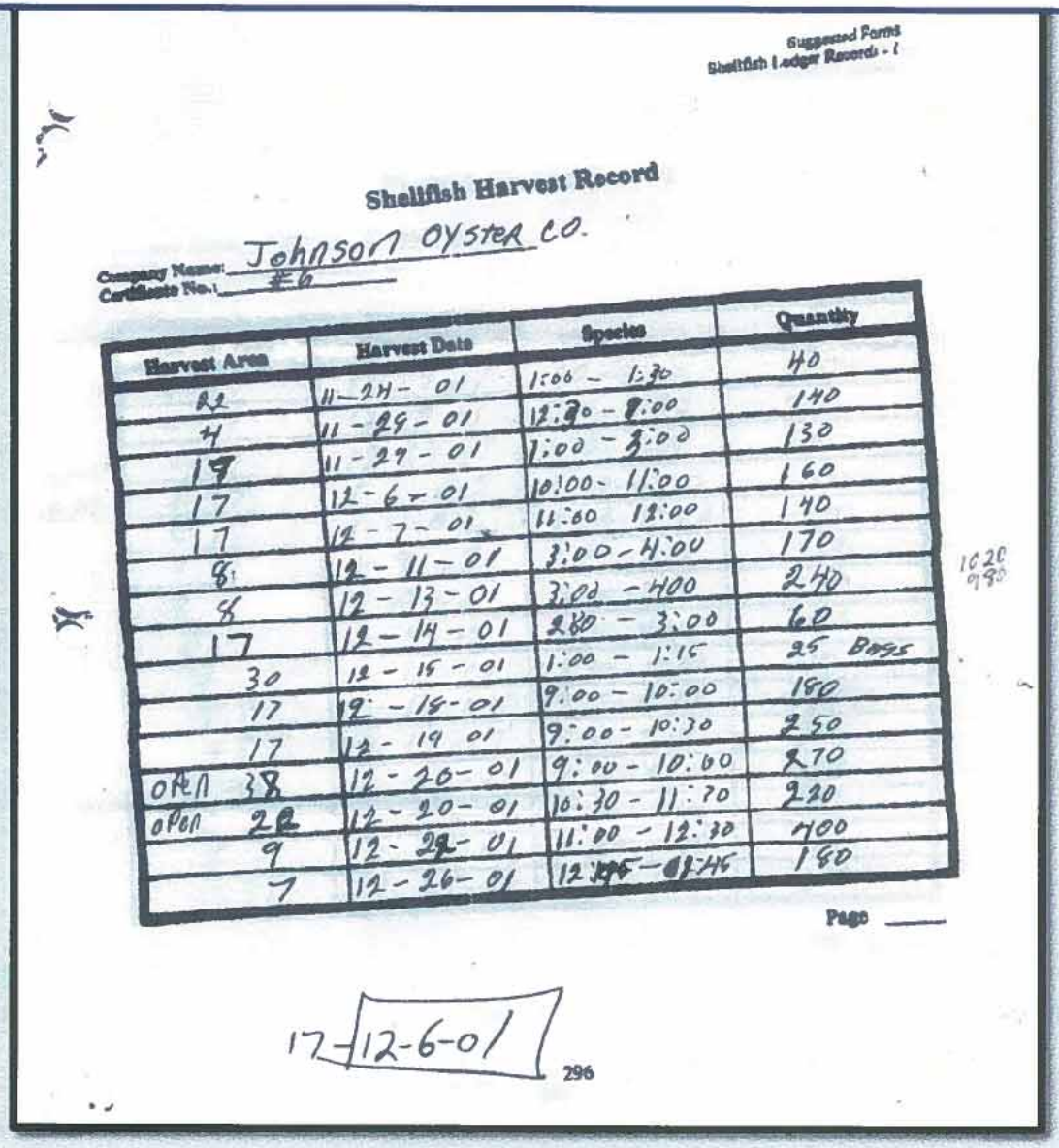
Before Drakes Bay Oyster Company began in 2005, every year since 1984 to the present, oyster bag culture was used on Bull Point, in areas 29 and 30 and on Berries Bar in harvest areas 14, 20 and 17.

Jorge Mata

We received statements three key people, all claiming that JOC continued to harvest oysters from bed #17 (UEN), bed #20 (OB), and other neighboring beds throughout 2000-2004, even as overall production decreased. The reason was simple: bed #17 is the only place where JOC or DBOC can harvest after rainfall, and thus is key for maintaining harvest in months such as March and into April (it is the only place in California where CDPH permits harvesting after rainfall).

(1) Jorge Mata, former JOC foreman and current DBOC foreman;
(2) Nellie Gamez, former JOC office manager who collected all records;
(3) Mark Johnson, former JOC co-owner

California Dept. of Public Health records of oyster harvest during rainy season show harvest from bed #17 in '01 to '04



Suggested Forms
Shellfish Ledger Records - 1

Shellfish Harvest Record

Company Name: Johnson Oyster Co.
Certificate No.: #6

Harvest Area	Harvest Date	Species	Quantity
22	11-24-01	1:00 - 1:30	40
4	11-29-01	12:30 - 2:00	140
17	11-29-01	1:00 - 3:00	130
17	12-6-01	10:00 - 11:00	160
17	12-7-01	11:00 12:00	140
8	12-11-01	3:00 - 4:00	170
8	12-13-01	3:00 - 400	240
17	12-14-01	2:00 - 3:00	60
30	12-15-01	1:00 - 1:15	25 Bags
17	12-18-01	9:00 - 10:00	180
17	12-19-01	9:00 - 10:30	250
OPEN 38	12-20-01	9:00 - 10:00	270
OPEN 28	12-20-01	10:30 - 11:70	220
9	12-29-01	11:00 - 12:30	400
7	12-26-01	12:45 - 01:45	180

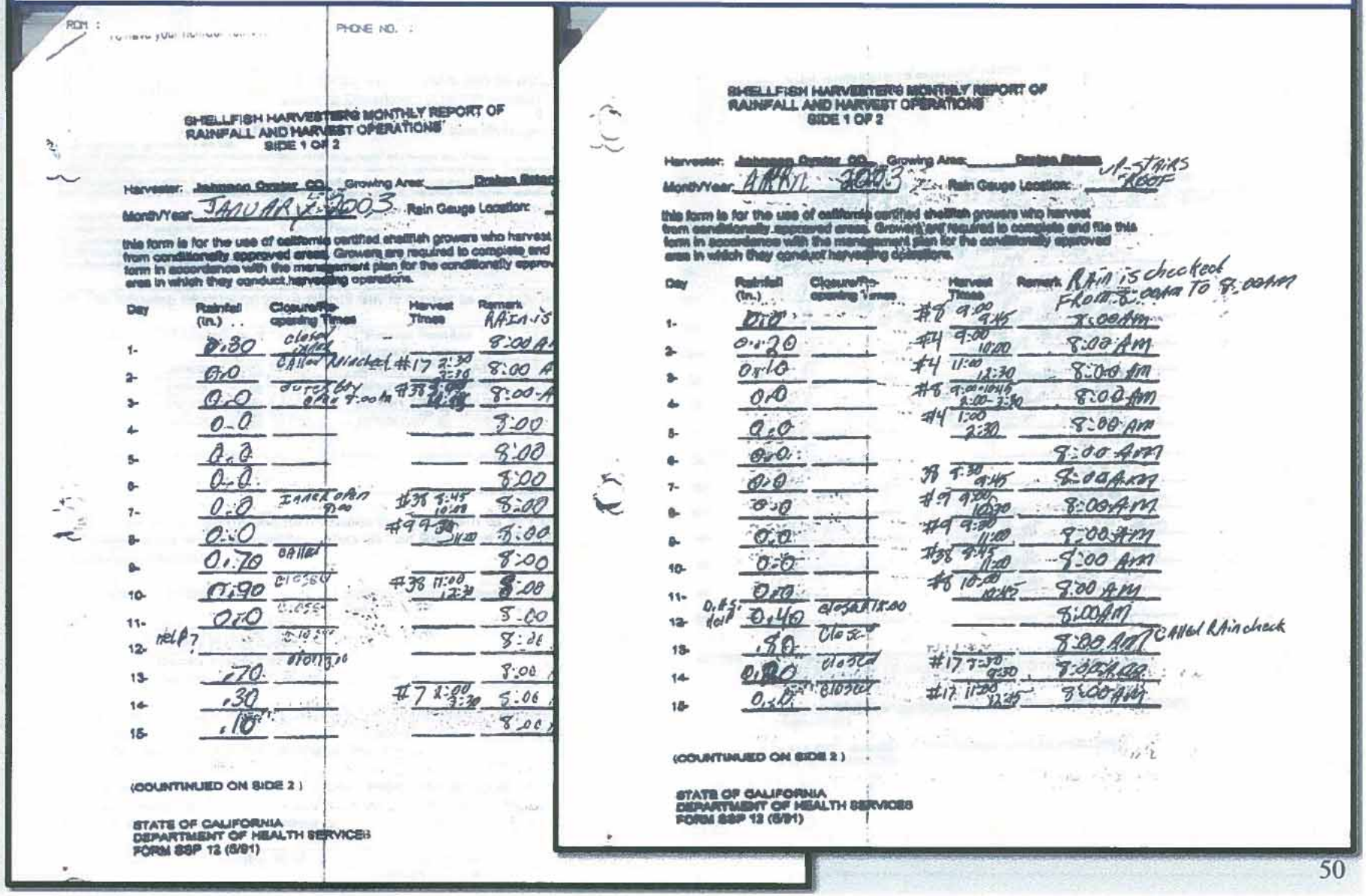
1020
980

Page ____

17 - 12-6-01

296

California Dept. of Public Health records of oyster harvest during rainy season show harvest from bed #17 in '01 to '04



SHELLFISH HARVESTER'S MONTHLY REPORT OF RAINFALL AND HARVEST OPERATIONS
SIDE 1 OF 2

Harvester: Johnson Oyster Co. Growing Area: Drakes Estero
Month/Year: JANUARY 2003 Rain Gauge Location:

this form is for the use of california certified shellfish growers who harvest from conditionally approved areas. Growers are required to complete and file this form in accordance with the management plan for the conditionally approved areas in which they conduct harvesting operations.

Day	Rainfall (in.)	Closure/Re-opening Times	Harvest Times	Remark
1-	0.30	closed		8:00 A
2-	0.0		#17 2:30 3:30	8:00 A
3-	0.0		#38	8:00 A
4-	0.0			8:00
5-	0.0			8:00
6-	0.0			8:00
7-	0.0		#38 9:45 10:30	8:00
8-	0.0		#9 9:30 11:00	8:00
9-	0.70			8:00
10-	0.90		#38 11:00 12:30	8:00
11-	0.0			8:00
12-				8:00
13-	.70			8:00
14-	.30		#7 2:00 3:30	8:00
15-	.10			8:00

(COUNTINUED ON SIDE 2)

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
FORM SSP 13 (6/91)

SHELLFISH HARVESTER'S MONTHLY REPORT OF RAINFALL AND HARVEST OPERATIONS
SIDE 1 OF 2

Harvester: Johnson Oyster Co. Growing Area: Drakes Estero
Month/Year: APRIL 2003 Rain Gauge Location: 11-STINKS ROOF

this form is for the use of california certified shellfish growers who harvest from conditionally approved areas. Growers are required to complete and file this form in accordance with the management plan for the conditionally approved areas in which they conduct harvesting operations.

Day	Rainfall (in.)	Closure/Re-opening Times	Harvest Times	Remark
1-	0.10		#6 9:00 9:45	RAIN is checked FROM 8:00AM TO 8:00AM
2-	0.20		#4 9:30 10:00	8:00 AM
3-	0.10		#4 11:00 12:30	8:00 AM
4-	0.0		#6 9:00-10:45 1:00-2:30 #4 1:00 2:30	8:00 AM
5-	0.0			8:00 AM
6-	0.0			8:00 AM
7-	0.0		#38 7:30 9:45	8:00 AM
8-	0.0		#9 9:30 10:30	8:00 AM
9-	0.0		#4 9:30 11:00	8:00 AM
10-	0.0		#38 9:45 11:00	8:00 AM
11-	0.10		#6 10:30 10:45	8:00 AM
12-	0.40	closed 11:00		8:00 AM
13-	.10	closed		8:00 AM CALLED RAIN CHECK
14-	0.80	closed	#17 7:30 9:30	8:00 AM
15-	0.10	closed	#17 11:30 12:45	8:00 AM

(COUNTINUED ON SIDE 2)

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
FORM SSP 13 (6/91)

The years 2003, 2004, & 2005 were nearly identical: cluster cultures seen in photos and bag cultures not seen in photos

Becker 2011 claimed there were no oysters harvested at OB & UEN in last five JOC years (2000-2004), and DBOC increased activity in 2005. This was incorrect.

It is contradicted by CDPH records.
It is contradicted by JOC and DBOC employees, managers, and owners.
It is contradicted by the CDFG aerial photographs.

The 2003, 2004, & 2005 photos share two things in common.
(1) Just visible are similar oyster clusters (cluster culture) on OB (bed #20)
(2) Not visible are the equally similar oyster bags (bag culture) on UEN (bed #17)

Had Becker worked with Lunny, as MMC suggested, he would have learned this.

Analysis of Becker et al. 2011: conclusions part 2

***Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades*†**

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
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1. Annual oyster harvest is not surrogate for UEN/OB pupping season

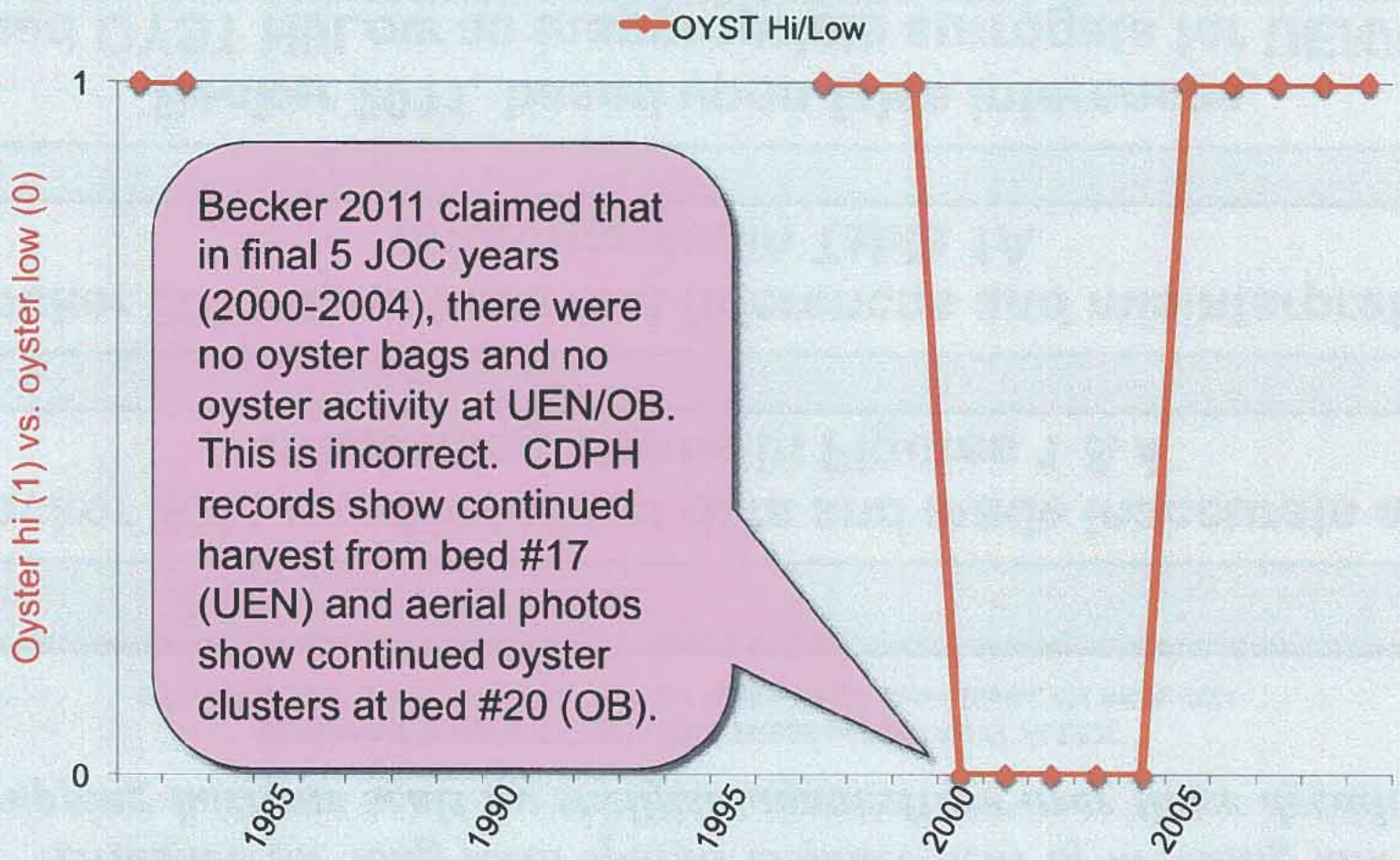
2. Seal haul-out map is misleading: seals and oysters do not overlap

3. Claims and maps of oyster bags in pupping areas are incorrect

4. Claims of zero oyster bags at OB/UEN from 2000-2004 are incorrect
   CDPH records show JOC continued to harvest from UEN & OB

5. **Inferences that drove OYST Hi/Low categorical model are incorrect**
   NPS did not provide conclusive data to support major model in paper

Is OYST Hi/Low a surrogate for oyster activity at OB/UEN during pupping season? A: No



OYST Hi/Low categorical oyster activity

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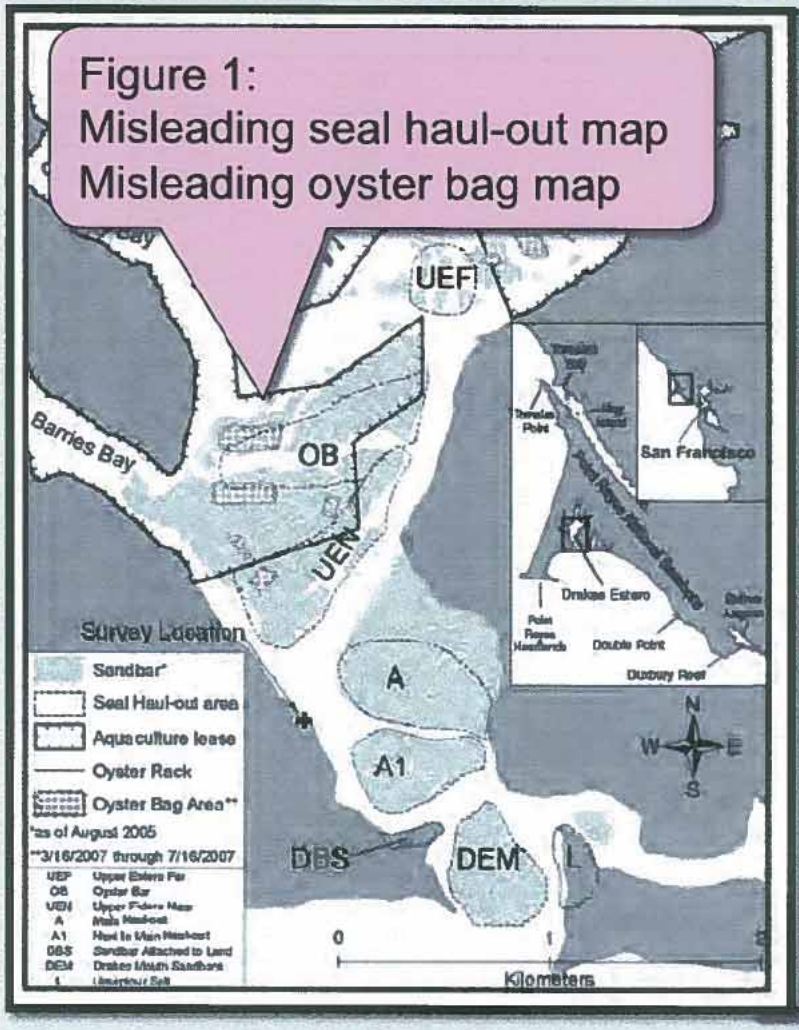
Becker 2011 used incorrect data and made inaccurate and misleading claims in Figures 1 & 4

Becker 2011 used incorrect inferences and misinterpreted photographs in Table 1A

Becker 2011, based upon false inferences, used OYST Hi/Low as inappropriate surrogate for UEN/OB

Conclusion: Becker 2011 used incorrect data and made inaccurate and misleading claims in Figures 1 & 4



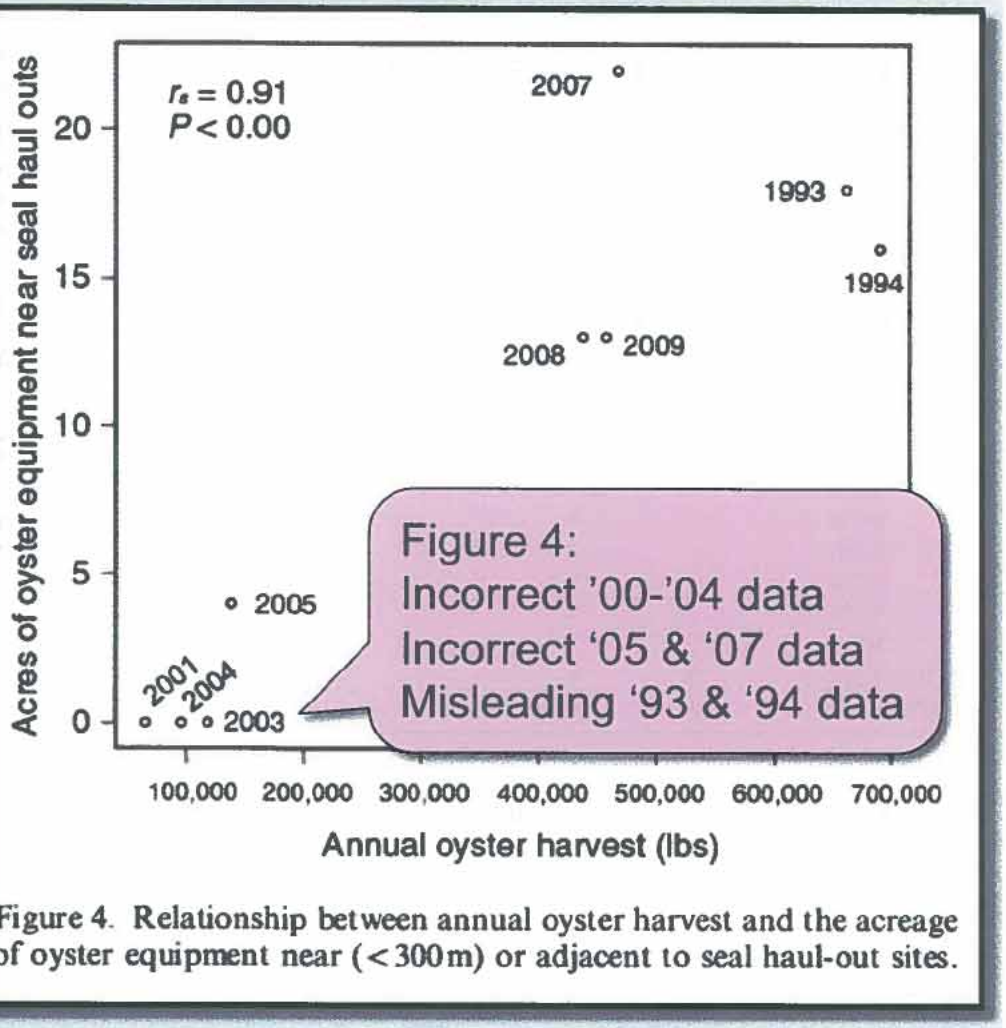


Figure 4. Relationship between annual oyster harvest and the acreage of oyster equipment near (<300m) or adjacent to seal haul-out sites.

Conclusion: Becker 2011 used incorrect inferences and misinterpreted photographs in Figure 1A

Table A1.

Year	Oyster harvest (lbs)	Inferred level of mariculture use of sandbars near seals	Source(s) of inference	Analysis scale			
				Haul-out site	Intra-colony	Regional	Seal data source
1982	360,004	high	harvest data		x	x	SGA/A&H
1983	440,139	high	harvest data		x	x	SGA/A&H
1986	437,043	high	harvest data		x		SGA
1987	634,869	high	harvest data, oblique image of bags		x		SGA
1989	549,953	high	harvest data		x		SGA
1991	442,745	high	harvest data		x		SGA
1992	606,484	high	harvest data		x		SGA
1993	662,388	high	aerial image of bags		x		SGA
1997	476,791	high	harvest data	x	x	x	NPS
1998	292,188	high	harvest data, higher than 2005	x	x	x	NPS
1999	125,749	modelled high & low	slightly higher than 2000-2004, declining	x	x	x	NPS
2000	34,094	low	lower than 2002-2004	x	x	x	NPS
2001	65,676	low	aerial image of absence of bags	x	x	x	NPS
2002	78,064	low	DTP, pers. obs, harvest data	x	x	x	NPS
2003	118,643	low	aerial image of absence of bags	x	x	x	NPS
2004	96,754	low	DTP, pers. obs, harvest data	x	x	x	NPS
2005	138,958	high	aerial image of bags, increasing harvest	x	x	x	NPS
2006	291,538	high	increasing harvest, bags in '05	x	x	x	NPS
2007	468,000	high	aerial image of bags	x	x	x	NPS
2008	438,000	high	aerial image of bags	x	x	x	NPS
2009	458,000	high	aerial image of bags		x	x	NPS

Table 1A:
Incorrect inferences
Misrepresented photos
Misuse of harvest data

Analysis of Becker et al. 2011: conclusions part 2

Evidence for long-term spatial displacement of breeding and pupping harbour seals by shellfish aquaculture over three decades†

BENJAMIN H. BECKER*, DAVID T. PRESS and SARAH G. ALLEN
US National Park Service, Point Reyes National Seashore, Point Reyes Station, CA 94956, USA

1. Annual oyster harvest is not surrogate for UEN/OB pupping season

2. Seal haul-out map is misleading: seals and oysters do not overlap

3. Claims and maps of oyster bags in pupping areas are incorrect

4. Claims of zero oyster bags at OB/UEN from 2000-2004 are incorrect
   CDPH records show JOC continued to harvest from UEN & OB

5. Inferences that drove OYST Hi/Low categorical model are incorrect
   NPS did not provide conclusive data to support major model in paper

Analysis of Becker et al. 2011: concluding comments

1. Title says "*long-term spatial displacement*" but analysis shows transient; authors failed to note their statistics driven by 2003 & 2004

2. Title says "*evidence*" oyster farm displaced seals but models fail; authors' data generates models 1000 times better than oyster activity

3. Title says "*three decades*" of data but 14 year gap; authors cherry picked 1982 & 1983 data – NPS previously denied these data existed

4. Analysis shows regional harbor seal population, events at Double Point, and elephant seals drive movements of harbor seals into Estero

5. Authors used incorrect seal haul-out maps, incorrect oyster bag maps, and misinterpreted aerial photos; never asked for Lunny data

6. Authors missed opportunity to determine if adaptive management succeeded with 92 (oyster boats) & 96 (kayak) management changes

7. Authors missed opportunity to use data to study biology of harbor seals and population dynamics; authors too focused on oyster farm

RECEIVED
2011 DEC -9 PM 5:06
PT REYES NS

December 7, 2011

Draft EIS DBOC SUP
Superintendent Cicely Muldoon
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94952

Dear Ms. Muldoon,

Thank your for the opportunity to comment on the National Park Service (NPS) Draft Environmental Impact Statement (dEIS) for the Drakes Bay Oyster Company (DBOC) Special Use Permit. My comments spotlight the impact topic: Visitor Experience and Recreation. I was terribly disappointed to read the consistent flaws throughout the dEIS, but will comment primarily on the fact that the dEIS states that DBOC "does not provide a visitor service" within Point Reyes National Seashore (PRNS). This glaring error must be corrected in the final EIS.

I have spent most of my adult life in education. My Bachelors degree from St. Mary's College in Moraga, CA is in education. I began my educational career as a National Park Service Interpretive Ranger at Pt. Reyes National Seashore during Point Reyes' beginning years as a National Seashore. I was provided additional formal instruction at NPS Mather Training Center, Harpers Ferry, West Virginia and I developed greater interpretive skills through ongoing training and workshops provided to me by the NPS for the years I was employed at PRNS. These same interpretive skills are what helped to shape my classroom model and management for all grades throughout the following years. A little over two years ago, I was invited to manage the Drakes Bay Oyster Farm, and one of my primary duties was to strengthen the interpretive program for the highly visited oyster farm located in the heart of the National Seashore.

The EIS erroneously states, "...the primary focus of DBOC is the commercial operation for the sale of shellfish to restaurants and the wholesale shellfish market outside the park." The NPS has no authority to misrepresent the "focus" of DBOC. The NPS made this false declaration without asking DBOC what its "focus" is. This is either an intentional effort to mislead the public or it is irresponsible speculation. This comment caused me great discontent knowing the effort the Lunny family has put into the education and enjoyment of the Seashore visitors at the oyster farm, both prior to my employment with DBOC as well as the continued enrichment of the visitor services program over the past two and a half years that I have been a part of the family business. Our indoor visitor area, although small, has developed into a visual and hands on educational display which contributes to the personal growth and well-being of every visitor that walks through the door. Visitors learn about the sustainable farming practices that exist in Drakes Estero, some of which have been in place for over 80 years. The Pastoral Zone of the PRNS was created by the US Congress to preserve the cultural working landscapes. This cultural resource surrounds Drakes Estero and includes the DBOC processing, retail and visitor center. Seashore visitors that stopover at DBOC are also educated about the history

of the dairy and beef ranches in the Pastoral Zone. Many of our visitors have no interest in purchasing or consuming oysters yet are extremely interested in the variety of farming operations ongoing throughout the National Seashore, including oyster farming. The fact that I grew up one of the Pastoral Zone ranches (the Lunny Ranch or "G" Ranch), a neighbor to the Johnson Oyster Company and now DBOC, is a great attribute as so many questions arise about the Seashore's farming in the pastoral areas. Our interpretive program is a consistent, free of charge, year-round visitor service. Our visitor facility is open seven days a week, from 8:30 to 4:30, although rarely do we leave the premises, especially during the summer months, before 5:30pm. We never close the doors on a visitor. Our last visitor is greeted with the same enthusiasm as our first, and I have walked the farm giving impromptu tours well beyond closing hours for the curious visitor arriving late on more occasions than any employee would be expected to do. I do it out of the desire to contribute to these visitors' experience while in the Seashore. Our crew is here and working five days each week, Tuesday through Saturday, and our work week was specifically developed to enhance the visitors' experience. Weekends are typically busier than week days, so having the farming operation ongoing on a busy Saturday is an opportunity greatly enjoyed by the Seashore visitors. DBOC staff is also trained and encouraged to engage with the visiting public to enhance the visitor's experience. In addition, DBOC distributes PRNS publications, provides information about other seashore destinations, directions, as well as answering numerous other visitor inquiries.

Throughout the year, we open our doors to the oyster farm to a variety of groups of all ages for educational tours, and this welcoming invitation has been in place since the Lunny's purchase of the oyster farm. We work in partnership with Marin Agricultural Land Trust and their outreach program, Ag in the Classroom. Our program for elementary classes is typically two and a half hours, including at least two hands on projects along with an age appropriate tour. It has always been well received and classes return year after year. We are a member of the Marin Convention & Visitors Bureau (MCVB) and regularly provide tours for groups initiated by MCVB. Our most recent tour was a bus of 45 concierges from every hotel in San Francisco. It was a wonderful opportunity to share with them the natural and cultural resources found in PRNS, only an hours drive from their San Francisco hotels. Drakes Bay Oyster Farm has become a destination point for many guests of these hotels. Other groups include, but are not limited to, Marin Organic, the Treasure Island Job Corps (Advanced Culinary Trainees), College of Marin, Stanford University, The Urban School of San Francisco, UC Davis, SF State, UC Berkeley, The Berkeley School, Dominican University, St. Rita's Elementary School, Mountain Oaks Elementary, American River College, Future Farmers of America-McArthur California Chapter, The Ohio State University Agribusiness Club, The American Indian Education Program (out of Marysville, CA), Taiwanese-American Women, Google Executive Chefs, Non-Native Plant Removal Group working for the NPS, Whole Foods Leadership Retreat, Waterbar Staff Retreat, Northern California Airstreamers, and the list continues to grow. On average, a group size is 25 to 30 people. On a daily basis, our educational corner evokes enough curiosity that questions are asked and tours are given to groups of 1 to 15-20 visitors as needed on any day. I would like to share one very fond memory that I often recall. On the 4th of July weekend in 2010, I enthusiastically put a small festive sign at the end of

DBOC's oyster farm road indicating tour times of noon, 2:00 pm and 4:00 pm. Cars came into the farm in streams. The parking lot had 50 to 60 cars coming and going all afternoon long. I began the first tour at noon and did not stop our hiking tour of the farm until after 6:00 pm. The tours became continuous due to the number of visitors that arrived. The most often heard comment was, "This was the best part of our visit to PRNS". Over all, there were between 400 and 500 visitors to visit and tour on that 4th of July Saturday. On Monday, July 6th, I was called by a NPS employee, Kevin McKay, and told that signs were prohibited within the park and I was not to invite visitors to the facility in this manner in the future. I found this to be such a loss for our urban visitors who enjoy touring a valuable cultural resource, fully permitted to provide this beloved visitor service. Even without signage, we still draw crowds every day of the week, although we could better serve of our park visitors with an "open to visitors" sign. Since the inception of the PRNS, the Johnson Oyster Company had a sign at the beginning of the driveway identifying "oysters for sale" and the hours of operation. PRNS appropriately replaced the sign with two signs, one with the farm name only and the other containing the balance of the information. DBOC was told at the time that, in order to meet NPS sign codes, the information needed to be divided into two signs and that the one identifying the farm as open to the public would be located on the entrance to the driveway, not actually of Sir Francis Drake Boulevard. Inexplicably, after conflict arose about the future of the oyster farm, the PRNS removed the sign that identified the farm as open to the public and hours of operation. The removal of the sign has damaged, and continues to seriously damage, DBOC financially. It is also cheating Seashore visitors of an opportunity, had they known the farm was open to the public, to add to their PRNS experience. DBOC has requested that the same NPS sign that was wrongly removed, be replaced in the same location. These signs were approved by the Superintendent, installed by PRNS staff, and the one removed without explanation. The EIS should fully evaluate the replacement of this sign. (A photo of the sign to be replaced is attached to this letter.)

DBOC is the only farm of any kind that is fully permitted to provide interpretive services to the visiting public. Without DBOC, the opportunity to visit a working farm, learn about where our food comes from, learn about the working landscapes of PRNS and an opportunity to purchase the bounty of the PRNS working landscapes would be lost forever, affecting over 50,000 seashore visitors per year. In addition, the dEIS falsely claims that the 50,000 visitors could be accommodated at the two other West Marin oyster farms on Tomales Bay that are open to the public. The capacity of those two farms is already exceeded, mostly due to their limited parking space. Actually, these two farms have received heavy criticism for causing traffic congestion and driving safety hazards on the highway along Tomales Bay (Highway 1). If NPS removes the DBOC opportunity, it would be impossible for the two Tomales Bay oyster farms to accommodate the 50,000 displaced former DBOC visitors. Simply dismissing DBOC's valuable Seashore visitor services is unacceptable. Certainly, of the hundreds of destinations within the Seashore, DBOC is among the most popular. The EIS must provide an honest analysis of how DBOC's 50,000 visitors compared to other specific destinations in the Seashore. The EIS must fully consider the adverse impact to 50,000 seashore visitors per year if NPS chooses to evict DBOC.

Visitors come from all over the world. These visitors spend money in our local markets, restaurants and lodges, thereby contributing our local economy. We have been told by many visitors from Germany that Drakes Bay Oyster Farm is a well know destination place for German visitors to San Francisco. We regularly draw large crowds from California's Central Valley, largely populated by Portuguese, who enjoy oysters as a staple of their diet, along with Asians and Hispanics from all over the Bay Area for whom freshly harvested oysters are a culturally valued food. We are pleased to be one of the most popular destinations within the PRNS for this ethnically diverse group of visitors. Many tell us they come to PRNS only to visit the oyster farm, not to hike, kayak, bird watch, visit beaches or the lighthouse or to whale watch. Rather, these Seashore visitors enjoy picnicking with family and friends at the oyster farm. Picnicking is an historical and important part of our farm visiting public's visitor experience and recreation. The dEIS shows no negative effects as a result of the picnic tables, yet Alternatives B, C and D include varying degrees of picnic table removal. All of the alternatives should allow the picnic tables without any proposed restriction to their location on the farm. Any alternative that excludes picnic tables, or restricts their location on the farm, would negatively impact Seashore visitors at DBOC "visitor experience and recreation". The EIS must analyze this negative effect.

DBOC also provides other important visitor services that must be acknowledged and evaluated in the EIS. DBOC has CPR and First Aid trained staff and supplies, in the event of a visitor emergency. Additionally, as cell phones do not work anywhere near DBOC, DBOC offers its land line phone to visitors in need upon request. DBOC provides safe and sanitary public restrooms. DBOC maintains the restrooms, usually several times per day on busier days. DBOC pays for all restroom supplies. DBOC paid for, installed and maintains an approved, state-of-the-art septic system to accommodate waste water used by the visiting public. In addition, DBOC pays a Special Use Permit fee to the PRNS for the land occupied by the septic leach field. DBOC pays for annual septic inspections by the Marin County Environmental Health Services. DBOC monitors, maintains and pays for septic tank pumping services. DBOC also operates a permitted State public water system. DBOC has developed an approved public water system, maintains all records, and pays all annual fees to the California Department of Public Health, Drinking Water Branch. DBOC also conducts and pays for <u>weekly</u> sampling, delivery of samples to the State lab in Santa Rosa, 1.5 hours from the farm, and pays the laboratory fees to the State. DBOC is responsible for, and pays for well maintenance, water treatment, certified water system professional services and distribution. The NPS failed to consider the visitor services provided and paid for by DBOC, valued at tens of thousands of dollars. The EIS must correct this omission.

In conclusion, I would ask that a more informed study be made on the impact topic "visitor experience and recreation", including the contribution of tours offered to the Seashore's visiting public by Drakes Bay Oyster Company, seven days every week, at no cost to taxpayers. I would enjoy the opportunity to educate the dEIS committee of our daily activities, beyond "the commercial operation and sale of shellfish to restaurants and the wholesale shellfish market outside the park." Drakes Bay Oyster

Farm is an interpretive goldmine that the NPS should embrace, not eradicate. Our entire nation is beginning to understand the social, environmental and health benefits of supporting local farms, local farmers markets and local sustainable foods. NPS/PRNS have one of the finest examples right in the heart of the Seashore, in Drakes Estero, where the wildlife, mammals, a pristine estuary and healthy local food production coexist in harmony in Point Reyes National Seashore. Let the citizens of our United States not loose this "pearl" of an example of coexistence and harmony within Drakes Estero.

Unfortunately, DBOC has been met with hostility from PRNS locally, and NPS nationally, instead of collaboration. I truly believe that what is needed is simply new leadership. Other national park units have created amazing and exciting partnerships with food producers (see NPS publication: Stewardship Begins with People, Diamont et al.). Collaboration between PRNS and its rancher and farmer partners was once very healthy, productive and enjoyable. Trust in the PRNS and NPS has unnecessarily eroded due to the actions of PRNS and NPS staff with obvious bias against the agricultural and aquacultural uses it is supposed to protect. New leadership with a fresh perspective---leadership that would not be unduly influenced by selected NGOs opposing the cultural uses of PRNS---would lead to a return of collaboration, cooperation, natural and cultural resource protection. The Lunny family is looking forward to that time. The amazing visitor services provided at the oyster farm should be a joint effort between DBOC and PRNS. Together, we should be celebrating our cultural heritage: our local food, our shellfish grown in the seashore as it has for nearly a century, and the opportunity to protect these natural and cultural resources for future generations. To this end, I support the "Collaborative Management Alternative" as submitted by the Alliance for Local Sustainable Agriculture as the preferred alternative in the EIS.

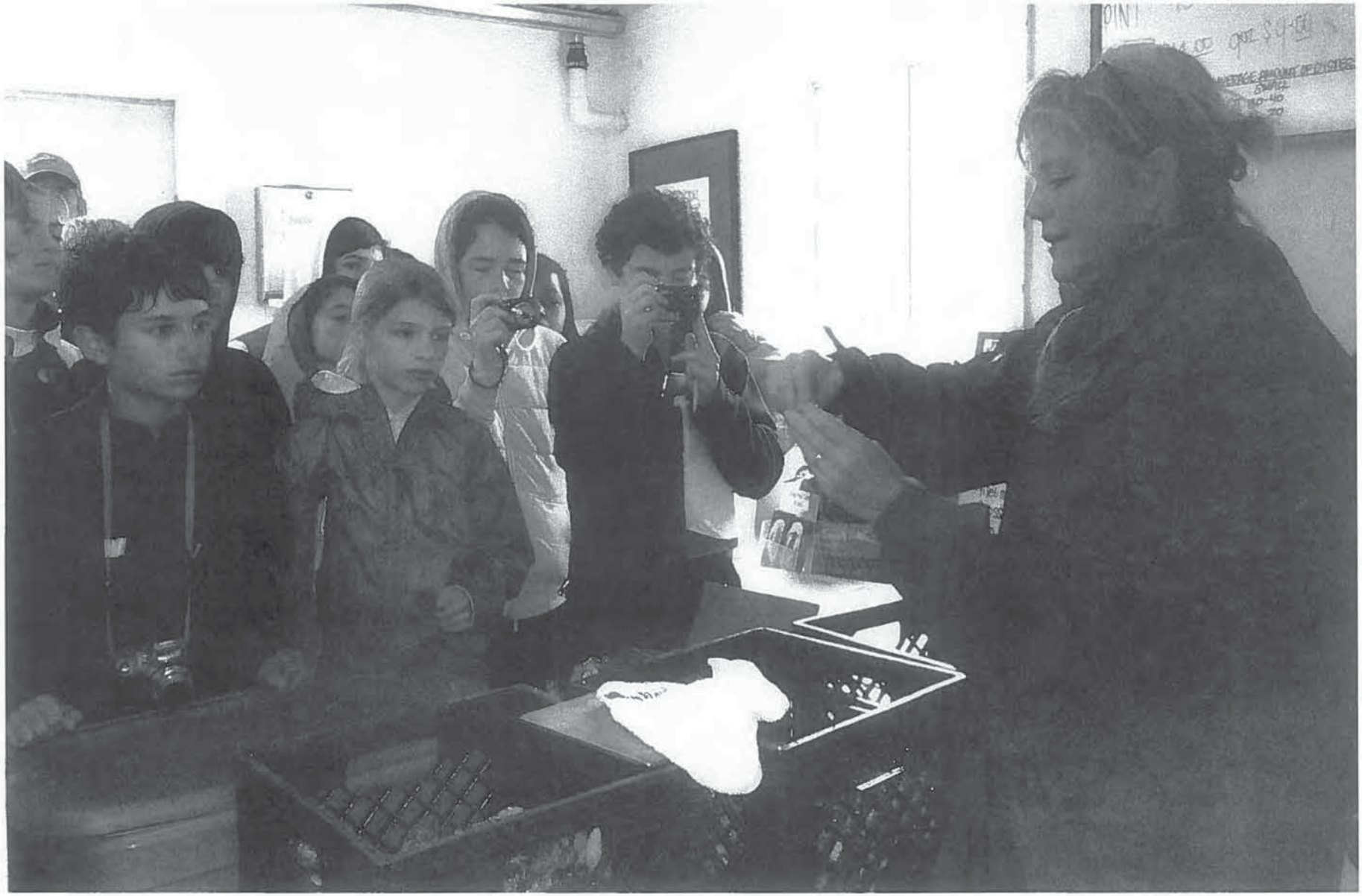
Sincerely,

Ginny Lunny Cummings

Ginny Lunny Cummings
Farm Manager
Drakes Bay Oyster Company
1 Oyster Company Road
17171 Sir Francis Drake Blvd.
Inverness, CA 94937
415-669-1149
707-217-6108

Local Seafood
and
Farm Products
Open
8:00AM to 4:30PM
Drakes Bay
Oyster Farm

Johnson's
Oyster Company
Oysters For Sale
Open: 8:00 am to 4:30 pm
open · Monday



Big Thank you!

Warm regards,

SFCA

SanFrancisco Conciérges Assoc

Drakes Bay —

Thank you for welcoming us to your Oyster Farm, giving us a tour, and providing a fabulous tasting!

Sincerely,
CCA Students

SALAMAT PO!
, ANGELO & SANDY
Simon

Thank you for all that you do!
Meredith Marion

Delish!
Allyn Lovatz

October 21, 2010

Dear Ginny,

On behalf of our whole Waterbar group, thank you ever so much for your hospitality at the farm this passed Monday. Not only did everyone learn quite a bit about the early life of an oyster, but we saw first hand the beauty and peacefulness that surrounds the farm, which I feel truly compliments the oysters that y'all grow.

We look forward to having you join us here at the restaurant so we can show you our appreciation. Thanks again!

eric

Ginny

From: Lauren Pincus [lmpincus@ucdavis.edu]
Sent: Wednesday, July 21, 2010 3:57 PM
To: ginny@drakesbayoyster.com
Subject: Tour for UC Davis students August 27th

Hi Ginny,
We spoke on the phone earlier. I am hoping to bring some students by on August 27th to see both the ranch and the oyster farm. The students are animal science students from Japan and are only here for a short time sight-seeing and visiting beef and dairy operations in California. Last time we were there we met with Joe and Joan and the students had a great time hearing about how the ranch began and seeing the equipment/facilities you have. This year we would like to see the oyster operation as well if it is possible. I am not sure of our exact schedule yet that day, but I think the afternoon would be best. I will also share my notes from two years ago because it might help you coordinate a visit this year.

"Comments: The Lunnys were gracious hosts who really went above and beyond showing their farm and lifestyle to the students. They really were able to see how a California individual would raise beef. He gave excellent details and showed them every step of the process. Probably the best event in the itinerary. The visit felt very 'hands-on' because he let them get in the pen with his yearlings while he explained the ear tags, he turned on equipment to show them how it worked, he opened up every shed that had something interesting in it, and he let the students sample the grass-fed beef that was in his kitchen. I would plan ahead and ask them to pre-prepare samples again of their grass-fed beef, allow a full 2 hours, and include a visit to their shop. It might help the flow of his information to ask him to go systematically through the life of one of his cows. This might help make sure all information is included in his presentation."

Looking forward to hearing from you. If you need to contact me, my cell phone number is [redacted].

Lauren

Lauren Pincus
M.S. International Agricultural Development M.S. Horticulture and Agronomy University of California, Davis

DOMINICAN
UNIVERSITY
of CALIFORNIA
1890

October 25, 2010

Ms. Ginny Cummings
Drakes Bay Oyster Company
17171 Sir Francis Drake Blvd.
Inverness, CA 94937

Dear Ginny,

On behalf of Dominican University of California, I would like to thank Drakes Bay Oyster Company for your donation of oysters for 300 people. This letter confirms that Drakes Bay Oyster Company did not receive any goods or services in exchange for this donation.

We were proud to serve your oysters at the private reception following the 2010 California Governor's Debate on October 12. The event was held in the newly renovated Dominican Heritage and Alumni House, an 1882 Queen Anne Victorian that served as an elegant backdrop for the evening's festivities. After an unseasonably warm day and following an hour of heated exchanges between the candidates, the oysters were a refreshing and much sought-after treat!

Thank you for this donation and for your ongoing support of Dominican University of California. Thanks a million, Ginny & Kevin!

Sincerely,

Tracy

Tracy Stempel Hogan
Director of External Relations

Dominican University of California is a 501(c)(3) charitable organization, tax ID# 94-1156525. In accordance with IRS regulations, Dominican University of California does not assign a Fair Market Value to items donated.

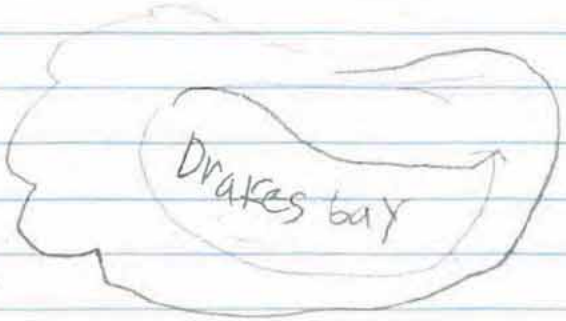
50 Acacia Avenue, San Rafael, California 94901-2298 · *p.* 415-257-1396 · *f.* 415-257-0162
www.dominican.edu

Dear Ginny,

Thank you for your hospitality In showing my class your AMAZING and fascinating Oyster Farm. I was fascinated by the fact that you reuse your Oyster shells. And though we didn't have time to see the beef farm I am positive that that would have been amazing too. Thanks again and keep up the good work! and being organic!

Sincerely,

Anna Z



To Ginny,

Thank you so much for taking us on a tour around the Oyster farm. It was very interesting and I learned a lot. The Oysters where very good. I had them at my house the nigtt after the tour. The way you recyle shells is very cool. The room that cleans all the Oysters is pretty small for the hundreds of oyster's. Thanks a lot.

from
Oskar

College of Marin
Marin County Agriculture Course
Fall Semester, 2011

Thank you for your cheer, hospitality, information & samples
DSO

Dear Ginny -

Thank you so much for the most enjoyable and informative tour (and oysters!)

Carl

I wish you all the best in the future of your wonderful place. Yummy ~~[illegible]~~ great information! Thank you!!
Sandy

Ginny - Thank you for the fantastic tour. I really support what you're doing and love those oysters! I'll be commenting on the public record.
Linda

Thank you for the tour - I will be rooting for your farm to survive this mess. The oysters were delicious and I learned a lot!
Susan

I wish you all the best and success for the next 10 years! I already sent my letter in, pushing to keep Drakes Bay oysters here for another decade!
Moira

Dear Ginny,

Thank you so much for teaching us about drakes bay Oyster farm. I learned alot and enjoyed getting to poke holes in the oyster shells. thank you for sharing your farm with us, and for giving us your time. We really appreciated it!

Thank you so much!

-Kerry

Dear Ginny,

Thank you very much for guiding us on the tour of Drakes Bay Oyster Farm. I learned many things including how oysters helped the water around the Estero and the process of farming the oysters. I think it is really thoughtful to take time out of your day to give us a tour of the the farm in the pouring rain. It also made me appreciate the people who go out there no matter what the weather to bring fresh products to the consumer.

Thanks again!

Sincerely,
Will Nagle

5/19/10

Dear Ms. Binny,

Thank you so much for giving us a tour of your farm! Before I came I didn't know anything about oysters and you gave us an amazing, descriptive and helpful tour. It was really interesting the way you recycle your oyster shells by poking holes into them and then bagging them and planting seeds in the shells so that they can regrow. My group found this so interesting that we are basing our iMovie on it. If you would like to come and see our iMovies we are having a film festival at Marin Country Day school on June 3rd please come!

From,
Raiden

Dear Ginny,

I would like to thank you for touring us around Drakes Bay Oyster Farm and describing all of the steps it takes to grow oysters. It was very enjoyable and I learned a lot despite the bad weather. I learned the history of Drakes Bay Oyster Farm and that Indians used to fish there. I also learned all the steps of growing oysters: First, create holes in the shells. Then put the shells into plastic bags by using a plastic tube to hold open the bag. After bagging the oysters, let the shells sit in water and while the oyster seeds grow into the shells. After the seeds grow, string the shells with twine and put them in Drakes Estuary for them to grow large enough to harvest. I also learned that oysters taste really good when you let us try some and that they taste even better with lemon juice. In addition, I learned that Drakes Bay provides 60% of California's oyster. Thank you for everything you did from giving us the tour of the farm to letting us try an oyster to spending your time. Thank You.

Thanks,

Piers

Dear Ginny Cummings,

Thank you for touring our class and teaching us about your farm. I learned how you guys reuse your oyster shells so they do not go to waste. I saw the process of first poking a hole in the oyster shells and then bagging them. After that, you guys put seeds into the shells and put them in water that is about 70 degrees Fahrenheit. Then you take the oysters shells and put them in the bay until you can them. When you can them, everything needs to be sterilized including all the glasses. Thank you for teaching us this process and letting us try some of your oysters. They were good and you were very generous to let us try them. I really appreciate you spending your time volunteering to show us your oyster farm and teaching us the process of growing oysters. Thank You!

Sincerely,
Ethan Pritikin

Dear Ginny,

Thank you so much for taking time out of your busy day to show us the Oyster farm. I thought it was cool that you recycle the oyster shells by tying the shells together. It was interesting how the Miwok Indians used the land you use today for the same thing- raising oysters

Thanks again,

Allison

Dear Ginny Cummings,

Thank you SO much for taking us on a wonderful tour of your Oyster Farm. It was a great learning experience for us to learn about organic and local oyster farming. My favorite part was to see how you make a hole in the oyster, and making a hole. I was very appreciative that you took one of the free days off to take us on a tour of the farm and how the farm worked. We are now making a movie on your farm in class with a script, pictures, and a video! I was also very surprised that your workers are so hard-working that they go out to the Estero, no matter what the weather is. I was also very surprised that you guys work so hard, that with a staff with 22 members that your oysters are sold in Mainstream markets like Whole Foods. Keep up the great work and THANK YOU!!!!!!!!!!!!!!!! I hope I can come back sometime soon!

Peace, Love, Joy,

Peter G. Koch

Dear Ginny,

May 14, 2010

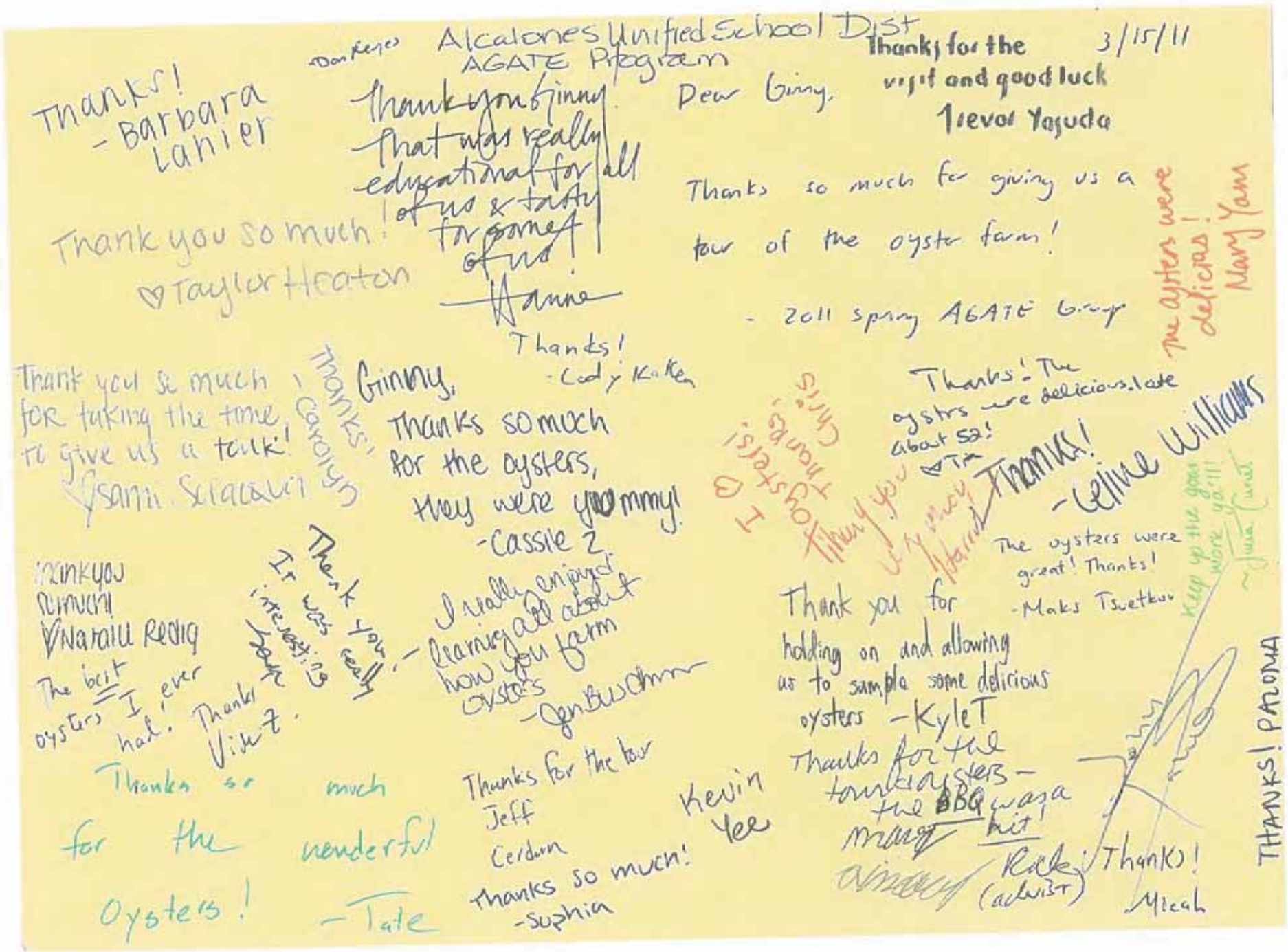
Thank you so much for showing us your Oyster Farm!!! It was really cool. I really liked how you explained the life of the Oysters. Actually, you explained it so well that that is what I am making my IMOVIE about! You really amazed us with your Oysters because they were really tasty! Esperially because you put the lemon sauce on mine. I remember tasting your Oysters because they were my first one and I tasted them in front of every one!!!

It was so much fun and I will always remember it.

From,

Zada Clark

(PS) Next time I would enjoy seeing the cattle!



Alcalones Unified School Dist
AGATE Program

3/15/11

Thanks! - Barbara Lanier

Thank you Ginny! That was really educational for all of us & tasty for some of us! Hanne

Dear Ginny,

Thanks for the visit and good luck
Trevor Yasuda

Thanks so much for giving us a tour of the oyster farm!

- 2011 spring AGATE Group

The oysters were delicious! Mary Yam

Thank you so much! ♡ Taylor Heaton

Thanks! - Cody Kaken

Thank you so much for taking the time to give us a tour! ♡ Sami Scracquin

Thanks! Carolyn

Ginny,
Thanks so much for the oysters, they were yummy! - Cassie Z

I ♡ oysters! Thanks! Chris

Thanks! The oysters were delicious. I ate about 52! ♡ Tim

Thank you very much Harold

Thanks! - Celine Williams

The oysters were great! Thanks! - Maks Tsuetkov

Keep up the good work you'll! ~ Juna Cunet

Thank you so much! ♡ Natalie Redig

The best oysters I ever had! Thanks Vice Z.

Thank you. It was really interesting tour

I really enjoyed learning all about how you farm oysters - Jen Buschmann

Thank you for holding on and allowing us to sample some delicious oysters - Kyle T

Thanks for the tour oysters - the BBQ was a hit! Mary Rick (advisor)

Thanks! Micah

THANKS! PALOMA

Thanks so much for the wonderful Oysters! - Tate

Thanks for the tour Jeff Cerdan

Thanks so much! - Sophia

Kevin Yee

[redacted]

March 20, 2011

[redacted]

Lunny Family
c/o Drakes Bay Oyster Company
17171 Sir Francis Drake Blvd.
Inverness, CA 94937

Dear Lunnys,
Last year I was among the group from the South Bay Area which you graciously entertained on a tour of your farm and oyster facility. Both Russ Wallace and I learned so much about beef, on and off the hoof, as well as oyster farming. As oyster "fans", we are very interested in your continued operation of the oyster farm.

As an alumnus of the University of New Hampshire, I receive this magazine. When I saw the cover, I thought of you immediately. Both Russ and I hope you can use this in your defense of continued aquaculture. We are often at his place in Inverness [redacted], and drive by for your oysters.

Sincerely,

Anne Zucchi

Anne Zucchi
[redacted]

Dear Ginny –

Thank you so much for sharing your knowledge, enthusiasm and oysters with us!

from
Paul & The Marin Agriculture Class
College of Marin, Fall Semester, 2011

Dear Avery,

Thank you so much for giving us the tour. I had no idea it took so much work to get an oyster from the small baby to an oyster getting ready to be shucked. I thou it was really interesting to learn about how to produce an oyster. Now when ever I will have an oyster I will think of Drakes Bay Oyster farms and how hard you worked so it could be on someones table. I am really thankful that you took the time to tour our group. Again I am really thankful.

Chloe M. Parker

P.S.
sorry my pen is running out of ink.
-Bird

ADAMS ASSOCIATES, INC.

Treasure Island Job Corps

October 15, 2010

Dear Ginny,

I want to thank you for the time you spent with six of our Advanced Culinary Trainees this past Wednesday. This was a truly wonderful and educational experience for these chefs to be. They came back to our center full of vim and vigor, excited to put into practice that which you taught them. They were bragging to those who did not come with us to Drakes Bay Oyster Company that they had learned how to shuck an oyster, learned how clean and fresh the oysters tasted, and, they were talking about the merits of having a sustainable, local and organic product. They were all talking about how much they had ~~learned~~ learned about aquaculture and how one "grows" oysters and how much fun it was. I was delighted that they had a fun, but still educational experience.

When I returned to the culinary building I ran into the Culinary Program Manager, with the goodies that you had given us. He was both delighted and surprised. He said that he wanted to set up a regular educational program with you. Mr. Fitzgerald said that he would like to send six or seven of our trainees at a time to go to the Drakes Bay Oyster Company and to visit with you. Mr. Fitzgerald was impressed with your knowledge and willingness to teach our young people about oyster aquaculture. He was very impressed with the knowledge that you imparted to our young people. He was so delighted, in fact that he asked me to invite you and your brothers (and parents) to our Culinary Fine Dinning as a thank you for your care of us. When the instructor of our Bistro class saw what our trainees had and what they had learned, he was really miffed, as the instructors were only allowed to take their charges to the Ferry Building and China Town. I told him I had a better boss!

I hope that you will visit us soon and that we will be able to show you the same hospitality that you and your parents showed us. Until then I want to wish you continued success with your oyster farm.

Sincerely,

Emily S. Rapaport, CTS
Treasure Island Job Corps Center

Future Farmers of America
McArthur Chapter
Fall River Junior-Senior High School
Post Office Box 340 – 44215 Walnut Street
McArthur, California 96056
Phone: (530) 336-5515 FAX: (530) 336-6256

Dear Drakes Bay Oyster Company,

On behalf of the McArthur FFA Chapter we would like to thank you for taking the time out of your busy schedule to show us the many great aspects of your family owned oyster farm. Being able to hear the fight you have to put up, in order to keep the oyster company running is deserving of praise. Our class had no idea that the oyster industry incorporated so many aspects of agriculture. We were very impressed with the amount of physical labor as well as technical effort your company has to put in to make a high quality product. From Ginny's bubbly personality to the delicious Drakes Bay Oysters with lemon and special sauce the stay at your oyster farm was easily the most enjoyable tour we had throughout our trip. Having this experience and hearing from a very professional agriculturist will benefit our minds in the future. Being in a National Park the effort to restore the natural oyster populations is also deserving of admiration. We all gained a new perspective on agriculture and the deep realization of fighting for something that could be soon lost has impacted us all. Thanks again and anytime we need oysters we will be sure to call Drakes Bay Oyster Company for the best oysters in the universe.

Sincerely,

FRHS Advanced Ag

Rhian Taylor

Dear Ginny,

Last Tuesday, you took me and 19 other students from the Urban School on a tour through your facilities. I'm writing to thank you for answering all of our questions thoroughly and comprehensively and explaining to us the facts and controversy relating to Drake's Bay. Your company was our first stop in our six-week exploration of water systems and got us off to a great start. Seeing your operation in action really helped to contextualize and unravel the complexities of water policy in California and your passion was so inspiring for all of us. It was amazing to be able to see and talk to someone so fully committed to what they do. Thank you so much for your time and information!

Regards,

Marina Hydeman and the rest of California Studies

Thank you Ginny
+ Family for letting
me come to your
oyster farm! We really
enjoyed it! I thought
we really learned infor from
your farm. I think that
we really have improved
our oyster learning
ever since we visited
your farm.

THANK YOU
SO MUCH
GINNY!

Sena
Janet

-TBS 7th
Grade

Haley

Andrea

Janet

Ebikinle

Simon

Nathan

Sena

Adinora

Clara Halula

Gemma

Adamma

Bianca

Sonana

Marysville Joint Unified School District
Dobbins Elementary School
P. O. Box 129, Dobbins School Lane, Dobbins CA 95935

MARYSVILLE CA 959
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Drakes Bay Oyster Farm
17171 Sir Francis Drake Blvd
Inverness, CA 94937

Jenny

Thank you so much for the great tour of the oyster farm and all your enthusiasm! The views were amazing and the oysters were delicious!

The Ohio State University
agibusiness club

Thanks!

Chris Weeks

IT WAS VERY MUCH APPRECIATED.

You are very generous!
Shannon Horn

THANK YOU.
David Spisak

Thank you,
Jonathan Francis

Thank you,
Michelle Shepherd

Thanks!
Kayla Sharp

Thanks,
Beau Burgess

Thanks
Constance Steamann

Jill Townsend

Thank you
Mark Cook

Sierra Cousineau

Thank you,
Jonathan Zucka

American Indian Education Program
1919 B Street
Marysville, CA 95901

Drakes Bay Oyster Farm
17171 Sir Francis Drake Boulevard
Inverness, CA 94937

Dear Staff of Drakes Bay Oyster Farm,

Thank you for letting all of us try out the fresh oysters. They were very tasty. It was funny watching everyone's' face when they ate the oysters. All of us enjoyed picking an oyster shell from the piles. We thought it was interesting how you grew new oysters from grains of sand and millions of microscopic larva. It was unique how you used filtered water form the bay for nutrients. We also would like to thank you for showing us where the Costal Miwok used to eat their oysters at the shell mound. We totally enjoyed our visit, and hope to visit again next year.

Sincerely, Alexwoods Gratewite

"Baleen"
Julieann Bullock

Marlin Marie

Suny Sea Turtle

Robb "Rock"

Sallyann Williamson

Brittany
have a good day

Chanleigh Caldwelly

Crystal Clear

Jumping Jellyfish Joara Noel

Michael marin

The American Indian Education Program of Marysville at Dobbins and Yuba Feather School

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POINT REYES NS

Julia Stalker
San Francisco, CA 94117

December 5, 2011

Superintendent Cicely A. Muldoon
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, California 94956

RE: Comments on the DEIS for the DBOC SUP

Dear Superintendent Muldoon:

I am a Wetland Biologist with several years of experience working in tidal marsh, native oyster and eelgrass research, restoration and education within the San Francisco Bay.

I appreciate the thorough and sound scientific analysis of, and consideration for, the factors that benefit the Estero's naturally functioning system, as well as the real and potential negative and threatening impacts that other factors contribute to that system.

I fully support Alternative A as the best option for fulfilling the project objective of managing the natural ecological resources of Drake's Estero and to support their protection, restoration and preservation.

Impacts on Wildlife Habitat-Benthic Fauna

In 2006-07, I managed the field operations of a project conducted by Save the Bay, San Jose State University and the Smithsonian Institute. This project was designed To study and better understand the preferred locations and substrates for the recruitment of the native oyster, *Ostrea lurida*.
At five locations in the San Francisco Bay, lines with non-native oyster shells at various depths, mesh bags filled with exotic oyster shells, PVC plates attached to bricks, and cement plates were all hung from docks and monitored monthly. We did find native oysters to varying degrees at most locations and on all substrate types, but more prevalent in recruitment than the native oyster, were the numerous other exotic fouling organisms, many of which were invasive (various tunicate, hydroid, sponge, bryozoan and snail species, to name a few) (Welaratna 2008; personal observation 2007). The exotic oyster shells that were used as substrate for this project were the same type of shells that are used for cultivating oysters at DBOC.

Although in comparison to the San Francisco Bay, Drake's Estero is still relatively uninvaded, a fair number of exotic marine invertebrates have been identified there (Elliot-Fisk et al., 2005, personal observation, 2011). The substrates of the exotic pacific oyster & manila clam shells, as well as the mesh, lines, PVC piping, concrete tubes and wooden racks used by DBOC are ideal recruitment sites for these organisms in Drake's Estero just as they are in San Francisco Bay. Allowing the mariculture activities to continue and the associated artificial substrate to remain on the Estero for an additional ten years under Alternatives B, C or D would cause a much greater threat of invasion of, and expansion by, exotic species and the associated detrimental effects to the native ecosystem. This would not be consistent with the NPS management policies (2006) "natural processes will be allowed, insofar as possible, to shape and control wilderness ecosystems ".

The DEIS accurately describes the impacts to native benthic fauna imposed by the presence of exotic species in the Estero, focusing mainly on the competitive exclusion of native species by exotic species within the epibenthic community, the unintentional introduction of exotic species with the cultivated stock. and the potential expansion of the *Didemnum* species on the infrastructure and through fragmentation, but only minimally addresses the impacts of the potential expansion of other exotic (fouling) species populations maintained by the continued use of offshore infrastructure.

I am suggesting that a stronger emphasis be placed on the impacts on the benthic fauna and the natural processes of the ecosystem of the Estero should the artificial hard substrate habitat be provided by the offshore infrastructure, and the potential of consequential expansion of exotic populations be allowed for an additional ten years as provided by Alternatives B, C and D.

I am also suggesting that the long-term adverse impacts on native benthic fauna be considered as major rather than moderate.

The removal of structures would remove artificial substrates that support invasive tunicates and other fouling species.

It is well documented that one or more species of the invasive colonial tunicate *Didemnum* is present in Drake's Estero, that the presence of the structures associated with DBOC operations (racks, pipes, tubes, lines & the cultures themselves) provide substrate for these exotic invasives to live and reproduce on, and that the presence of these exotic invasives causes a threat to the native organisms living in the Estero (Cohen 2005).

Several other exotic benthic (fouling) invertebrates have also been identified in the Estero. Their presence could potentially disrupt the natural ecological functions of the native faunal community within there as well (Elliot-Fisk et al., 2005; personal observation).

Exotic species (invasive or not) can have strong adverse impacts on the local native species by competing for resources, altering their ecological functions and community dynamics and potentially displacing them altogether.
Exotic species have also been shown to have a competitive advantage on artificial substrate (Tyrrell et el., 2006)

Exotic species identified in Drake's Estero Include:

- ***Didemnum albidum* and *Didemnum lahilei*:**
  Didemnum species are **invasive** colonial tunicates that are known to form extensive sheets overgrowing a variety of substrates and attached organisms. They grow subtidally in bays, harbors and coastal waters, on rocks, gravel, boulders, ropes, pilings and all kinds of artificial structures. They have been observed overgrowing on seaweeds, sponges, hydroids, anemones, limpets, oysters, mussels, scallops, barnacles, bryozoans and other species of sea squirts.
  On the Northwest Atlantic coast, a species of Didemnum has been observed colonizing large areas of the gravel-covered seabed, threatening the suffocation of other benthic organisms and the prevention of larval settlement (Cohen 2005, Valentine et al., 2007).
  They have a great potential to become a significant aquaculture pest, and may have a substantial impact on natural environments. (Cohen A. N. 2005).

- **Botryllid ascidian species** (*Botrylloides* sp. & *Botryllus* sp.):
  These exotic colonial tunicates are commonly found on a variety of submerged, and occasionally intertidal surfaces including docks, ropes, boats, mariculture pens, trays, and nets, pilings. They are also found on seagrass and rocky substrate in intertidal and subtidal habitats including boulders, walls, and even small cobble (Cohen, A. N. 2005). These fouling organisms are often found overgrowing other marine invertebrates, plants & algae and can compete with other organisms for space and food (Cohen A. N. 2005). They can overgrow other attached, filter-feeding organisms and compete with them for food (Cohen A. N. 2005). Like Didemnum, they are capable of both sexual reproduction and asexual regeneration (Cohen 2005, Voskoboynik et al., 2004; Kurn et al., 2011). They have been identified in high numbers on artificial substrate in several SF Bay locations (Cohen and Carlton 1995; Welaratna 2008; personal observation 2007).

- ***Watersipora subtorquata***:
  This loosely encrusting bryozoan is infamous for fouling ships hulls and facilitating the fouling and spread of other marine invasives. It is considered cosmopolitan and widely invasive among cool temperate water ports. Preventative measures are the only practical means of control at this time (Global Invasive Species Database).

- ***Obelia* sp:** This exotic hydroid is widespread and has been identified in great numbers on artificial substrate in SF Bay locations (personal observation 2007).

- ***Halichondria bowerbanki***: This exotic sponge is found growing in wave-sheltered, sediment-rich environments. It often grows intertwined with hydroids and algae and may be common in estuaries on rock or other animals. It reaches its maximal development in harbors and estuaries, being very tolerant of muddy and brackish conditions.
  H. bowerbanki has been listed as an **invasive** marine and estuarine aquatic animal by NOAA (O'Conner et al., 2008). It has been identified in high numbers on artificial substrate in SF Bay locations (Cohen and Carlton 1995; personal observation 2007).

- ***Bugula neritina***: This exotic bryozoan is a common member of fouling communities in harbors and bays on the Pacific Coast, from intertidal to shallow subtidal depths. It is common on dock sides, buoys, pilings and rocks, settling often on shells and sometimes on seaweeds, sea grasses, sea squirts and other bryozoans (Cohen 2005).

- ***Schizoporella unicornis***: This bryozoan can be found growing on any hard surface especially on mussel shells, barnacles, floating docks and pilings and is often found encrusting on shells (Cohen 1995).

Alternative A supports the removal of offshore infrastructure presently serving as suitable substrate for these (and other) exotic fouling organisms in Drake's Estero and would significantly decrease the threat of expansion by these species populations.

The termination of mariculture operations would better prevent the introduction of new exotic species into Drake's Estero.

There is a high probability that most of the exotic species now present in Drake's Estero were brought in inadvertently with the introduction of oysters for mariculture (Carlton 1989; Cohen, 2005; Cohen and Carlton 1995).

Safer methods for importing seed for the pacific oysters and manila clams have been better regulated and implemented, but if there is any chance of importing other exotic species along with the imported culture, the impacts of the introduction of new and potentially invasive exotics should be analyzed and emphasized strongly in the Final Environmental Impact Statement.

The use of pressure-treated wood in the offshore infrastructure of DBOC is potentially harmful to native benthic species.

The DEIS does not address the impacts to the benthic faunal community from the harmful chemicals present in the pressure treated wood that the offshore structures are composed of.

Pressure-treated wood contains chemicals that are harmful to aquatic organisms, particularly immediately after being submersed.

Scientific studies have revealed that the copper in pressure treated wood can cause negative impacts to epibiotic (fouling) communities and can be transferred through trophic levels (Weis and Weis 1996).

Some exotic species, including three that have been identified in Drake's Estero, have been found to have a higher tolerance for copper, giving them a competitive advantage over native organisms on the treated substrate and allowing them to provide substrate for other exotic species (Gonzalez 2008).

With 179,000 linear feet of pressure-treated lumber present in the Estero and the replacement of up to 8,900 feet of lumber per year under Alternatives B, C and D, this could be a significant impact to the natural community of the Estero. I request that this issue and its impacts be addressed in the Final EIS.

The Estero de Limantour Wilderness is threatened by the close proximity of exotic species in Drake's Estero.

Under Alternatives B, C and D, the fully designated and recognized wilderness area of Estero de Limantour is at a higher risk of receiving invasive organisms with known invasive species present at such a close proximity in Drake's Estero.

The exotic ascidian species (*Didemnum*, *Botrylloides* and *Botryllus*) already present in Drake's Estero, are known to be capable of asexual regeneration (Cohen, Voskoboynik et al., 2004; Kurn et al., 2011), are capable of highly invasive behavior and can colonize eelgrass.

When surveyed for benthic fouling invertebrates, Estero de Limantour was found to be relatively free of invasive species (Elliot-Frisk 2005).

Alternative A would allow NPS to fulfill its obligations under the 2006 NPS Management Policies to manage both the potential wilderness area of Drake's Estero and the fully designated wilderness area of Estero de Limantour for the prevention of interference by exotic species with natural processes, native species or natural habitats; the prevention of displacement of native species, and the preservation of the physical wilderness resources and wilderness character.

I strongly urge you to emphasize the major long-term adverse and potentially irreversible impacts that the exotic fouling invertebrate species could have on the native species in Drake's Estero if DBOC continues its operations and the offshore infrastructure and cultures are allowed to remain.

Alternative A is the only Alternative that would remove this major threat.

Thank you very much for considering my comments,

Julia Stalker

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Julia Stalker, Personal observation, 2007
Photos of exotic fouling invertebrates on artificial substrate in S. F. Bay

PVC-Brick: Oyster Point-5 months
Includes Botryllid ascidians and solitary tunicates (Mogula sp.).

PVC-Brick: San Rafael-1 year
Includes Botrllid ascidians, Hydroids and *Halichondria bowerbanki*.

Oyster Shell Bag: San Rafael, 6 months
***Halichondria bowerbanki*, hydroids and Botryllid ascidians.**

Oyster Shell Bag: Palo Alto, 2 months
Hydroid (*Bugula sp.*).

Julia Stalker, Personal observation, 2007 (continued)

Oyster-shell String: Oyster Point, 6 months
Botryllid ascideans & solitary tunicates (Mogula sp & Ciona sp.)

PVC-Brick: Berkeley, 2 months
Botryllid ascidians & hydroids

Julia Stalker, Personal observation, 2011
Exotic fouling invertebrates (Botryllid ascidians) in Drakes Estero

Botryllid ascidian on eelgrass blade, Drakes Estero 2011

Botryllid ascidian on oyster culture, Drakes Estero 2011

CORRESPONDENCE ID: 52046

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COMMENTS

FROM

THE ENVIRONMENTAL LAW SOCIETY OF
THE UNIVERSITY OF CALIFORNIA, BERKELEY, SCHOOL OF LAW
Berkeley, CA 94720
environment@law.berkeley.edu

TO

Draft EIS DBOC SUP c/o Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

REGARDING

Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement (ID: 33043)
Draft EIS DBOC SUP (ID: 43390)

December 8, 2011

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APPENDIX A. Congressionally Designated Potential Wilderness Areas as of 11/2011 A-1

APPENDIX B. Review of Scientific Evidence of DBOC Environmental Impacts B-1

I. Introduction

We submit these comments on behalf of the University of California, Berkeley, School of Law Environmental Law Society (ELS),[1] a student group that engages its members in major environmental issues through advocacy campaigns, comments on administrative actions, and public events. ELS is the Berkeley chapter of the National Association of Environmental Law Societies (NAELS).[2]

A group of seven ELS members reviewed the record for the Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement, including the EIS itself, the applicable laws and authorizing legislation, legislative histories, dozens of the scoping comments, as well as other background documents. Comprised principally of law students, the team included members with undergraduate and advanced degrees in biology, geology, and environmental science, as well as a former National Environmental Policy Act (NEPA) planner for the U.S. Forest Service. Members of the group traveled to Drakes Estero to visit the estuary and Drakes Bay Oyster Company's (DBOC's) land-based facilities on October 15, 2011, and attended the October 20, 2011, public hearing held in Mill Valley, California.

In addition to addressing some issues already analyzed by other parties, we attempted to conduct a comprehensive survey of non-conforming uses in congressionally designated potential wilderness areas (CDPWAs) in the National Wilderness Preservation System.[3] Our research determined that, beginning with 8,003 acres associated with the Phillip Burton Wilderness—designated initially as the Point Reyes Wilderness in 1976 by Public Law 94-544—Congress has designated more than 250,000 acres of potential wilderness in conjunction with 29 different wildernesses spread across 13 states. We examined the nature of non-conforming uses in these CDPWAs, the time limits placed on them, if any, and their history since designation. This work provides useful legal context for the Draft EIS that we could not find in the record. We hope it will be helpful in assessing the possible impact of the Secretary's decision on both local wilderness values and the integrity of the Wilderness Act more generally. We also discuss the limitations of some of the scientific evidence cited by the EIS, which has been the subject of significant dispute.

Through our research we sought to address three main questions:

1. ***What implications would granting a new Special Use Permit (Alternatives B–D) have for local wilderness values and for wilderness more generally?***
   (Addressed in Part II and Appendix A)
2. ***What are the likely environmental implications of granting a new Special Use Permit?***
   (Addressed in Part III and Appendix B)
3. ***Based on these analyses, should the Secretary select the No-Action Alternative (A), or should he authorize one of the Action Alternatives (B–D) and issue a new Special Use Permit?***
   (Addressed in Parts II, III, and IV)

[1] http://www.boalt.org/els

[2] http://www.naels.org/

[3] The National Wilderness Preservation System comprises federally-designated wilderness and potential wilderness areas managed by four agencies: the Forest Service, the National Park Service, the Bureau of Land Management, and the Fish and Wildlife Service.

II. Wilderness Implications of Granting a New Special Use Permit

Assessing the likely impact of the four proposed Alternatives on wilderness values at Point Reyes, the administration of CDPWAs around the nation, and the integrity of the Wilderness Act requires situating the proposed Special Use Permit in the broader context of the National Wilderness Preservation System.

For example, if DBOC's current and proposed activities are representative of non-conforming uses present in other CDPWAs and there is administrative precedent for extension/expansion of similar non-conforming uses, then selection of an Action Alternative might leave CDPWA administration largely unchanged. If few non-conforming uses in CDPWAs have specific time limitations that could be granted extensions, the proposed 10-year extension to DBOC's Special Use Permit might have little direct applicability to or influence over administration of other current CDPWAs. However, under such a scenario, setting administrative precedent for extending (and, certainly, for expanding) non-conforming uses could have significant generalized impact on CDPWA administration going forward.

On the other hand, if DBOC's activity is novel, its extension/expansion would be unprecedented, and/or many non-conforming uses in CDPWAs are time limited, granting a new Special Use Permit could have significant repercussions for CDPWA administration.

In order to analyze how DBOC's current and proposed mariculture operations fit within the overall context of the National Wilderness Preservation System and management of other CDPWAs, we examined what uses the Wilderness Act prohibits and makes exceptions for and cataloged the nonconforming uses present in CDPWA's across the nation.

A. Prohibited and Allowed Uses Under the Wilderness Act

Through the Wilderness Act,[4] Congress sought to preserve and protect certain federally owned lands "in their natural condition" for the long-term "use and enjoyment of the American people."[5] To achieve this goal, ("subject to existing private rights" and a limited palette of other exceptions) the Act bars commercial enterprise, permanent or temporary roads, and motorized vehicles or equipment in designated wilderness areas[6] and withdraws them from mineral appropriation and leasing.[7] Aside from the limited exceptions defined in the Wilderness Act, administering agencies are required to preserve the wilderness character of designated land, which must "be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use."[8]

Most exceptions to these prohibitions are permissive (in other words, the administering agency has the authority to allow them, but is not required to). However, some are mandatory. (*See* **Table 1**, below.) For example, if temporary roads and motorized equipment are essential for meeting Congress's minimum requirements for wilderness administration or to control insects, diseases, or fire, the administering agency *may* use them, but only so far as "necessary." Similarly, agencies *may* permit established uses of aircraft or motorboats to continue, and *may* allow commercial services necessary to valid wilderness pursuits. On the other hand, state or private owners of inholdings that are surrounded by wilderness areas *must* be allowed access to their properties and holders of valid mining claims, grazing permits, or other valid occupancy rights *must* be allowed to exercise their rights.

---

[4] Wilderness Act of 1964, Pub. L. No. 88-577, §§ 1–7, 16 U.S.C. §§ 1131–1136 (2006).

[5] *Id.* § 2(a).

[6] *Id.* § 4(c).

[7] *Id.* § 4(d)(3).

[8] *Id.* § 4(b).

Table 1. Exceptions to prohibited uses in designated wilderness areas defined in the Wilderness Act.

§	Exception for	Further Description	Agency Discretion?	Subject to
4(c)	*Minimum requirements for wilderness administration*	**Temporary roads** and **motorized vehicles or equipment** may be used "as necessary to meet minimum requirements for the administration of the area" as Wilderness.	Permissive	Necessity requirement.
4(d)(1)	*Measures necessary for fire, insect, and disease control*	The administering agency may authorize **measures necessary** to control "fire, insects, and diseases" that would otherwise be prohibited under the Wilderness Act.	Permissive	Necessity requirement + restrictions agency "deems desirable."
4(d)(1)	*Established use of aircraft or motorboats*	The administering agency (via delegation from the Secretary) may permit continuation of previously established uses of **aircraft** and **motorboats** in a Wilderness area.	Permissive	Previous establishment + restrictions agency "deems desirable."
4(d)(3)	*Exploitation of valid mining claims*	Allows "where essential the use of **mechanized ground or air equipment**"; "necessary "**transmission lines, waterlines, telephone lines, or facilities**"; and **cutting timber** on the claim if "not otherwise reasonably available" and if "needed in the extraction, removal, and beneficiation of the mineral deposits.	Mandatory	Essentiality requirement + "reasonable stipulations" to protect "the wilderness character of the land consistent with . . . the purposes for which . . . leased, permitted, or licensed"; "reasonable regulations governing ingress and egress"; rules and regulations for forest management.
4(d)(4)(1)	*Water and hydroelectric projects in the public interest*	If the President (not the agency) determines that allowing water **prospecting, construction and maintenance of dams and reservoirs, hydroelectric projects,** and **power lines** in a particular wilderness will better serve the U.S. public interest than denying them, he may authorize these activities.	Permissive	Presidential determination of public interest.
4(d)(4)(2)	*Established grazing*	**Grazing** established before wilderness designation "shall be permitted to continue."	Mandatory	Previous establishment + "reasonable regulations as are deemed necessary."
4(d)(5)	*Commercial services*	"**Commercial services** may be performed within the wilderness areas designated by this chapter to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas."	Permissive	Necessary and proper requirement.
5(a)	*Access to state or private inholdings*	Owners of inholdings within designated wilderness "shall be given **such rights as may be necessary to assure adequate access** . . . by [the] State or private owner and their successors in interest." Alternatively, a land exchange can be arranged.	Mandatory	Necessity requirement.
5(b)	*Access to valid mining claims or other valid occupancies*	"[W]here valid mining claims or other valid occupancies are wholly within a designated . . . wilderness area, the Secretary of Agriculture shall . . . permit **ingress and egress . . . by means which have been or are being customarily enjoyed** with respect to other such areas similarly situated."	Mandatory	"[R]easonable regulations consistent with the preservation of the area as wilderness."

Prior statutory exceptions in wilderness designation legislation have had a logical connection to those nonconforming uses explicitly authorized by the text of the Wilderness Act itself. For example, legislation has permitted the continuance of motorized vehicle use,[9] aircraft,[10] and cultural activities[11] in

[9] *See, e.g.*, Pub. L. No. 95-495, § 4(c)–(e) (permitting indefinite continuation of motorboat use on nearly twenty lakes and one river within the Boundary Waters Canoe Area Wilderness, allowing mechanized portage, and permitting use of snowmobiles within certain areas in the wilderness); Pub. L. No. 108-447, § 140(d)(2) (allowing continued snowmobile and motorboat usage on Lake Superior and maintenance and expansion of docks within the Gaylord A. Nelson Apostle Islands National Lakeshore Wilderness).

designated wilderness areas, along with other limited exceptions (such as insect and disease control and access to inholdings).[12] Each of these extends or echoes an exception made within the Wilderness Act.

The only additional[13] commercial activity exception we identified was a timber harvesting specific to the Boundary Waters Canoe Area (BWCA), which was part of the original Wilderness Act.[14] The BWCA received this special provision because past timber harvesting disqualified it under the proposed statutory definition of wilderness, which Congress did not want to weaken.[15] Following a subsequently overturned district court opinion banning logging in the area's virgin forests,[16] however, Congress directed the Secretary of the Interior to end logging in the BWCA and cancel all timber sale contracts in the wilderness within one year, resolving the inconsistency.[17]

A commercial oyster farming operation, like DBOC, does not resonate with any of the established exceptions for nonconforming uses in wilderness areas. However, that does not end our inquiry. Since they have yet to achieve full wilderness status, theoretically, agencies might have a history (whether justified by the Wilderness Act or not) of allowing maintenance or even expansion of nonconforming commercial uses within CDPWAs under some circumstances.

B. The Difference Between CDPWAs and Undesignated Potential Wilderness

Potential wilderness areas, by definition, contain uses that are not compatible with full wilderness designation. They encompass:

> lands that are surrounded by or adjacent to lands proposed for wilderness designation but that do not themselves qualify for immediate designation due to *temporary* nonconforming or incompatible conditions. . . . [W]ilderness recommendation[s] forwarded to the Congress by the President may identify these lands . . . for future designation as wilderness when the nonconforming use has been removed or eliminated.[18]

Although the Wilderness Act contains no reference to "potential wilderness," Congress officially codified the category when it first designated "potential wilderness additions" at Point Reyes in 1976.[19] Federal land management agencies frequently use this label when evaluating wilderness suitability and when

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[10] *See, e.g.*, Pub. L. No. 110-229 (§ 101(b)(3) (authorizing helicopter access to construct and maintain a telecommunications site; § 101(b)(4), authorizing continued use of floatplanes on a lake within the wilderness area). Statutorily designated access for emergencies and maintenance is common. *See* ROSS W. GORTE, CONG. RESEARCH SERV., WILDERNESS LAWS: STATUTORY PROVISIONS AND PROHIBITED AND PERMITTED USES 10, 19 (2011) [hereinafter WILDERNESS LAWS].

[11] *See* Pub. L. No. 97-384 and Pub. L. No. 101-663 (providing access to cemeteries located within wilderness); Pub. L. No. 107-282, Pub. L. No. 108-424, Pub. L. No. 109-432, and Pub. L. No. 111-11 (Subtitle L) (providing access to wilderness areas for Native American tribes).

[12] *See* WILDERNESS LAWS, at 19–20.

[13] In other words, not related to the generally permitted nonconforming economic uses enumerated in the Wilderness Act—grazing, water/power developments in the public interest, mining, and recreation-related commercial activities.

[14] Pub. L. No. 88-577, § 4(d)(5). *See also* Minnesota Public Interest Research Group v. Butz, 541 F.2d 1292, 1297 (8th Cir. 1976) ("It is undisputed that some commercial logging in the BWCA was contemplated by Congress.").

[15] Minnesota Public Interest Research Group v. Butz, 401 F. Supp. 1276, 1328 (D. Minn. 1975), rev'd, 541 F.2d 1292.

[16] *See id.*

[17] *See* Pub. L. No. 95-495, § 6(a), 92 Stat 1649 (1978).

[18] NAT'L PARK SERV., MANAGEMENT POLICIES, 6.2.2.1 (2006), *available at* http://www.nps.gov/policy/mp2006.pdf (6.2.2.1 Potential Wilderness) (emphasis added).

[19] An Act to Designate Certain Lands in the Point Reyes National Seashore, California, as Wilderness, Amending the Act of September 13, 1962 (76 Stat. 538), as Amended (16 U.S.C. 459c–6a), and for Other Purposes, Pub. L. No. 94–544, § 1, 90 Stat. 2515 (1976).

(through the President) making recommendations for wilderness and potential wilderness designations to Congress; however, only Congress can take the final step of actually designating them.[20]

Undesignated and designated potential wilderness share significant similarities. However, they are quite different in the eyes of the law. National Park Service management policies require potential wilderness, both before and after designation, "to be managed as wilderness to the extent that existing nonconforming conditions allow."[21] But whereas agency-proposed potential wilderness has not yet received Congress's stamp of approval, CDPWAs are designated by an act of Congress and will automatically convert to full wilderness upon publication of a Federal Register notice that non-conforming uses have ceased.[22] After designation, nonconforming uses of National Park Service administered CDPWAs must "be eliminated as soon as practicable," with progress checked on a 5-year inventory cycle and publication of notice of conversion to full wilderness required within 1 year of the time nonconforming uses cease.[23]

In other words, CDPWA management guidance reflects that these areas are on a one-way journey to becoming full wilderness. No generic timeline exists, but a standard theme is that nonconforming uses must be phased out when practicable—not extended or expanded. As the Park Service notes in its Reference Manual, "[p]otential wilderness is not intended to be a permanent land status" but is instead "a 'half-way house' for lands that otherwise merit full wilderness designation except for *temporary*, non-conforming conditions."[24]

How has this guidance played out in practice? **Table 2**, below, summarizes nonconforming uses in CDPWAs, changes in use since designation, and approximate time frames expected for conversion to full wilderness. **Appendix A** describes these results in greater detail and provides additional information for each CDPWA, citing references for all material. (Note that question marks after values for "Current Size" and "Remaining Non-Conforming Use(s)" denote that the values are assumed based on the lack of Federal Register notices stating otherwise.)

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[20] *Id.* §§ 2(a), 3; *e.g.*, *id.* § 3(c) (explaining that "[a] recommendation of the President for designation as wilderness shall become effective only if so provided by an Act of Congress").

[21] *See* MANAGEMENT POLICIES, *supra* note 18, 6.3.1.

[22] *See, e.g.*, National Parks and Recreation Act of 1978, Pub. L. No. 95-625, § 403, 92 Stat. 3467 (stating that "[a]ny lands which represent potential wilderness additions in this title, upon publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness").

[23] Nat'l Park Serv., Director's Order 41: Wilderness Preservation and Management, at 4–5 (1999), *available at* http://wilderness.nps.gov/document/Director's%20Order%2041.doc.

[24] Nat'l Park Serv., Reference Manual 41, Wilderness Preservation and Management, at 73 (1999), *available at* http://www.nps.gov/policy/DOrders/RM41.doc (emphasis added).

Table 2. Summary of nonconforming uses in congressionally designated potential wilderness areas.

Wilderness Area	Agency	State	Year	Designating Public Law	Initial Size (acres)	Current Size (acres)	Initial Non-Conforming Use(s)	Remaining Non-Conforming Use(s)	Time Frame for Conversion to Full Wilderness
Buffalo National River Wilderness	NPS	AR	1978	95-625, § 401(1)	25,471	1,007	Non-federal ownership, motorized boat access	Non-federal ownership	Upon acquisition
Carlsbad Caverns Wilderness	NPS	NM	1978	95-625, § 401(2)	320	same (?)	Non-federal ownership	same (?)	Upon acquisition
Chiricahua National Monument Wilderness	NPS	AZ	1976	94-567, § 1(c)	2	same (?)	Lead mining claim	same (?)	Upon acquisition
Chumash Wilderness	FS	CA	1992	102-301, § 2(5)	50	same (?)	Road corridor with ORV traffic	same (?)	When agency constructs alternate route
Congaree National Park Wilderness	NPS	SC	1988	100-524	6,840	same (?)	Non-federal ownership, road	same (?)	Upon acquisition; road removal
Cumberland Island Wilderness	NPS	GA	1982 2004	97-250, § 2(a); 108-447, § 145(a)	~~(11,746)~~ 10,500	same (?)	Non-federal ownership	same	Upon acquisition
Death Valley Wilderness	NPS	CA	1994	103-433, § 601(b)	6,846	same (?)	Power line corridor	same (?)	Upon cessation of power line use
Elkhorn Ridge Wilderness	BLM	CA	2006	109-362, § 6(a)	11,271	0	Ecological degradation from logging	-	-
Great Sand Dunes Wilderness	NPS	CO	1976 1979	94-567, § 1(d); 96-87, § 401	670 + 1,900	65 (?)	Non-federal ownership, access, and improvements	same (?)	Upon acquisition
Gulf Islands Wilderness	NPS	FL	1978	95-625, § 401(5)	2,800	520	Non-federal ownership	same	Upon acquisition
Haleakala Wilderness	NPS	HI	1976	94-567, § 1(e)	5,500	51	Non-federal ownership	same	Upon acquisition
Hawaii Volcanoes Wilderness	NPS	HI	1978	95-625, § 401(6)	7,850	same (?)	Non-federal ownership	same (?)	Upon acquisition
Isle Royale Wilderness	NPS	MI	1976	94-567, § 1(f)	231	93	Trailside shelters, 4 commercial fishing bases, Coast Guard boathouse, power line, ranger station facilities, 11 life leases	Trailside shelters, Coast Guard boathouse/ trail, ranger station facilities, SUPs extending life leases to children, volunteer-in-park agreements, researcher/NPS housing, Artist in Residence cabin	When life leases are up and other non-conforming uses cease
John Krebs Wilderness	NPS	CA	2009	111-11, § 1902(1)(A)	130	same (?)	Check dams and water impoundments	same (?)	Upon cessation of hydroelectric operations
Joshua Tree Wilderness	NPS	CA	1976 2009	94-567, § 1(g); 111-11, § 1851(c)(1)	30, 740 + 43,300	62,138 to 82,238	Non-federal ownership	same	Upon acquisition
Kimberling Creek Wilderness	FS	VA	2009	111-11, § 1103(c)(1)	349	same (?)	Extensive former road network	same (?)	Upon notice of wilderness compatibility or after 5 years
Marjory Stoneman Douglas Wilderness	NPS	FL	1978	95-625, § 401(3)	81,900	same	Non-federal ownership, mineral rights, power line	same (?)	Upon acquisition; burial of power line
Olympic Wilderness	NPS	WA	1988	100-688, § 101(a)(1)	378	same (?)	Non-federal ownership	same (?)	Upon acquisition
Oregon Badlands Wilderness	BLM	OR	2009	111-11, § 1702(a), (c)(1)	25 ft.-wide "corridor"	same (?)	Motorized sled dog training by visually impaired musher	same (?)	Upon termination of training
Organ Pipe Cactus Wilderness	NPS	AZ	1978	95-625, § 401(7)	1,240	same (?)	Overhead power line (?)	same (?)	Upon burial or relocation of power line
Otis Pike Fire Island High Dune Wilderness	NPS	NY	1980	96-585, § a	18	1	Non-federal ownership, structures, access roads	Boardwalk nature trail; boardwalk, dune crossing, and bathhouse	Upon removal of structures
Phillip Burton Wilderness	NPS	CA	1976	94-544, § 1; 94-567, § 1(k)	8,003	6,251	Commercial oyster farming operation, State mineral and fishing rights, road, power/phone lines	Commercial oyster farming operation, road, power/phone lines (?)	When non-conforming uses cease (after efforts to steadily remove all obstacles to conversion)
Pinnacles Wilderness	NPS	CA	1976	94-567, § 1(l)	990	same (?)	Non-federal ownership	same (?)	Upon acquisition
Roaring River Wilderness	FS	OR	2009	111-11, § 1202(c)(1)(A)	900	same (?)	Human alteration related to timber harvest	same (?)	Upon notice of wilderness compatibility
Rocky Mountain National Park Wilderness	NPS	CO	2009	111-11, § 1952(a),(c)	5,169 (?)	same (?)	Non-federal ownership, life tenancy	same (?)	Upon acquisition; expiration of life tenancy
Sequoia-Kings Canyon National Parks Wilderness	NPS	CA	1984	98-425, § 106(2)	100	same (?)	Visitor use developments	same (?)	Upon showing of adverse impact and removal (?)
Shenandoah Wilderness	NPS	VA	1976	94-567, § 1(m)	560	0	Fire tower, power line, fire road, SUPs	-	-
Stephen Mather Wilderness	NPS	WA	1988	100-688, § 201(a)(1)	5,226	same (?)	Patented mining claims, planned flooding, road, structures(?)	same (?)	Upon acquisition
Yosemite National Park Wilderness	NPS	CA	1984	98-425, § 106(1)	3,550	same (?)	Non-federal ownership, power line corridor, Hetch Hetchy dam, other(?)	same (?)	Upon acquisition; power line burial or relocation; dam removal

By far the most common nonconforming use in CDPWAs is more accurately described as a nonconforming condition: non-federal ownership of lands surrounded by or adjacent to designated wilderness.[25] Although administering agencies can pursue land purchases and exchanges, they may not always find willing negotiating partners or may lack the funds for acquisition, so the time at which "practicable" conversion of pockets of non-federal land to full wilderness becomes possible is only partly under agency control. Potentially, private or state owners (and their successors in interest) could continue to hold out indefinitely, all the while receiving the access guaranteed them by the Wilderness Act. On the other hand, removal of some nonconforming uses, like federally owned structures, may be directly within agency discretion and control (though not wholly: Congress must appropriate funds for removal and, potentially, ecological restoration activities). The right-hand column in Table 2 highlights cases in which the administering agency likely has significant power to influence the timing for conversion to full wilderness. An intermediate category of nonconforming uses—for example, life leases—are necessarily time limited but lack precise expiration dates.

DBOC's existing Reservation of Use and Occupancy (RUO) and Special Use Permit have a known, finite expiration date: November 30, 2012. Less than one year from now, the primary obstacle to Drakes Estero achieving full wilderness status will evaporate—unless the Secretary discretionarily decides to grant DBOC an extension and, potentially, an expansion. A decision that would result in cessation of DBOC operations and removal of DBOC facilities upon expiration of the RUO and Special Use Permit would align with the agency's best management practices and the specific stated intent of Congress that the "land and waters designated as potential wilderness additions [at Point Reyes]. . . *be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these lands and waters to wilderness status.*"[26]

C. Extension or Expansion of a Non-Recreation-Focused Commercial Enterprise in a CDPWA Appears to Be Unprecedented

While our research was not necessarily exhaustive, and it is possible to undertake a more in-depth exploration of the details and complete history of agency management in CDPWAs, our findings suggest that granting a new Special Use Permit for DBOC's oyster farming business would represent a significant departure from accepted wilderness/CDPW management practices. In general, the record shows that once Congress designates an area as potential wilderness, nonconforming uses that can't be characterized as "valid existing rights" are generally phased out, not unnecessarily expanded or even extended.[27]

Our survey (summarized in **Table 2** and **Appendix A**) of CDPWAs indicates that DBOC is a highly unusual nonconforming use. While other CDPWAs contain documented nonconforming uses related to commercial activity—such as cattle grazing in Death Valley potential wilderness,[28] patented mining claims in Stephen Mather potential wilderness, and Southern California Edison's operation and maintenance of hydroelectric dams in John Krebs Wilderness potential wilderness—these are generally substantively related to one or more of the exceptions explicitly listed in the Wilderness Act. By contrast, DBOC's mariculture business is a facially commercial production, harvesting, and retail operation (that includes physical facilities both on land and in the water) without obvious ties to any Wilderness Act exceptions. Its closest analog is four commercial fishing bases in the Isle Royale potential wilderness. However, all four of those bases ceased to operate sometime before 2005.

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[25] Past federal land disposal policies contributed to an unwieldy patchwork of federal, state, and private ownership in many parts of the west.

[26] H.R. REP. NO. 94-1680, at 3 (1976) (emphasis added).

[27] One of the few pieces of evidence for extension is a generic reference to Special Use Permits and a specific reference to "Special Use Permit[s] extending life lease use rights" to the children of leaseholders in Isle Royale potential wilderness. However, it is unclear whether these permits were issued prior to or after designation.

[28] Hearings before the *Subcommittee on Public Lands, National Parks, and Forests* to consider S. 21, the California Desert Protection Act of 1993 at 232. HRG-1993-NAR-0024.

Furthermore, while park staff may be authorized to operate motor vehicles in CDPWAs as necessary to complete essential wilderness management tasks[29] without violating the Wilderness Act, allowing a purely commercial operator to do so on a near-daily basis appears to be essentially unheard of. Although established use of motorboats by private parties may be permitted to continue after wilderness designation, this exception seems to have been made mostly for longstanding recreational and administrative uses of watercraft (*see, e.g.*, the Boundary Waters Canoe Area Wilderness). Even well-established and widespread recreational motorboat use has been phased out over time within Buffalo National River potential wilderness.

Finally, aside from Public Law 111-88, Section 124, our research found no other instances of congressional action to authorize extension of a non-conforming commercial use not previously contemplated by one of the established exceptions to Wilderness Act prohibitions.

Therefore, granting DBOC a new Special Use Permit would be an unprecedented act.[30]

III. Environmental Implications of Granting a New Special Use Permit

The Draft EIS indicates that granting a new Special Use Permit would have significant negative impacts on environmental resources and recreational values in Drakes Estero. These include "long-term major adverse impacts" to soundscapes and wilderness;[31] "long-term moderate adverse impacts" to wetlands, eelgrass, benthic fauna, harbor seals, birds, coastal flood zones, and visitor experience and recreation;[32] and "long-term minor adverse impacts" to fish, special-status species, water quality, and NPS operations.[33] In fact, according to the Draft EIS, Alternatives A–D would result in "long-term beneficial impacts" to only one category analyzed—socioeconomic resources.[34] Conversely, the Draft EIS projects that Alternative A, the No Action Alternative, would have "long term beneficial impacts" for all resources and values, with the exception of socioeconomic resources (where it would have "long-term minor adverse impacts") and NPS Operations (where all 4 alternatives would have "long-term minor adverse impacts").[35]

The likely negative impacts the Park Service envisions from extending or expanding DBOC's operations[36] in Drakes Estero raise concerns about the wisdom of discretionarily permitting continued disturbance to this unique estuarine system. The 2009 National Research Council (NRC) report noted

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[29] See, e.g. Haleakala Wilderness in Hawaii, where Congress affirmed the use of helicopters "if necessary . . . for fence maintenance to control destructive invasive alien plants and non-native animals," 67 Fed. Reg. 6944 and Appendix at A-3, and Kimberling Creek Wilderness in Virginia where Congress mentioned that "motorized equipment and mechanized transport" could be used "if necessary to restore the natural ecosystems," Pub. L. No. 111-11, § 1103(c)(1) and Appendix at A-23.

[30] Some might argue that the uniqueness of DBOC's nonconforming use cabins the potential effect of granting an extension of it because this management change is not readily transferable to other CDPWAs. However, this oversimplification ignores the probable precedential effect of granting an unnecessary extension/expansion on a especially nonconforming category of use.

[31] NAT'L PARK SERV., DRAKES BAY OYSTER COMPANY SPECIAL USE PERMIT DRAFT EIS lii, liv (2011) [hereinafter DEIS].

[32] *Id.* at xl, xlii, xliv, xlvi, xlviii, l, and lv.

[33] *Id.* at xlv, xlix, li, and lviii.

[34] *Id.* at lvii (explaining that continuing DBOC operations would "provide employment and housing to DBOC staff and their families . . . contribut[e] to the regional tax base . . . [and] provide a local food source for the region").

[35] References, *supra* notes 31–34.

[36] It is important to not that, in addition to officially permitted activities, unforeseen and unpermitted activities may have significant impacts on Drakes Estero. For example, DBOC has been found to be in violation of the terms of its RUO on a number of occasions. Violations have included unpermitted septic discharges into the Estero and motor boats operation in off-limits areas protected for harbor seal breeding. *See* DEIS at 46; *Letter of September 29, 2011 from California Coastal Commission to Kevin Lunny, DBOC.* Re: Compliance With the Coastal Act and Consent Cease and Desist Order CCC-07-CD-11 (Drakes Bay Oyster Company). The extent of the harm these violations cause may be difficult to quantify, but they may also have long-term cumulative impacts that were not fully assessed in the EIS.

that even sustainable, highly-regulated bivalve mariculture exposes the ecosystem to a number of risks (including greater susceptibility to disease), and use of artificial substrate facilitates the spread of non-native epibiotic organisms.[37]

However, that report and many other sources have concluded that the scientific record of DBOC's past and ongoing impacts suffers from significant data gaps, leading to uncertainty about the magnitude of these impacts and calling into question the strength of the evidence for causal links between specific DBOC activities and particular changes in the estuary. A few of these questions are highlighted in **Table 3** and discussed in **Appendix B**.

Table 3. Relevant questions relating to DBOC's impacts that have not been satisfactorily answered yet.

Question	What we know	What we don't know	Conclusion?
What is the impact of DBOC's Pacific oyster mariculture on native Olympia oyster recovery in Drakes Estero?	Species can compete directly for resources.	Population of Olympia oysters in Drakes Estero.	Pacific oyster most likely has a negative impact on the potential for Olympia oyster rehabilitation in Drakes Estero. However, Estero-specific research needed to give better idea of the likely magnitude of the impact, e.g., researching factors relevant to Pacific oyster's potential to go feral in the area.
	Pacific oyster beds act as "recruitment sink" for Olympia oyster.	Detailed differences between the physical, chemical, and biological environment of Drakes Estero and areas where Pacific oyster has become independently invasive, like San Francisco Bay.	
	Pacific oyster has become self-established in San Francisco Bay.	Detailed differences between Drakes Estero ecosystems and physical/chemical environment and that of localities where studies are done, and how/if this effects Pacific oyster's impacts.	
What is the impact of DBOC's mariculture structures on sedimentation in Drakes Estero?	Oyster bags and racks have been documented to trap sediments in other areas.	Significance of effects of mariculture structures on sedimentation in Drakes Estero.	Potential for negative impact/change in sedimentation, but more research needed to determine precise effects.
What is the impact of DBOC's mariculture activities on fish in Drakes Estero?	In Humboldt Bay, California, oyster long-lines were found to harbor more fish than eelgrass.	Similarities/differences between long-lines used in Humboldt Bay and oyster racks used in Drakes Estero.	More research needed in Drakes Estero to determine if oyster mariculture apparatus affects fish densities and varities.
	North Carolina study showed equal fish density over plastic bottom netting (used to cover cultured clams) and in eelgrass beds.	Same or different fish species, other factors in Drakes Estero vs. two study areas.	Assumption that increase in fish populations represents a net benefit to the ecosystem should be analyzed critically.
What is the impact of DBOC's mariculture activities on harbor seals in Drakes Estero?	Data from population studies.	Effects of disturbances on seals during breeding season.	More research needed to determine specific impacts of mariculture on harbor seals (including causal relationships).
	Statistical analysis.	Relationship between mariculture activities and seal behaviour at haul-out sites?	Disturbances from mariculture should be precautionarily reduced.
	Mariculture activities, in particular motor boat use, can disrupt seals in breeding grounds.	Affect on seals in water (as opposed to hauled-out).	Need long term monitoring
What is the impact of DBOC's mariculture activities on water quality in Drakes Estero?	Oyster waste can cause sedimentary anoxia.	Extent to which oysters vs. tidal flux influence water quality in Drake's Bay	Use of term "benefits" to describe ecosystem changes should be closely assessed.
	Oyster pseudo-feces can fertilize benthic macro- and microalgae, increasing benthic primary production.		Pacific oyster may cause sedimentary annoxia or improve water quality, but both effects may be made largely irrelevant by strong tidal flow. Therefore, using these as arguments for/against continuation of oyster mariculture may not be meaningful.
	Oyster mariculture has been shown to improve overall water quality in some areas.		

[37] OCEAN STUDIES BOARD. NATIONAL RESEARCH COUNCIL, ECOSYSTEM CONCEPTS FOR SUSTAINABLE BIVALVE MARICULTURE 8 (2010) [hereinafter NRC REPORT]. The Draft EIS also mentions these impacts. *See, e.g.*, DEIS, *supra* note 31, at xliv.

The NRC report found that "onsite investigations of potential impacts of DBOC operations on the Drakes Estero ecosystem . . . could be fairly characterized as preliminary results that would require additional focused research to allow definitive conclusions to be reached about the presence, absence, or magnitude of any ecological impacts."[38] Furthermore, it noted that studies of impacts in other locations "may help support results from initial studies in Drakes Estero, [but] comparability is not always sufficient to reach confident conclusions on the most important issues of relevance to management decisions."[39]

Similarly, the recently issued Marine Mammal Commission report[40] points out the many limitations of data linking changes in harbor seal population and distribution to a variety of influences, including DBOC's activities, in the estuary. The Commission found that:

- Although "the number of seals using [the oyster bar haulout] site declined substantially in 2007 . . . existing information is [not] sufficient to determine the factor(s) that caused the change."
- "[D]ata . . . are not sufficient to support firm conclusions regarding the rate and significance of [] disturbance" by mariculture activities."
- "[D]ata supporting the [statistical] analyses are scant and have been stretched to their limit. Nevertheless, . . . [they] provide some support for the conclusion that harbor seal habitat-use patterns and mariculture activities in Drakes Estero are at least correlated . . . [but] are not sufficient to demonstrate a causal relationship. Additional, carefully guided study would be required to determine if the apparent relationship is one of cause and effect."
- "Improvements are needed in the procedures used to collect disturbance data and to characterize mariculture activities and effort in the upper estuary. Photographs taken between 2007 and 2010 warrant further review to assess their usefulness for characterizing the rates and consequences of disturbance. Also, studies are needed to characterize harbor seal haulout patterns in the absence of disturbance, and to assess the biological significance of disturbance when it occurs."[41]

Without more and better data, then, the environmental repercussions of the Secretary's decision remain unclear. The Commission notes that "whether and to what extent the above shortcomings are addressed will depend, in part, on the decision by the Secretary of the Interior."[42] Far from negating the need to learn more, "[i]f the Secretary determines that the estuary should be converted to full wilderness status, then the Park Service should continue to study the seals to determine if and how they may change in abundance or alter their habitat-use patterns."[43] On the other hand, if the Secretary selects one of the Action Alternatives and grants a new Special Use Permit, it will be crucial for the National Park Service to "address the various weaknesses and gaps in the available data" with a well-thought out long-term monitoring and adaptive management plan.[44] The Commission gives detailed suggestions for such a plan, including 20 elements it sees as essential to successful adaptive management.[45] It cautions that:

> "[i]mplementing an adaptive management approach is not a simple or trivial matter. To be successful, . . . [it] would have to be well conceived, adequately supported, and responsibly implemented by all parties involved. Most importantly, it would have to be based on getting at the truth, rather than having those with conflicting viewpoints seeking simply to win the debate."[46]

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[38] NRC REPORT, at 67.
[39] *Id.*
[40] MARINE MAMMAL COMMISSION, MARICULTURE AND HARBOR SEALS IN DRAKES ESTERO, CALIFORNIA (2011).
[41] *Id.* at i–iii.
[42] *Id.* at iii.
[43] *Id.*
[44] *Id.*
[45] *Id.* at 59–60.
[46] *Id.* at 59.

Given the Park Service's limited budget and the tight time constraints for preparing the Final EIS, it is unlikely that sufficient data to adequately evaluate the potential impacts of DBOC's proposed future activities will become available within the timeframe of NEPA review. While adaptive management is a possibility, it is an expensive and labor-intensive one, the need for which would be obviated by selecting Alternative A.

In circumstances of scientific ambiguity, some policy-makers adopt the precautionary principle,[47] placing the burden on the party proposing an action to affirmatively show a lack of negative impact on the environment. Given the uniqueness of Drakes Estero, our incomplete knowledge of its complex ecology, and the limitations on our understanding of the specific effects of DBOC's activities, we counsel the Secretary to adopt a precautionary approach in his decision-making and select the No Action Alternative.

IV. Adherence to the Purpose and Substance of the Wilderness Act and the Precautionary Principle Compel the Secretary to Select the No-Action Alternative

While Section 124 of Public Law 111-88 indeed *authorizes* the Secretary to grant a 10-year extension of DBOC operations, it does not *mandate* it. The Secretary has discretion to grant or deny on the basis of his expert opinion after reasoned analysis of all factors. We urge that approving a new Special Use Permit would result in significant, clear negative impacts to wilderness values and uncertain, although likely negative, impacts to Drakes Estero ecosystems.

First, granting an extension or expansion of a non-recreation-focused commercial enterprise in a CDPWA seems to lack precedent and would take place in apparent contravention of the authorizing legislation's intent, the Wilderness Act's purpose and substance, and the Park Service's own management guidance.

Additionally, even divorced from the wilderness context, the lack of robust, relevant, temporally and spatially extensive scientific data regarding the magnitude and extent of DBOC's impacts does not demonstrate that mariculture activities in Drakes Estero pose little risk of environmental harm. On the contrary, it demonstrates that the Secretary does not have the information he would need to make an informed decision about the scientific wisdom of discretionarily extending/expanding this non-conforming use in this CDPWA. Therefore, to protect wilderness values at Point Reyes and the integrity of the National Wilderness Preservation System and to avoid unnecessary risk to local ecosystems, we urge the Secretary to select Alternative A, the No-Action Alternative.

DBOC took over Johnson's Oyster Farm's RUO and Special Use Permit in 2005 with full knowledge that the authorization for this nonconforming use was fast coming to an end. While the RUO contains a permissive renewal clause,[48] it pre-dates the designation of Drakes Estero as potential wilderness, and it is unrealistic to think that, absent the current congressional authorization, the Secretary would have even entertained the possibility of renewal.

The 2009 authorization explicitly denies that it will serve as precedent for administrative actions elsewhere within the National Wilderness Preservation System,[49] but this is a false promise. Although the

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[47] *See, e.g.*, Article 191 of the Treaty on the Functioning of the European Union (EU) (stating that the Precautionary Principle may be invoked when a phenomenon, product or process may have a dangerous effect, identified by a scientific and objective evaluation, if this evaluation does not allow the risk to be determined with sufficient certainty).

[48] RUO (1972) ("Any permit for continued use will be issued in accordance with National Park Service regulations at the time the Reservation expires.").

[49] *See* Interior Department and Further Continuing Appropriations, Fiscal Year 2010, Pub. L. No. 111-88, § 124, 123 Stat. 2932 (2009) (stating that "[n]othing in this section shall be construed to have any application to any location other than Point Reyes National Seashore; nor shall anything in this section be cited as precedent for management of any potential wilderness outside the Seashore").

explicit scope of Section 124 is limited to Point Reyes National Seashore, this language does nothing to limit potential indirect impacts in the event the Secretary chooses to approve a new Special Use Permit under this congressional grant of authority. Section 124's disclaimer in no way precludes other members of Congress—noting the Secretary's willingness to sacrifice wilderness values under political pressure—from seeking legislative (or legislatively authorized) extensions or expansions for nonconforming activities in CDPWAs in their own states.

This is the kind of political intervention that Arthur Wright, President of The Wilderness Society, warned of in a 1976 hearing on designation of wilderness areas in Badlands National Monument:

> We do not believe the legislative history of [The Wilderness Act] or the act itself is favorable to [the] idea of Congress delegating authority to make wilderness judgments [by designating potential wilderness and leaving its conversion to wilderness up to an executive agency]. Moreover, we have a concern that something could happen to potential wilderness additions if they receive bad handling . . . or there are administrative or legal loopholes involved in potential additions and *I think with strong economic pressures, somehow, someway, potential wilderness additions could find themselves in deep trouble, and not make this wilderness system as intended by Congress.*"[50]

Unlike many CDPWAs, which must wait an unknown length of time until agency acquisition of non-federal land/rights before conversion to full wilderness, for the past 35 years, Drakes Estero's potential wilderness status had a known expiration date. Ironically, that date is at risk of being pushed off (perhaps indefinitely) into the future because Congress has given the Secretary discretion he did not have before. Whereas agency control over the time frame for ending non-conforming uses would normally expedite their removal (and, therefore, CDPW conversion to full wilderness), here it may have the opposite effect.

If the Secretary grants the 10-year extension Congress has authorized (but not mandated), what will change from one decade to the next? As 2022 draws near, DBOC will be at liberty to seek, and Congress will be at liberty to grant, authorization for another 10-year reprieve. In this circumstance, would the Secretary approve a second extension? If not, by what logic? In the overall scheme of things, a 20-year delay in the conversion of CDPW to full wilderness seems not so different from a 10-year delay. However, this type of rationalizing could rapidly lead to Drakes Estero earning *permanent* status as a *potential* wilderness. This outcome, and the likelihood it would be repeated in other locations around the country, will harm local wilderness values and chip away at the integrity of the Wilderness Act itself.

While we argue against it, if the Secretary decides to select an Action Alternative, we strongly recommend that he include explicit provisions to cure the information gaps currently plaguing analysis of DBOC's impacts on Drakes Estero ecosystems. This would require extensive, ongoing monitoring as part of a well-thought-out adaptive management system. Additionally, instead of expanding DBOC's operations, the Secretary should demand a stepped phase out of its "temporary nonconforming or incompatible conditions" over the next ten years. These include both DBOC's direct activities[51] and its indirect impacts.[52] An adaptive, research-oriented approach to a DBOC extension would at least ensure that we know more about its impacts in 10 years than we do today.

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[50] "Wilderness Additions: National Park System" hearings before the Committee on Interior and Insular Affairs. Senate, Feb. 5, 19, Mar. 2, 1976 at 150. HRG-1976-IIA-0075 (emphasis added).

[51] For example, the near-daily use of motorboats over a large portion of the estuary, the periodic import of out-of-state oyster seed (potentially containing additional invasive species like the introduced tunicate *Didemnum vexillum*), and the maintenance of hard, benthic substrates in a traditionally mud and sand dominated estuary

[52] For example, environmental loading of mariculture-associated viruses, parasites, and epibionts; competitive depletion of plankton and organic particulate matter; shifts in the overall nutrient cycling of the estuary; and unknown impacts on the recovery and persistence of native species in the estuary (e.g., native oyster reintroduction, harbor seal pupping success).

APPENDIX A.
Congressionally Designated Potential Wilderness Areas as of 11/2011

Potential Wilderness Areas Designated in 1976

Pub. L. No. 94-544	Phillip Burton Wilderness (Point Reyes Wilderness) (Discussed as #6, at page A-5)	CA
Pub. L. No. 94-567		
1.	Chiricahua National Monument Wilderness	AZ
2.	Great Sand Dunes Wilderness	CO
3.	Haleakala Wilderness	HI
4.	Isle Royale Wilderness	MI
5.	Joshua Tree Wilderness	CA
6.	Phillip Burton Wilderness (Point Reyes Wilderness)	CA
7.	Pinnacles Wilderness	CA
8.	Shenandoah Wilderness	VA

1. Chiricahua National Monument Wilderness — 1976 *Arizona*

Responsible Agency: National Park Service
Initial Size (1976): **2** acres (Pub. L. No. 94-567, § 1(c))
Current Size: **2** acres (?)

Reasons for "potential" wilderness status:

- Lead Mining Claim: "The two-acre potential wilderness on the northeast corner of the monument is part of a valid lead mining claim. When the two acres are acquired, they will become wilderness." *Walker Statement* at 88.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 94–567, § 3.
- General Administration: "[T]he following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act." *Id.* § 1; *see also id.* § 6.

Sources (ordered by date):

i. *Designation of Wilderness Areas Part IV: Hearing on H.R. 13562 and H.R. 13563 Before the Subcomm. on National Parks and Recreation of the H. Comm. on Interior and Insular Affairs*, 93rd Cong. 10–43, 87–115 (1974) (statement of Ronald Walker, Director, Nat'l Park Serv.) [hereinafter *Walker Statement*]
ii. An Act to Designate Certain Lands Within Units of the National Park System as Wilderness; to Revise the Boundaries of Certain of Those Units; and for Other Purposes, Pub. L. No. 94–567, 90 Stat. 2692 (1976)

2. Great Sand Dunes Wilderness — 1976 + 1979 *Colorado*

Responsible Agency: National Park Service
Initial Size (1976): **670** (Pub. L. No. 94-567, § 1(d)) + **1,900** (Pub. L. No. 96-87, § 401; *see also* 74 Fed. Reg. 16005)
Current Size: **65** acres (?) (*see* 74 Fed. Reg. 16006 (announcing conversion of 2,505 acres to full wilderness in 2009))

Reasons for "potential" wilderness status:

- Non-Federal Ownership, Access, and Improvements: "This potential wilderness consists of private inholdings and some Federal land utilized for access to one of them." *Walker Statement* at 25. "There are no manmade structures . . . and we have no plans to put anything there, possibly except a primitive camp here in San Creek [indicating] and one here on Little Medano Creek." *Id.* at 26. "At the time of the establishment of the wilderness area two of the potential wilderness units had been purchased by the government but had non-conforming uses . . . . One was occupied by the previous owner under a ''Life Estate Agreement'' while the other was occupied under a ''Use and Occupancy'' agreement. The former expired upon the death of the occupant in 1995 while the latter's term expired in 1999. . . . Additionally, improvements existing on one of the units were removed and the area restored to a natural state." 74 Fed. Reg. 16005–16006. The government purchased two other private units, which had previously been "accessible by motor vehicle," in 2000 and 2004. *Id.* at 16006.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 94–567, § 3.
- General Administration: "[T]he following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act." *Id.* § 1; *see also id.* § 6.
- Motorized Vehicles for Fence Maintenance: "The Committee recognized the possible need . . . to utilize motorized vehicles along certain parts of the monument boundary to maintain fencing for protection . . . from trespass of domestic livestock" and "that this necessary management activity may continue pursuant to Sec. 4 (a)(3) of the Wilderness Act." S. REP. NO. 94-1357 at 4–5.

Sources (ordered by date):

i. *Designation of Wilderness Areas Part IV: Hearing on H.R. 13562 and H.R. 13563 Before the Subcomm. on National Parks and Recreation of the H. Comm. on Interior and Insular Affairs*, 93rd Cong. 10–43, 87–115 (1974) (statement of Ronald Walker, Director, Nat'l Park Serv.) [hereinafter *Walker Statement*]
ii. S. REP. NO. 94-1357 (1976)
iii. An Act to Designate Certain Lands Within Units of the National Park System as Wilderness; to Revise the Boundaries of Certain of Those Units; and for Other Purposes, Pub. L. No. 94–567, 90 Stat. 2692 (1976)
iv. An Act to Authorize the Secretary of the Interior to Provide for the Commemoration of the Efforts of Goodloe Byron to Protect the Appalachian Trail, and for Other Purposes, 1979, Pub. L. No. 96–87, § 401, 93 Stat. 664 (1979)
v. Notice of Designation of Potential Wilderness as Wilderness, Great Sand Dunes National Park and Preserve, CO, 74 Fed. Reg. 16005–16006 (Apr. 8, 2009)

3. Haleakala Wilderness — 1976 *Hawaii*

Responsible Agency: National Park Service
Initial Size (1976): **5,500** acres (Pub. L. No. 94-567, § 1(e))
Current Size: **51** acres (67 Fed. Reg. 6944 (explaining that East Maui Irrigation Inc. owns the remaining acreage in 2002))

Reasons for "potential" wilderness status:

- Non-Federal Ownership: The potential wilderness "consists of 5,310 acres of State land and 190 acres of privately owned land" that will become wilderness "upon their acquisition by the Federal Government." *Walker Statement* at 91.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 94–567, § 3.

- General Administration: "[T]he following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act." *Id.* § 1; *see also id.* § 6.
- Exclusion Fence Construction and Maintenance: "It is noted that construction of fences to exclude feral animals and access via helicopter for fence maintenance to control destructive invasive alien plants and non-native animals" allowed if "necessary to preserve wilderness resources and ecosystem processes." 67 Fed. Reg. 6944.

Sources (ordered by date):

i. *Designation of Wilderness Areas Part IV: Hearing on H.R. 13562 and H.R. 13563 Before the Subcomm. on National Parks and Recreation of the H. Comm. on Interior and Insular Affairs*, 93rd Cong. 10–43, 87–115 (1974) (statement of Ronald Walker, Director, Nat'l Park Serv.) [hereinafter *Walker Statement*]
ii. An Act to Designate Certain Lands Within Units of the National Park System as Wilderness; to Revise the Boundaries of Certain of Those Units; and for Other Purposes, Pub. L. No. 94–567, 90 Stat. 2692 (1976)
iii. Notice of Conversion of Potential Wilderness as Designated Wilderness, Haleakala National Park, 67 Fed. Reg. 6944 (Feb. 14, 2002)

4. Isle Royale Wilderness — 1976 *Michigan*

Responsible Agency: National Park Service
Initial Size (1976): **231** acres (Pub. L. No. 94-567, § 1(f))
Current Size: **93** acres (*see* 48 Fed. Reg. 12842 (announcing conversion of 138 acres consisting of two power line corridors where the line "was abandoned . . . dismantled and removed" to full wilderness in 1983))

Reasons for "potential" wilderness status:

- Structures, Power Line, Special Use Permits, Commercial Fishing Bases, Life Leases, etc.: "There are approximately 20 existing trailside shelters . . . included in areas of potential wilderness addition, and these areas shall become wilderness when the shelters are no longer needed." S. REP. NO. 94-1357, at 5. "[N]o acreage is provided, but as these shelters are eliminated, the area upon which they stand will likewise become wilderness." H.R. REP. NO. 93-1636, at 5. Other nonconforming uses consisted of: 4 commercial fishing bases, U.S. Coast Guard boathouse, a power line, ranger station facilities, and 11 life leases. *See id.*
  - In 2005, remaining non-conforming uses included: 3 "Volunteer in Park agreement[s] allowing residence," 2 Special Use Permits, "NPS and researcher housing," 2 "Special Use Permit[s] extending life lease use rights," ranger station with fuel storage, 2 "NPS residence[s]," 4 life leases, "[b]oat house and trail to light house for past Coast Guard use," and an "Artist in Residence Program cabin." ISLE ROYALE EIS, at 24.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 94–567, § 3.
- General Administration: "[T]he following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act." *Id.* § 1; *see also id.* § 6.
- Boat Dock Maintenance, Power Line, Prescribed Burning: "The Committee understands that no significant expansion of boat docks numbers is anticipated, but that continued maintenance of these facilities is essential to the continued ease of access as well as the health and safety of the visitors. The continued operation of a power line to Mt. Ojibway, and the use of prescribed burning are both management decisions which lie with the National Park Service pursuant to Sec. 4(a)(3) of the Wilderness Act. The Committee assumes these activities will continue with reference to testimony received from the" NPS. S. REP. NO. 94-1357, at 5.

Sources (ordered by date):

i. H.R. REP. NO. 93-1636 (1974)
ii. S. REP. NO. 94-1357 (1976)
iii. An Act to Designate Certain Lands Within Units of the National Park System as Wilderness; to Revise the Boundaries of Certain of Those Units; and for Other Purposes, Pub. L. No. 94–567, 90 Stat. 2692 (1976)
iv. Designation of Wilderness; Isle Royale National Park, 48 Fed. Reg. 12842 (Mar. 28, 1983)
v. NATIONAL PARK SERVICE, WILDERNESS AND BACKCOUNTRY MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT, ISLE ROYALE NATIONAL PARK (2005) [hereinafter ISLE ROYALE EIS].

5. Joshua Tree Wilderness — 1976 + 2009 — *California*

Responsible Agency: National Park Service

Initial Size (1976): **30,740** acres (initially thought to be 37,550 due to miscalculation) (Pub. L. No. 94-567, § 1(g); 62 Fed. Reg. 28729) + **43,300** acres (Pub. L. No. 111-11, § 1851(c)(1) (2009))

Current Size: **62,138 to 62,238** acres (62 Fed. Reg. 28729–28730 (announcing conversion of 3,502.20 acres to full wilderness in 1997); *Daly Statement* at 24 (describing the intent in 2007 to incorporate "about 8,400 acres" designated as potential wilderness in 1976 due to private ownership "or use[] for non-wilderness purposes" as part of 36,800 acres of wilderness); *see also* Pub. L. No. 111-11 § 1851(b)(1)(F) (designating 36,700 acres as wilderness in 2009, presumably including 8,300 to 8,400 acres of 1976 potential wilderness))

Reasons for "potential" wilderness status:

- Non-Federal Ownership:
  - Potential wilderness designated in 1976 included private and state lands the Park Service was attempting to exchange or purchase, including 10,500 acres owned by the Southern Pacific Railroad Company arrayed in a "checkerboard pattern" with federal land. *Walker Statement,* at 97–98. "With the recent land acquisition progress exhibited here, it is anticipated that a significant amount of the potential wilderness addition acreage will soon be acquired and will then convert to wilderness status." S. REP. NO. 94-1357, at 5–6.
  - Potential wilderness designated in 2009 included non-federally owned inholdings. Pub. L. No. 111-11 § 1851(c)(2)(B); *see also Daly Statement,* at 24 (explaining that "[a]bout one-third of the acreage is in private ownership" and "the park already is managing this area as wilderness").

Achievement of wilderness designation / administration:

Potential Wilderness Designated in 1976:

- Conversion to Full Wilderness: "All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 94–567, § 3.
- General Administration: "[T]he following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act." *Id.* § 1; *see also id.* § 6.
- Wildlife Watering Devices: "Special management language . . . was deleted. It authorized the Secretary to construct and maintain wildlife watering devices and to use necessary manipulative techniques to perpetuate natural ecological conditions. While recognizing the necessity of this authority, . . . explanation of specific management functions are [sic] not appropriate in this legislation in light of Sec. 4(a)(3) of the Wilderness Act." S. REP. NO. 94-1357, at 6.

Potential Wilderness Designated in 2009:

- Conversion to Full Wilderness: "The land designated potential wilderness . . . shall be designated as wilderness . . . effective upon publication by the Secretary of the Interior in the Federal Register of a notice that—(A) all uses of the land within the potential wilderness prohibited by the Wilderness Act . . . have ceased; and (B) sufficient inholdings within the boundaries of the potential wilderness have been acquired to establish a manageable wilderness unit." Pub. L. No. 111-11 § 1851(c)(2).
- General Administration: "[D]esignated potential wilderness . . . shall be managed by the Secretary of the Interior insofar as practicable as wilderness until such time as the land is designated as wilderness."

Id. § 1851(c)(1). "Subject to valid existing rights, the land designated as wilderness or as a [potential] wilderness addition by this section shall be administered by the Secretary in accordance with the Wilderness Act." *Id.* § 1851(d)(1).

- Fire, Insect, and Disease Control: "The Secretary may take such measures in a wilderness area or wilderness addition designated by this section as are necessary for the control of fire, insects, and diseases in accordance with section 4(d)(1) of the Wilderness Act (16 U.S.C. 1133(d)(1)) and House Report 98–40 of the 98th Congress." *Id.* § 1851(d)(4)(A).
- Grazing: "Grazing of livestock in a wilderness area or wilderness addition designated by this section shall be administered in accordance with the provisions of section 4(d)(4) of the Wilderness Act (16 U.S.C. 1133(d)(4)) and the guidelines set forth in House Report 96–617 to accompany H.R. 5487 of the 96th Congress." *Id.* § 1851(d)(5).
- Military Airspace Use: "Nothing in this section precludes—(A) low-level overflights of military aircraft over the wilderness areas or wilderness additions designated by this section; (B) the designation of new units of special airspace over the wilderness areas or wilderness additions designated by this section; or (C) the use or establishment of military flight training routes over wilderness areas or wilderness additions designated by this section." *Id.* § 1851(d)(7).

Sources (ordered by date):

i. *Designation of Wilderness Areas Part IV: Hearing on H.R. 13562 and H.R. 13563 Before the Subcomm. on National Parks and Recreation of the H. Comm. on Interior and Insular Affairs*, 93rd Cong. 10–43, 87–115 (1974) (statement of Ronald Walker, Director, Nat'l Park Serv.) [hereinafter *Walker Statement*]
ii. S. REP. NO. 94-1357 (1976)
iii. An Act to Designate Certain Lands Within Units of the National Park System as Wilderness; to Revise the Boundaries of Certain of Those Units; and for Other Purposes, Pub. L. No. 94–567, 90 Stat. 2692 (1976)
iv. Notice of Designation of Potential Wilderness, Joshua Tree National Park, 62 Fed. Reg. 28729–28730 (May 27, 1997)
v. *Hearing on H.R. 2334, H.R. 2632, H.R. 3287, H.R. 3513, and H.R. 3682 Before the Subcomm. on National Parks, Forests and Public Lands of the H. Comm. on Natural Resources*, 110th Cong. 21–41 (2007) (statement of Elena Daly, Director, National Landscape Conservation System, Bureau of Land Management) [hereinafter *Daly Statement*]
vi. Omnibus Public Land Management Act of 2009, Pub. L. No. 111-11, 123 Stat. 991

6. Phillip Burton Wilderness — 1976 (x 2) *California*

Previous Name:	Point Reyes Wilderness (changed by Pub. L. No. 99-68, 99 Stat. 166 (1985))
Responsible Agency:	National Park Service
Initial Size (1976):	**8,003** acres (Pub. L. No. 94–544, § 1; Pub. L. No. 94-567, § 1(k))
Current Size:	**6,251** acres (64 Fed. Reg. 63057 (announcing conversion of 1,752 acres in "Muddy Hollow, Abotts Lagoon, and Limantour Area . . . [now] entirely in Federal ownership" to full wilderness in 1999))

Reasons for "potential" wilderness status:

- Non-Federal Title, Structures, Commercial Oyster Farming: "[P]otential wilderness . . . will automatically gain wilderness status when the Federal government gains full title to these lands, and when certain non-conforming uses and/or structures are eliminated." S. REP. NO. 94-1357, at 7. "Limantour Estero . . . and Abotts lagoon . . . are subject to mineral and fishing rights owned by the State." H.R. REP. NO. 94-1680, at 5. "Commercial oyster farming operations [in Drakes Estero] . . . and the reserved rights by the State on tidelands in this area make this acreage inconsistent with wilderness." *Id.* at 6. Additionally, the "Muddy Hollow Road corridor . . . consists of a road and overhead electric power and telephone lines." *Id.*

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 94–567, § 3.

- General Administration: "[T]he following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act." *Id.* § 1; *see also id.* § 6. "[T]he following lands . . . are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act: those lands comprising twenty-five thousand three hundred and seventy acres, and potential wilderness additions comprising eight thousand and three acres." Pub. L. No. 94–544 § 1; *see also id.* § 3. "As is well established, it is the intention that those lands and waters designated as **potential wilderness additions will be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these lands and waters to wilderness status**." H.R. REP. NO. 94-1680, at 3 (emphasis added).
- Fire Trail Maintenance, Emergencies: "[M]echanized equipment may be necessary to maintain passable fire trails" and NPS does not have to "cope with an emergency, such as an oil spill, or the health and safety of park visitors, without the use of mechanized equipment" S. REP. NO. 94-1357, at 7.

Sources (ordered by date):

i. *Designation of Wilderness Areas Part IV: Hearing on H.R. 13562 and H.R. 13563 Before the Subcomm. on National Parks and Recreation of the H. Comm. on Interior and Insular Affairs*, 93rd Cong. 10–43, 87–115 (1974) (statement of Ronald Walker, Director, Nat'l Park Serv.) [hereinafter *Walker Statement*]
ii. An Act to Designate Certain Lands in the Point Reyes National Seashore, California, as Wilderness, Amending the Act of September 13, 1962 (76 Stat. 538), as Amended (16 U.S.C. 459c–6a), and for Other Purposes, Pub. L. No. 94–544, 90 Stat. 2515 (1976)
iii. H.R. REP. NO. 94-1680 (1976)
iv. S. REP. NO. 94-1357 (1976)
v. An Act to Designate Certain Lands Within Units of the National Park System as Wilderness; to Revise the Boundaries of Certain of Those Units; and for Other Purposes, Pub. L. No. 94–567, 90 Stat. 2692 (1976)
vi. Notice of Designation of Potential Wilderness, Point Reyes National Seashore, 64 Fed. Reg. 63057 (Nov. 18, 1999)

7. Pinnacles Wilderness — 1976 *California*

Responsible Agency: National Park Service
Initial Size (1976): **990** acres (Pub. L. No. 94-567, § 1(i))
Current Size: **990** acres (?)

Reasons for "potential" wilderness status:

- Non-Federal Ownership. *See Talcott Statement* at 303.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 94–567, § 3.
- General Administration: "[T]he following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act." *Id.* § 1; *see also id.* § 6.

Sources (ordered by date):

i. *Wilderness Additions–National Park System: Hearing on S. 885 and S. 1096, S. 1085 and S. 1675, S. 731 and S. 1069, S. 1068, S. 72 and S. 1092, S. 1093, S. 2472, and S. 97 and S. 1099 Before the S. Subcomm. on Parks and Recreation of the Comm. on Interior and Insular Affairs*, 94th Cong. 300–305 (statement of Rep. Burt Talcott) [hereinafter *Talcott Statement*]
ii. An Act to Designate Certain Lands Within Units of the National Park System as Wilderness; to Revise the Boundaries of Certain of Those Units; and for Other Purposes, Pub. L. No. 94–567, 90 Stat. 2692 (1976)

8. Shenandoah Wilderness — 1976 *Virginia*

Responsible Agency: National Park Service
Initial Size (1976): **560** acres (Pub. L. No. 94-567, § 1(m))
Current Size: **0** acres (43 Fed. Reg. 39188 (announcing conversion of all 560 acres of potential wilderness to full wilderness in 1978 after removal of power line and fire tower and transfer of special use permits "to a nonwilderness park road for the remaining lifetime of the current permittees" and permanent closure and blockage of potential wilderness road to "prevent further motorized use"))

Reasons for "potential" wilderness status:

- Fire Tower, Power Line, Fire Road, Special Use Permits: "[A]bandoned . . . fire tower, and an unused overhead powerline and a fire road that lead to the tower from opposite directions"; "fire road, upon which special use permits had been issued to stockmen of record at the time of the purchase of the park to permit the continuation of their traditional hauling of cattle from one side of the park to the other." 43 Fed. Reg. 39188.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "All lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 94–567, § 3.
- General Administration: "[T]he following lands are hereby designated as wilderness, and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act." *Id.* § 1; *see also id.* § 6.

Sources (ordered by date):

i. An Act to Designate Certain Lands Within Units of the National Park System as Wilderness; to Revise the Boundaries of Certain of Those Units; and for Other Purposes, Pub. L. No. 94–567, 90 Stat. 2692 (1976)
ii. Shenandoah National Park, VA, 43 Fed. Reg. 39188 (Sept. 1, 1978)

Potential Wilderness Areas Designated 1978

Pub. L. No. 95-625

9.	Buffalo National River Wilderness	AR
10.	Carlsbad Caverns Wilderness	NM
11.	Gulf Islands Wilderness	FL
12.	Hawaii Volcanoes Wilderness	HI
13.	Marjory Stoneman Douglas Wilderness (Everglades Wilderness)	FL
14.	Organ Pipe Cactus Wilderness	AZ

9. Buffalo National River Wilderness — 1978 *Arkansas*

Responsible Agency: National Park Service
Initial Size (1978): **25,471** acres (Pub. L. No. 95-625, § 401(1))
Current Size: **1,007** acres (58 Fed. Reg. 53746 (announcing conversion of all but 1,007 acres of potential wilderness to full wilderness in 1993, after "all non-Federal interests and uses prohibited by the Wilderness Act" were eliminated))

Reasons for "potential" wilderness status:

- Non-Federal Ownership, Motorized Boat Access: Non-conforming uses included "non-Federal interests and uses prohibited by the Wilderness Act." 58 Fed. Reg. 53746. "Traditionally, Johnboats with motors have been used on the lower portion of the Buffalo River and it is felt that use of motors is a convenience to those who desire motorized access for fishing, but is not necessary for public enjoyment of the proposed wilderness." INTERIOR STATEMENT at 85.
    - The remaining 1,007 acres "are divided between nine separate parcels in the three units of the BNR Wilderness Area," mostly "use and occupancy reservations which will expire by the year 2004." BNR PLAN, at 20.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands which represent potential wilderness additions in this title, upon publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 95-625, § 403.
- General Administration: "Lands designated as potential wilderness additions shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated wilderness." *Id.*

Sources (ordered by date):

i. SUBCOMM. ON NATIONAL PARKS AND INSULAR AFFAIRS OF THE H. COMM. ON INTERIOR AND INSULAR AFFAIRS, LEGIS. HISTORY OF THE NATIONAL PARKS AND RECREATION ACT OF 1978, at 9–113 (1978) (statement of witness for the Department of the Interior) [hereinafter INTERIOR STATEMENT]
ii. National Parks and Recreation Act of 1978, Pub. L. No. 95-625, 92 Stat. 3467
iii. Buffalo National River, AR, 58 Fed. Reg. 53746 (Oct. 18, 1993)
iv. NAT'L PARK SERV., BUFFALO NATIONAL RIVER WILDERNESS AND BACKCOUNTRY MANAGEMENT PLAN, ARKANSAS (1994?), *available at* http://wilderness.nps.gov/document/buffalo.pdf [hereinafter BNR PLAN]

10. Carlsbad Caverns Wilderness — 1978 *New Mexico*

Responsible Agency: National Park Service
Initial Size (1978): **320** acres (Pub. L. No. 95-625, § 401(2))
Current Size: **320** acres (?)

Reasons for "potential" wilderness status:

- Non-Federal Ownership: "The potential wilderness consists of private lands at the western end of the park." INTERIOR STATEMENT at 87.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands which represent potential wilderness additions in this title, upon publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 95-625, § 403.
- General Administration: "Lands designated as potential wilderness additions shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated wilderness." *Id.*

Sources (ordered by date):

i. SUBCOMM. ON NATIONAL PARKS AND INSULAR AFFAIRS OF THE H. COMM. ON INTERIOR AND INSULAR AFFAIRS, LEGIS. HISTORY OF THE NATIONAL PARKS AND RECREATION ACT OF 1978, at 9–113 (1978) (statement of witness for the Department of the Interior) [hereinafter INTERIOR STATEMENT]
ii. National Parks and Recreation Act of 1978, Pub. L. No. 95-625, 92 Stat. 3467

11. Gulf Islands Wilderness — 1978 *Florida*

Responsible Agency: National Park Service
Initial Size (1978): **2,800** acres (Pub. L. No. 95-625, § 401(5))
Current Size: **520** acres (45 Fed. Reg. 46211 (announcing acquisition and conversion of 1,402.88 acres to full wilderness in 1980); 59 Fed. Reg. 18154 (announcing acquisition and conversion of 877.27 acres to full wilderness in 1994))

Reasons for "potential" wilderness status:

- Non-Federal Ownership: "The potential wilderness additions consists [sic] of outstanding private rights." INTERIOR STATEMENT, at 95; *see also* 45 Fed. Reg. 46211; 59 Fed. Reg. 18154.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands which represent potential wilderness additions in this title, upon publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 95-625, § 403.
- General Administration: "Lands designated as potential wilderness additions shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated wilderness." *Id.*
- Dock, Vault Toilets, Coast Guard Maintenance, Beach Clean-Up and Patrol: "The recommendation includes proposed special provisions for an administrative dock, use of vault toilets in primitive campsites, Coast Guard maintenance of navigation structures, and the use of small motor vehicles for beach clean-up and patrol in time of storms." INTERIOR STATEMENT at 95. "In keeping with the committee's position for beach and tidelands cleanup policy for Point Reyes National Seashore Wilderness, routine administrative use of motorized equipment shall not be permitted, and may occur only in emergency or very unusual situations." H.R. REP. NO. 95-1165, at 74. "While it might not be practical or possible to remove such existing devices and facilities [including vault toilets, boat docks, wildlife watering devices, underground transmission lines, etc.], the addition of more of these incompatible items should not be permitted, and every effort should be made to eliminate those items now existing. *Id.* at 75.
- Navigational and Maritime Safety: "Nothing in this title shall be construed to diminish the authority of the Coast Guard . . . or the Federal Aviation Administration to use the areas designated wilderness by this Act within . . . the Gulf Islands National Seashore, Florida and Mississippi, for navigational and maritime safety purposes." Pub. L. No. 95-625, § 405.

Sources (ordered by date):

i. H.R. REP. NO. 95-1165 (1978)
ii. SUBCOMM. ON NATIONAL PARKS AND INSULAR AFFAIRS OF THE H. COMM. ON INTERIOR AND INSULAR AFFAIRS, LEGIS. HISTORY OF THE NATIONAL PARKS AND RECREATION ACT OF 1978, at 9–113 (1978) (statement of witness for the Department of the Interior) [hereinafter INTERIOR STATEMENT]
iii. National Parks and Recreation Act of 1978, Pub. L. No. 95-625, 92 Stat. 3467
iv. Gulf Islands National Seashore; Designation of Wilderness, 45 Fed. Reg. 46211 (Jul. 9, 1980)
v. Designation of Wilderness, Gulf Islands National Seashore, MS, 59 Fed. Reg. 18154 (Apr. 15, 1994)

12. Hawaii Volcanoes Wilderness — 1978 *Hawaii*

Responsible Agency: National Park Service
Initial Size (1978): **7,850** acres (Pub. L. No. 95-625, § 401(6))
Current Size: **7,850** acres (?)

Reasons for "potential" wilderness status:

- Non-Federal Ownership: Potential wilderness consists of "privately owned lands within the park that possess wilderness qualities." INTERIOR STATEMENT at 96.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands which represent potential wilderness additions in this title, upon publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 95-625, § 403.
- General Administration: "Lands designated as potential wilderness additions shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated wilderness." *Id.*
- Shelter Maintenance, Feral Animal Control, Volcanic Research: "The draft legislation [] includes special provisions to maintain shelters within the wilderness, and to permit the use of motorized vehicles and special equipment for controlling feral animals and conducting volcanic research." INTERIOR STATEMENT at 96.

Sources (ordered by date):

i. SUBCOMM. ON NATIONAL PARKS AND INSULAR AFFAIRS OF THE H. COMM. ON INTERIOR AND INSULAR AFFAIRS, LEGIS. HISTORY OF THE NATIONAL PARKS AND RECREATION ACT OF 1978, at 9–113 (1978) (statement of witness for the Department of the Interior) [hereinafter INTERIOR STATEMENT]
ii. National Parks and Recreation Act of 1978, Pub. L. No. 95-625, 92 Stat. 3467

13. Marjory Stoneman Douglas Wilderness — 1978 *Florida*

Previous Name: Everglades Wilderness (changed by Pub. L. No. 105-82, § 3, 111 Stat. 1541 (1997))
Responsible Agency: National Park Service
Initial Size (1978): **81,900** acres (Pub. L. No. 95-625, § 401(3))
Current Size: **81,900** acres (*see Everglades Park Statistics*)

Reasons for "potential" wilderness status:

- Non-Federal Ownership, Mineral Rights, Isolated Federal Lands, Power Line: "The potential additions consist of private lands or areas with mineral rights, small areas of federal lands isolated by private holdings, and a powerline to be placed underground." INTERIOR STATEMENT at 92.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands which represent potential wilderness additions in this title, upon publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 95-625, § 403.
- General Administration: "Lands designated as potential wilderness additions shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated wilderness." *Id.*
- Motorboat Access: "The wilderness recommendation includes most of the submerged lands within the park to offer the highest protection to this significant ecosystem. Motorboating would continue as before in the waters over the submerged wilderness." INTERIOR STATEMENT at 92. "The Secretary should give prompt consideration to the regulation of such use to minimize its adverse influence on the wildlife, and should further consider the advisability of permanently closing some of these routes by their later designation as wilderness." H.R. REP. NO. 95-1165, at 73.
- Elimination of Non-Conforming Uses: "While it might not be practical or possible to remove [] existing devices and facilities [including boat docks, underground transmission lines, etc.], the addition of more of these incompatible items should not be permitted, and every effort should be made to eliminate those items now existing. *Id.* at 75.

- Navigational and Maritime Safety: "Nothing in this title shall be construed to diminish the authority of the Coast Guard . . . or the Federal Aviation Administration to use the areas designated wilderness by this Act within the Everglades National Park, Florida . . . navigational and maritime safety purposes." Pub. L. No. 95-625, § 405.

Sources (ordered by date):

i. H.R. REP. NO. 95-1165 (1978)
ii. SUBCOMM. ON NATIONAL PARKS AND INSULAR AFFAIRS OF THE H. COMM. ON INTERIOR AND INSULAR AFFAIRS, LEGIS. HISTORY OF THE NATIONAL PARKS AND RECREATION ACT OF 1978, at 9–113 (1978) (statement of witness for the Department of the Interior) [hereinafter INTERIOR STATEMENT]
iii. National Parks and Recreation Act of 1978, Pub. L. No. 95-625, 92 Stat. 3467
iv. *Everglades Park Statistics*, NATIONAL PARK SERVICE, http://www.nps.gov/ever/parknews/parkstatistics.htm (last visited Nov. 26, 2011)

14. Organ Pipe Cactus Wilderness — 1978 *Arizona*

Responsible Agency: National Park Service
Initial Size (1978): **1,240** acres (Pub. L. No. 95-625, § 401(7))
Current Size: **1,240** acres (?)

Reasons for "potential" wilderness status:

- Overhead Power Line: "The potential wilderness additions contain an overhead powerline. The area could qualify as wilderness when the powerline is placed underground or relocated." INTERIOR STATEMENT at 99 (discussing an earlier proposal including 9,000 acres of potential wilderness).

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands which represent potential wilderness additions in this title, upon publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 95-625, § 403.
- General Administration: "Lands designated as potential wilderness additions shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated wilderness." *Id.*

Sources (ordered by date):

i. SUBCOMM. ON NATIONAL PARKS AND INSULAR AFFAIRS OF THE H. COMM. ON INTERIOR AND INSULAR AFFAIRS, LEGIS. HISTORY OF THE NATIONAL PARKS AND RECREATION ACT OF 1978, at 9–113 (1978) (statement of witness for the Department of the Interior) [hereinafter INTERIOR STATEMENT]
ii. National Parks and Recreation Act of 1978, Pub. L. No. 95-625, 92 Stat. 3467

Potential Wilderness Areas Designated in 1979

Pub. L. No. 96-87 Great Sand Dunes Wilderness CO
(Discussed as #2 under "Potential Wilderness Areas Designated 1976," at page A-1)

Potential Wilderness Areas Designated in 1980

Pub. L. No. 96-585	15. Otis Pike Fire Island High Dune Wilderness	NY

15. Otis Pike Fire Island High Dune Wilderness — 1980 *New York*

Responsible Agency: National Park Service
Initial Size (1980): **18** acres (Pub. L. No. 96-585, § a)
Current Size: **1** acre (64 Fed. Reg. 55308 (announcing conversion of 17 acres to full wilderness in 1999 after elimination of all non-federal ownership and non-conforming uses except the "Smith Point boardwalk nature trail" and "boardwalk, dune crossing and bathhouse at Old Inlet")

Reasons for "potential" wilderness status:

- Non-Federal Ownership, Structures, Access Roads: Potential wilderness includes 21 "sites of [] residential structures and their associated access roads," "vehicle cuts . . . [and] sand roads leading from them to the access roads to the [] residences . . . and the access road to Watch Hill," "[t]he sites of the [] Watch Hill horse stable and maintenance yard, and the access roads leading to them" and access roads, "[t]he [] Long Cove boardwalk nature trail," and "the boardwalk nature trail at Smith point and the boardwalk, dune crossing and bathhouse at Old Inlet." 64 Fed. Reg. 55308

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Lands which represent potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses prohibited thereon by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 96-585, § c.
- General Administration: "Pending such designation, the Secretary shall administer such lands in such manner as to preserve, insofar as is possible, their wilderness or potential wilderness character." *Id.*
- Repair of Breaches: "Wilderness designation shall not preclude the repair of breaches that occur in the wilderness area, in order to prevent loss of life, flooding, and other severe economic and physical damage to the Great South Bay and surrounding areas." *Id.* § d.

Sources (ordered by date):

i. An Act to Designate Certain Lands of the Fire Island National Seashore as the "Otis Pike Fire Island High Dune Wilderness", and for Other Purposes, Pub. L. No. 96-585, 94 Stat. 3379 (1980)
ii. Notice of Designation of Potential Wilderness as Wilderness, Fire Island National Seashore, 64 Fed. Reg. 55308 (Oct. 12, 1999)

Potential Wilderness Areas Designated in 1982

Pub. L. No. 97-250	16. Cumberland Island Wilderness	GA

16. Cumberland Island Wilderness — 1982 + 2004 *Georgia*

Responsible Agency: National Park Service

Initial Size (1982): **10,500** acres (Pub. L. No. 97-250, § 2(a)(4), (c)(2) (as amended by Pub. L. No. 108-447, § 145(a) in 2004) ~~**11,718** acres (Pub. L. No. 97-250, § 2(a))~~

Current Size: **10,500** acres (?)

Reasons for "potential" wilderness status:

- Non-Federal Ownership: "Most of the potential wilderness is intertidal area owned by the State of Georgia." S. REP. NO. 97-531, at 3.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "[T]he Secretary shall . . . on acquisition of the approximately 231 acres of land identified on the map as 'Areas Become Designated Wilderness upon Acquisition by the NPS'; and . . . on publication in the Federal Register of a notice that all uses of the approximately 10,500 acres of land depicted on the map as 'Potential Wilderness' that are prohibited under the Wilderness Act . . . have ceased, adjust the boundary of the Wilderness to include the land." Pub. L. No. 97-250, § 2(c)(2) (as amended by Pub. L. No. 108-447 § 145(a)). ~~"Certain other lands in the Seashore . . . which are designated . . . as 'Potential Wilderness', are, effective upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, designated wilderness. Such notice shall be published with respect to any tract . . . after the Secretary has determined that such uses have ceased on that tract." Pub. L. No. 97-250, § 2(a).~~
- General Administration: "Subject to valid existing rights, the Wilderness shall be administered by the Secretary, in accordance with the applicable provisions of the Wilderness Act . . . governing areas designated by that Act as wilderness areas." Pub. L. No. 97-250, § 2(e) (as amended by Pub. L. No. 108-447 § 145(a)).
- Utility Service: "Any person with a right to utility service on Cumberland Island on the date of enactment of this subsection shall continue to have the right to utility service in the Wilderness after the date of enactment of this subsection." Pub. L. No. 97-250, § 2(f) (as amended by Pub. L. No. 108-447 § 145(a)).
- Roads: "[P]ortions of the island's existing primitive roads are included within the designated wilderness and potential wilderness areas." S. Rep. No. 97-531, at 3. "The 25-foot wide roadways depicted on the map as the 'Main Road', 'Plum Orchard', and the 'North Cut Road' shall not be included in the Wilderness and shall be maintained by the Secretary for continued vehicle use." Pub. L. No. 97-250, § 2(b)(2) (as amended by Pub. L. No. 108-447 § 145(a)). "[T]he Secretary shall complete a management plan to ensure that not more than 8 and not less than 5 round trips are made available daily on the Main Road north of the Plum Orchard Spur and the North Cut Road by the National Park Service or a concessionaire for the purpose of transporting visitors to and from the historic sites located adjacent to Wilderness." Pub. L. No. 97-250, § 2(g) (as amended by Pub. L. No. 108-447 § 145(a)).

Sources (ordered by date):

i. S. REP. NO. 97-531 (1982)
ii. An Act to Correct the Boundary of Crater Lake National Park in the State of Oregon and for Other Purposes, Pub. L. No. 97-250, § 2, 96 Stat. 709 (1982) (as amended 2004 by sec. 145(a) of Pub. L. No. 108-447)
iii. H.R. REP. NO. 108-738 (2004)
iv. Consolidated Appropriations Act, 2005, Pub. L. No. 108-447, § 145(a), 118 Stat. 2809 (2004) (amending Pub. L. No. 97-250 by striking and replacing sec. 2)

Potential Wilderness Areas Designated in 1984

Pub. L. No. 98-425

17.	Sequoia-Kings Canyon National Parks Wilderness	CA
18.	Yosemite National Park Wilderness	CA

17. Sequoia-Kings Canyon National Parks Wilderness — 1984 *California*

Responsible Agency: National Park Service
Initial Size (1984): **100** acres (Pub. L. No. 98-425, § 106(2))
Current Size: **100** acres (?)

Reasons for "potential" wilderness status:

- Visitor Use Developments, Other: "[V]isitor use developments at Bearpaw Meadow and Pear Lake . . . are designated as 30 acre enclaves of potential wilderness addition, in the identical manner and with the identical treatment as is given the 'high sierra camps' in Yosemite. If and when . . . [their] continued operation . . . at the then current acceptable operational standard results in an increased adverse impact on the adjacent wilderness environment [and the enclaves themselves, operation] . . . shall be promptly terminated, the facilities removed, the sites naturalized, and . . . the areas promptly designated as wilderness." H.R. REP. NO. 96-1223, at 46. Other (?).

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands (in section 106 of this title) which represent potential wilderness additions upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 98-425, § 108.
- General Administration: "Lands designated as potential wilderness additions shall be managed . . . insofar as practicable as wilderness until such time as said lands are designated as wilderness." *Id.*
- Hydrometeorological Devices, Helicopter Use: Hydrometeorological devices "serve a critically essential purpose for many interests. Modifications, relocations, adjustments and maintenance of these devices are therefore acceptable, but it should remain an objective to minimize any adverse impact of these devices upon wilderness resources where possible." H.R. REP. NO. 96-1223, at 47. "Helicopter use for routine nonemergency purposes associated with visitor use is a questionable activity in national park system wilderness areas and should be eliminated." *Id.*

Sources (ordered by date):

i. H.R. REP. NO. 96-1223 (1980)
ii. California Wilderness Act of 1984, Pub. L. No. 98-425, 98 Stat. 1619

19. Yosemite National Park Wilderness — 1984 *California*

Responsible Agency: National Park Service
Initial Size (1984): **3,550** acres (Pub. L. No. 98-425, § 106(1))
Current Size: **3,550** acres (?)

Reasons for "potential" wilderness status:

- Non-Federal Ownership, Power Line Corridor, Hetch Hetchy, Other(?): 50-acre power line corridor. H.R. REP. NO. 96-1223, at 45. "It is intended that the [Hetch Hetchy] dam be set aside in wilderness reserve until such time as the dam is removed. Lake Eleanor is included in the wilderness, but the Committee may wish to put this dam in wilderness reserve, too." *Cranston Statement,* at 269. A "121-acre potential wilderness addition is a tract . . . granted to . . . San Francisco . . . [that] has not been utilized for the [Hetch Hetchy] project and is in a wilderness condition." *Everhardt Statement,* at 313. Other (?).

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands (in section 106 of this title) which represent potential wilderness additions upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness." Pub. L. No. 98-425, § 108.
- General Administration: "Lands designated as potential wilderness additions shall be managed . . . insofar as practicable as wilderness until such time as said lands are designated as wilderness." *Id.*
- Hydrometeorological Devices, Helicopter Use: Hydrometeorological devices "serve a critically essential purpose for many interests. Modifications, relocations, adjustments and maintenance of these devices are therefore acceptable, but it should remain an objective to minimize any adverse impact of these devices upon wilderness resources where possible." H.R. REP. NO. 96-1223, at 47. "Helicopter use for routine nonemergency purposes associated with visitor use is a questionable activity in national park system wilderness areas and should be eliminated." *Id.*

Sources (ordered by date):

i. *Wilderness Additions–National Park System: Hearing on S. 885 and S. 1096, S. 1085 and S. 1675, S. 731 and S. 1069, S. 1068, S. 72 and S. 1092, S. 1093, S. 2472, and S. 97 and S. 1099 Before the S. Subcomm. on Parks and Recreation of the Comm. on Interior and Insular Affairs*, 94th Cong. 264–273 (statement of Sen. Alan Cranston) [hereinafter *Cranston Statement*]

ii. *Wilderness Additions–National Park System: Hearing on S. 885 and S. 1096, S. 1085 and S. 1675, S. 731 and S. 1069, S. 1068, S. 72 and S. 1092, S. 1093, S. 2472, and S. 97 and S. 1099 Before the S. Subcomm. on Parks and Recreation of the Comm. on Interior and Insular Affairs*, 94th Cong. 306–324 (statement of Gary Everhardt, Director, Nat'l Park Serv.) [hereinafter *Everhardt Statement*]

iii. H.R. REP. NO. 96-1223 (1980)

iv. California Wilderness Act of 1984, Pub. L. No. 98-425, 98 Stat. 1619

Potential Wilderness Areas Designated in 1988

Pub. L. No. 100-524	19. Congaree National Park Wilderness	SC
Pub. L. No. 100-688		
	20. Olympic Wilderness	WA
	21. Stephen Mather Wilderness	WA

19. Congaree National Park Wilderness — 1988 *South Carolina*

Previous Name: Congaree Swamp National Monument Wilderness (changed by Pub. L. No. 108-199, § 139(b), 118 Stat. 3 (2004))
Responsible Agency: National Park Service
Initial Size (1988): **6,840** acres (Pub. L. No. 100-524 § 2(b))
Current Size: **6,840** acres (?)

Reasons for "potential" wilderness status:

- Non-Federal Ownership, Road: "[P]otential wilderness areas would be designated as wilderness at such time as they are acquired by the Park Service and uses incompatible with wilderness designation are terminated or phased out." S. REP. NO. 100-449, at 3. Road. *Id.* at 5.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands designated as potential wilderness additions shall, upon acquisition of any non-Federal interests in land and publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, thereby be designated wilderness . . . and shall be managed in accordance with the Wilderness Act." Pub. L. No. 100-524 § 2(b).
- General Administration: Potential wilderness "shall be managed by the Secretary Interior . . . insofar as practicable as wilderness until such time as said lands are designated as wilderness." *Id.*
- Valid Existing Rights: "Subject to valid existing rights, the lands designated as wilderness pursuant to this Act shall be administered by the Secretary in accordance with the applicable provisions of the Wilderness Act governing areas designated by that Act as wilderness." *Id.* § 4.
- Road Access: "Under the potential wilderness designation [of the road west of Weston Lake identified as potential wilderness], only minimal motor vehicle access by the state agency should be permitted for [the] purpose [of servicing and maintaining an air quality monitoring station] and for eventual relocation of the monitoring station." S. REP. NO. 100-449, at 5.

Sources (ordered by date):

i. S. REP. NO. 100-449 (1988)
ii. Congaree Swamp National Monument Expansion and Wilderness Act, Pub. L. No. 100-524, 102 Stat. 2606 (1988)

20. Olympic Wilderness — 1988 *Washington*

Responsible Agency: National Park Service
Initial Size (1988): **378** acres (Pub. L. No. 100-688, § 101(a)(1))
Current Size: **378** acres (?)

Reasons for "potential" wilderness status:

- Non-Federal Ownership: "If and when the National Park Service acquires the rights to these lands, they would become wilderness as well." H.R. REP. NO. 100-961, at 7.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands designated as potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon that are inconsistent with the Wilderness Act have ceased or that non-Federal interests in land have been acquired, shall thereby be designated as wilderness and managed accordingly." Pub. L. No. 100-688, § 401(a)(2).
- General Administration: "Lands designated as potential wilderness additions shall be administered by the Secretary of the Interior insofar as practicable as wilderness until such time as said lands are designated as wilderness." *Id.* "Subject to valid existing rights, the wilderness areas designated under titles I, II, and III of this Act shall be administered by the Secretary of the Interior in accordance with the provisions of the Wilderness Act governing areas designated by that Act as wilderness." *Id.* § 401(a)(1).
- Power Line: "The Secretary is authorized to upgrade, maintain and replace, as necessary, the Wolf Creek underground powerline to Hurricane Ridge: Provided, That to the extend practicable, such maintenance and operation shall be conducted in such a manner as to remain consistent with wilderness management." *Id.* § § 102.

Sources (ordered by date):

i. H.R. REP. NO. 100-961 (1988)
ii. Washington Park Wilderness Act of 1988, Pub. L. No. 100-688, 102 Stat. 3961

21. Stephen Mather Wilderness — 1988 *Washington*

Responsible Agency: National Park Service
Initial Size (1988): **5,226** acres (Pub. L. No. 100-688, § 201(a)(1))
Current Size: **5,226** acres (?)

Reasons for "potential" wilderness status:

- Patented Mining Claims, Planned Flooding, Road, Structures(?): 5,000 acres in the Lake Chelan National Recreational Area and 226 acres in North Cascades National Park. STATE OF THE STEPHEN MATHER WILDERNESS, at 1-1. "These lands possess wilderness character but are prevented from wilderness designation by encumbrances including patented mining claims, potential plans for flooding due to the construction of the High Ross Dam, and the existence of a road." *Id.* Additionally, nineteen "historic structures are located within wilderness and potential wilderness," but these do not seem to bear on full wilderness status. *Id.* at 4-15.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Any lands designated as potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon that are inconsistent with the Wilderness Act have ceased or that non-Federal interests in land have been acquired, shall thereby be designated as wilderness and managed accordingly." Pub. L. No. 100-688, § 401(a)(2).
- General Administration: "Lands designated as potential wilderness additions shall be administered by the Secretary of the Interior insofar as practicable as wilderness until such time as said lands are designated as wilderness." *Id.* "Subject to valid existing rights, the wilderness areas designated under titles I, II, and III of this Act shall be administered by the Secretary of the Interior in accordance with the provisions of the Wilderness Act governing areas designated by that Act as wilderness." *Id.* § 401(a)(1).

Sources (ordered by date):

i. H.R. REP. NO. 100-961 (1988)
ii. Washington Park Wilderness Act of 1988, Pub. L. No. 100-688, 102 Stat. 3961
iii. NAT'L PARK SERV., STATE OF THE STEPHEN MATHER WILDERNESS (1994), *available at* http://wilderness.nps.gov/document/stephen_mather.pdf

Potential Wilderness Areas Designated in 1992

Pub. L. No. 102-301 22. Chumash Wilderness CA

22. Chumash Wilderness — 1992 *California*

Responsible Agency: Forest Service
Initial Size (1992): **50** acres (Pub. L. No. 102-301, § 2(5))
Current Size: **50** acres (?)

Reasons for "potential" wilderness status:

- Road Corridor with ORV Traffic: "The [50-acre] Toad Springs road corridor delineated as potential wilderness shall remain open to off road vehicle traffic until construction of an alternate route which bypasses this area is completed." Pub. L. No. 102-301 § 2(5); H.R. REP. 102-290, at 5.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "These potential wilderness lands shall be automatically incorporated in and managed as part of the Chumash Wilderness upon publication of a notice [that an alternate route has been constructed] in the Federal Register." Pub. L. No. 102-301 § 2(5).
- General Administration: "Subject to valid existing rights, each wilderness area designated by this Act shall be administered by the Secretary of Agriculture in accordance with the provisions of the Wilderness Act." *Id.* § 3(a).
- Fire Prevention and Watershed Protection: "In order to guarantee the continued viability of the watersheds of the wilderness areas designated by this Act and to ensure the continued health and safety of the communities serviced by such watersheds, the Secretary of Agriculture may take such measures as are necessary for fire prevention and watershed protection including, but not limited to, acceptable fire presuppression and fire suppression measures and techniques." *Id.* § 3(b).
- Wildlife Management: "In furtherance of the purposes and principles of the Wilderness Act, management activities to maintain or restore fish and wildlife populations, including the California condor, and the habitats to support such populations may be carried out within wilderness areas designated by this Act where consistent with the relevant wilderness management plans in accordance with appropriate policies and guidelines such as those set forth in Policies and guidelines for Fish and Wildlife Management in National Forests and Bureau of Land Management Wilderness, dated August 25, 1986." *Id.* § 3(c).

Sources (ordered by date):

i. H.R. REP. 102-290 (1991)
ii. Los Padres Condor Range and River Protection Act, Pub. L. No. 102-301, 106 Stat. 242 (1992)

Potential Wilderness Areas Designated in 1994

Pub. L. No. 103-433 23. Death Valley Wilderness CA

23. Death Valley Wilderness — 1994 *California*

Responsible Agency: National Park Service
Initial Size (1994): **6,848** acres (Pub. L. No. 103-433, § 601(b))
Current Size: **6,848** acres (?)

Reasons for "potential" wilderness status:

- Power Line Corridor: "The California Desert Protection Act . . . provides for the potential automatic creation of another 6,840 acres of wilderness along a powerline corridor from Furnace Creek to Stovepipe Wells upon cessation of powerline use." GMP, at 63.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "Upon cessation of all uses prohibited by the Wilderness Act and publication by the Secretary in the Federal Register of notice of such cessation, potential wilderness . . . shall be deemed to be a part of the Death Valley Wilderness." Pub. L. No. 103-433 § 601(b).
- General Administration: "Lands identified . . . as potential wilderness shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated as wilderness." *Id.* § 601(b). "Any lands within the boundaries of a wilderness area designated under this Act which are acquired by the Federal Government, shall become part of the wilderness area within which they are located and shall be managed in accordance with all the provisions of this Act and other laws applicable to such wilderness area." *Id.* § 704.
- Access to Private Property, Roads, Military Overflights: "The Secretary shall provide adequate access to nonfederally owned land or interests in land within the boundaries of the conservation units and wilderness areas designated by this Act which will provide the owner of such land or interest the reasonable use and enjoyment thereof." *Id.* § 708. "Although over 95% of Death Valley is designated as wilderness, about 700 miles of roads (paved and dirt) remain open within this Park." GMP, at 64. Military Overflights. Pub. L. No. 103-433, § 801.

Sources (ordered by date):

i. California Protection Act of 1994, Pub. L. No. 103-433, 108 Stat. 4471
ii. NATIONAL PARK SERVICE, DEATH VALLEY NATIONAL PARK GENERAL MANAGEMENT PLAN (2002), *available at* http://www.nps.gov/deva/parkmgmt/upload/GMP_001.pdf [hereinafter GMP]

Potential Wilderness Areas Designated in 2004

Pub. L. No. 108-447 Cumberland Island Wilderness GA
(Discussed as #16 under "Potential Wilderness Areas Designated 1982," at page A-13)

Potential Wilderness Areas Designated in 2006

Pub. L. No. 109-362	24. Elkhorn Ridge Wilderness	CA

24. Elkhorn Ridge Wilderness — 2006 *California*

Responsible Agency:	Bureau of Land Management
Initial Size (2006):	**11,271** acres (Pub. L. No. 109-362, § 6(a))
Current Size:	**0** acres (76 Fed. Reg. 2411 (announcing conversion to full wilderness of all potential wilderness in 2011, because "impacts from past activities are successfully recovering through natural rehabilitation and are compatible with . . . wilderness designation")

Reasons for "potential" wilderness status:

- Ecological Degradation from Logging: "The Elkhorn Ridge area's designation as a potential wilderness was intended to provide the Secretary of the Interior, through the BLM, time to assess and, if necessary, restore 1,565 acres of previously logged private in-holdings acquired shortly before the Act's passage." 76 Fed. Reg. 2411.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "The potential wilderness area shall be designated as wilderness and as a component of the National Wilderness Preservation System on the earlier of—(1) the date on which the Secretary publishes in the Federal Register notice that the conditions in the potential wilderness area that are incompatible with the Wilderness Act . . . have been removed; or (2) the date that is 5 years after the date of enactment of this Act." Pub. L. No. 109-362, § 6(d).
- General Administration: "Except as provided in subsection (c) and subject to valid existing rights, the Secretary shall manage the potential wilderness area as wilderness until the potential wilderness area is designated as wilderness." *Id.* § 6(b).
- Ecological Restoration: "For purposes of ecological restoration (including the elimination of non-native species, removal of illegal, unused, or decommissioned roads, repair of skid tracks, and any other activities necessary to restore the natural ecosystems in the potential wilderness area), the Secretary may use motorized equipment and mechanized transport in the potential wilderness area until the potential wilderness area is designated as wilderness." *Id.* § 6(c)(1). "To the maximum extent practicable, the Secretary shall use the minimum tool or administrative practice necessary to accomplish ecological restoration with the least amount of adverse impact on wilderness character and resources." *Id.* § 6(c)(2).

Sources (ordered by date):

i. Northern California Coastal Wild Heritage Wilderness Act, Pub. L. No. 109-362, 120 Stat. 2064 (2006)
ii. Notice of Designation of Elkhorn Ridge Wilderness, California, 76 Fed. Reg. 2411 (Jan. 13, 2011)

Potential Wilderness Areas Designated in 2009

Pub. L. No. 111-11

25.	John Krebs Wilderness	CA
	Joshua Tree Wilderness	CA
	(Discussed as #5 under "Potential Wilderness Areas Designated 1976," at page A-4)	
26.	Kimberling Creek Wilderness	VA
27.	Oregon Badlands Wilderness	OR
28.	Roaring River Wilderness	OR
29.	Rocky Mountain National Park Wilderness	CO

25. John Krebs Wilderness — 2009 *California*

Responsible Agency: National Park Service
Initial Size (2009): **130** acres (Pub. L. No. 111-11, § 1902(1)(A))
Current Size: **130** acres (?)

Reasons for "potential" wilderness status:

- Dams and Impoundments: "The designation of the potential wilderness additions . . . shall not prohibit the operation, maintenance, and repair of the small check dams and water impoundments on Lower Franklin Lake, Crystal Lake, Upper Monarch Lake, and Eagle Lake. The Secretary is authorized to allow the use of helicopters for the operation, maintenance, and repair." Pub. L. No. 111-11, § 1902(1)(C). "Designation as potential wilderness additions would allow Southern California Edison . . . to continue its hydroelectric power operation as long as it wants. However, in the event that the operator . . . ceases to operate them in the future, the National Park Service would have the option to convert the area to wilderness through administrative action." *Taylor-Goodrich Statement,* at 15.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: The potential wilderness additions shall be designated as wilderness and incorporated into the John Krebs Wilderness established by this section upon termination of the non-conforming uses." Pub. L. No. 111-11, § 1902(1)(C).

Sources (ordered by date):

i. *Current National Parks Legislation: Hearing Before the Subcomm. on National Parks of the S. Comm. on Energy and Natural Resources*, 110th Cong., at 12–24 (2008) (statement of Karen Taylor-Goodrich, Associate Director, Visitor and Resource Protection, National Park Service) [hereinafter *Taylor-Goodrich Statement*]
ii. Omnibus Public Land Management Act of 2009, Pub. L. No. 111-11, 123 Stat. 991

26. Kimberling Creek Wilderness — 2009 *Virginia*

Responsible Agency: Forest Service
Initial Size (2009): **349** acres (Pub. L. No. 111-11, § 1103(a))
Current Size: **349** acres (?)

Reasons for "potential" wilderness status:

- Extensive Road Network: "The Kimberling Creek addition was recently acquired as NFS land and in its current condition does not contain the basic natural characteristics that make it suitable for wilderness due to an extensive road network." *Holtrop Statement*, at 3

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "The potential wilderness area shall be designated as wilderness and incorporated in the Kimberling Creek Wilderness on the earlier of—(1) the date on which the Secretary

publishes in the Federal Register notice that the conditions in the potential wilderness area that are incompatible with the Wilderness Act . . . have been removed; or (2) the date that is 5 years after the date of enactment of this Act." Pub. L. No. 111-11, § 1103(c)(2)(d).

- General Administration: "Except as provided in subsection (c) and subject to valid existing rights, the Secretary shall manage the potential wilderness area in accordance with the Wilderness Act." *Id.* § 1103(b).
- Ecological Restoration: "For purposes of ecological restoration (including the elimination of nonnative species, removal of illegal, unused, or decommissioned roads, and any other activity necessary to restore the natural ecosystems in the potential wilderness area), the Secretary may use motorized equipment and mechanized transport in the potential wilderness area until the date on which the potential wilderness area is incorporated into the Kimberling Creek Wilderness." *Id.* § 1103(c)(1). "To the maximum extent practicable, the Secretary shall use the minimum tool or administrative practice necessary to accomplish ecological restoration with the least amount of adverse impact on wilderness character and resources." *Id.* § 1103(c)(2).

Sources (ordered by date):

i. *Hearing on H.R. 1011 Before the Subcomm. on National Parks, Forests & Public Lands of the H. Comm. on Natural Resources*, 110th Cong. (2007) (statement of Joel Holtrop, Deputy Chief, Forest Service), *available at* http://naturalresources.house.gov/uploadedfiles/holtroptestimony05.10.07.pdf [hereinafter *Holtrop Statement*].
ii. Omnibus Public Land Management Act of 2009, Pub. L. No. 111-11, 123 Stat. 991

27. Oregon Badlands Wilderness — 2009 *Oregon*

Responsible Agency: Bureau of Land Management
Initial Size (2009): **25-foot-wide** road corridor (Pub. L. No. 111-11, § 1702(c)(1))
Current Size: **25-foot-wide** corridor (?)

Reasons for "potential" wilderness status:

- Road Corridor for Sled Dog Training: "In furtherance of the purposes of the Wilderness Act (16 U.S.C. 1131 et seq.), a corridor of certain Federal land managed by the Bureau of Land Management with a width of 25 feet, as generally depicted on the wilderness map as 'Potential Wilderness', is designated as potential wilderness." Pub. L. No. 111-11, § 1702(c)(1). The corridor "accommodate[s] the existing use of the route for purposes relating to the training of sled dogs by Rachael Scdoris . . . a visually-impaired sled dog musher living outside of Bend, Oregon . . . . It is our understanding that the techniques she uses to train her dogs involve both motorized and mechanized transport." *Nedd Statement*.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "On the date on which the Secretary publishes in the Federal Register notice that any nonconforming uses in the potential wilderness designated by paragraph (1) that are permitted under paragraph (2) have terminated, the potential wilderness shall be—(A) designated as wilderness and as a component of the National Wilderness Preservation System; and (B) incorporated into the Oregon Badlands Wilderness." Pub. L. No. 111-11, § 1702(c)(3).
- General Administration: "The potential wilderness . . . shall be managed in accordance with the Wilderness Act . . . , except that the Secretary may allow nonconforming uses that are authorized and in existence on the date of enactment of this Act to continue in the potential wilderness." *Id.* § 1702(c)(2). "Subject to valid existing rights, the Oregon Badlands Wilderness shall be administered by the Secretary in accordance with the Wilderness Act." *Id.* § 1702(b)(1).
- Incorporation of Acquired Land and Interests: "Any land or interest in land within the boundary of the Oregon Badlands Wilderness that is acquired by the United States shall— (A) become part of the Oregon Badlands Wilderness; and (B) be managed in accordance with this subtitle, the Wilderness Act . . . , and any other applicable law." *Id.* § 1702(b)(2).
- Grazing: "The grazing of livestock . . . , if established before the date of enactment of this Act, shall be permitted to continue subject to such reasonable regulations as are considered necessary by the Secretary in accordance with—(A) section 4(d)(4) of the Wilderness Act . . . and (B) the guidelines set forth in

Appendix A of the report of the Committee on Interior and Insular Affairs of the House of Representatives accompanying H.R. 2570 of the 101st Congress (H. Rept. 101–405)." *Id.* § 1702(b)(3).

- Access to Private Property: "In accordance with section 5(a) of the Wilderness Act . . . , the Secretary shall provide any owner of private property within the boundary of the Oregon Badlands Wilderness adequate access to the property." *Id.* § 1702(b)(4).

Sources (ordered by date):

i. *Hearing on S. 3088 Before the Subcomm. on Public Lands and Forests of the S. Comm. on Energy and Natural Resources*, 110th Cong. (2008) (statement of Michael Nedd, Assistant Director, Minerals and Realty Management, Bureau of Land Management), *available at* http://www.doi.gov/ocl/2006/S3088and S3089_070908.htm [hereinafter *Nedd Statement*]
ii. Omnibus Public Land Management Act of 2009, Pub. L. No. 111-11, 123 Stat. 991

28. Roaring River Wilderness — 2009 *Oregon*

Responsible Agency: Forest Service
Initial Size (2009): **900** acres (Pub. L. No. 111-11, § 1202(c)(1)(A))
Current Size: **900** acres (?)

Reasons for "potential" wilderness status:

- The "potential wilderness area . . . has been altered by human influences relating to timber harvests." S. REP. NO. 110-172, at 16.

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "On the date on which the Secretary publishes in the Federal Register notice that the conditions in the potential wilderness area designated by subparagraph (A) are compatible with the Wilderness Act . . . , the potential wilderness shall be— (i) designated as wilderness and as a component of the National Wilderness Preservation System; and (ii) incorporated into the Roaring River Wilderness designated by subsection (a)(6)." Pub. L. No. 111-11, § 1202(c)(1)(C).
- General Administration: "The potential wilderness area designated by subparagraph (A) shall be managed in accordance with section 4 of the Wilderness Act." *Id.* § 1202(c)(1)(B). "Subject to valid existing rights, each area designated as wilderness by this section shall be administered by the Secretary that has jurisdiction over the land within the wilderness, in accordance with the Wilderness Act." *Id.* § 1202(e)(1).
- Incorporation of Acquired Land and Interests: "Any land within the boundary of a wilderness area designated by this section that is acquired by the United States shall— (A) become part of the wilderness area in which the land is located; and (B) be managed in accordance with this section, the Wilderness Act . . . , and any other applicable law. *Id.* § 1202(e)(2).
- State Wildlife Jurisdiction and Responsibility: "Nothing in this section affects the jurisdiction or responsibilities of the State with respect to fish and wildlife." *Id.* § 1202(g).
- Fire, Insect, Disease Control: "As provided in section 4(d)(1) of the Wilderness Act . . . , within the wilderness areas designated by this section, the Secretary . . . may take such measures as are necessary to control fire, insects, and diseases, subject to such terms and conditions as the Secretary determines to be desirable and appropriate." *Id.* § 1202(h).

Sources (ordered by date):

i. S. REP. NO. 110-172 (2007)
ii. Omnibus Public Land Management Act of 2009, Pub. L. No. 111-11, 123 Stat. 991

29. Rocky Mountain National Park Wilderness — 2009 *Colorado*

Responsible Agency: National Park Service
Initial Size (2009): **5,169** acres (?) (*see* Pub. L. No. 111-11, § 1952(c) (omitting acreage or other description); *but see* S. REP. NO. 110-358, at 6 (explaining that "[s]ubsection (c) designates approximately 5,169 acres of lands within the park as potential wilderness")
Current Size: **5,169** acres (?)

Reasons for "potential" wilderness status:

- Non-Federal Ownership, Life Tenancy, Other(?): "The areas recommended as potential wilderness additions include . . . Federal land with life tenancy and . . . [land] in private ownership." *1974 Correction.* Other (?).

Achievement of wilderness designation / administration:

- Conversion to Full Wilderness: "On publication in the Federal Register of a notice by the Secretary that all uses inconsistent with the Wilderness Act . . . have ceased on the land identified on the map as a "Potential Wilderness Area", the land shall be—(A) included in the Wilderness; and (B) administered in accordance with subsection (e)." Pub. L. No. 111-11, § 1952(c)(1).
- General Administration: "Subject to valid existing rights, any land designated as wilderness under this section or added to the Wilderness after the date of enactment of this Act under subsection (c) shall be administered by the Secretary in accordance with this subtitle and the Wilderness Act." *Id.* § 1952(e).
- Fire, Insect, Disease Control: "The Secretary may take such measures in the Wilderness as are necessary to control fire, insects, and diseases, as are provided for in accordance with—(1) the laws applicable to the Park; and (2) the Wilderness Act." *Id.* § 1952(g).

Sources (ordered by date):

i. Correction to Wilderness Report for Rocky Mountain National Park, Colorado (1974), *available at* http://wilderness.nps.gov/document/II-17.pdf, at 4 [hereinafter *1974 Correction*]
ii. S. REP. NO. 110-358 (2008)
iii. Omnibus Public Land Management Act of 2009, Pub. L. No. 111-11, 123 Stat. 991

APPENDIX B.
Review of Scientific Evidence of DBOC Environmental Impacts

Mariculture Impacts on the Spread of Invasive Species

Based on the research that is available, one significant environmental threat to Drakes Estero from oyster mariculture is through introduction of the invasive tunicate *Didemnum vexillum*. *D. vexillum* is a non-native tunicate with worldwide impact, having spread to Europe (Gittenberger 2007), New Zealand (Kott 2004), and both coasts of North America (Bullard *et al.* 2007) (Herborg et al). *D. vexillum* propagates rapidly, and can reproduce sexually and asexually; it also currently has no known predators (Carman et al.) and is capable of tolerating a wide range of temperature, salinity, and water quality conditions (Herborg et al). *D. vexillum* can be considered an"ecosystem engineer" because it has the capacity to "drastically adversely modify the habitats it invades (Wallentinus and Nyberg 2007)" (Lambert). As with other tunicates, *D. vexillum* grows on hard substrates. According to the National Academies Press, *D. vexillum* covers approximately half of the sub-tidal surfaces of cultivated oysters' shells and oyster mariculture apparatus in Drakes Estero, according to the committee's observations during its September 2008 visit (NRC at 56).

In addition to having introduced the tunicate in the first place, the ongoing presence of oyster mariculture likely encourages the continuation and propagation of *D. vexillum* in Drakes Estero. As discussed above, *D. vexillum* depends on hard substrates, such as those provided by oyster shells and oyster racks, to grow. In addition, there is an added risk that in the process of oyster mariculture, because workers might break off pieces of the tunicate, facilitating its asexual reproduction. Because of these possibilities, we find the National Research Council's conclusion that removing the oyster mariculture would help end the continuation and spread of *D. vexillum* in Drakes Estero to be likely (NRC at 56). Also, considering *D. vexillum's* rapid spread in conjunction with its already expansive invasion in Drakes Estero, we assert that the potential impacts of waiting ten years to remove the excacerbating oyster mariculture from the area should be seriously assessed.

One of the risks presented by allowing *D. vexillum* to flourish is the danger it poses to native eelgrass ecosystems. A study performed in a Massachusetts lake published in 2010, recorded the first observation of *D. vexillum* attached to eelgrass (Carman et al). More troubling still, *"D. vexillum* has recently been reported colonizing eelgrass blades at presently low levels in Tomales." (NRC at 55). Although more scientific study is needed to draw definite conclusions about the result of *D. vexillum's* use of eelgrass as a substrate, it is reasonable to predict that when attached to Eelgrass, the tunicate "may block the plants' basic processes, including photosynthesis, release of seeds, and natural defoliation." (Carman et al)

In light of the points discussed above, we find it likely that the invasive tunicate *D. vexillum*, whose propagation is augmented by the presence of oyster mariculture gear and its processes, will have a negative effect on the natural ecology of the area; specifically, it may decrease the amount of the protected native eelgrass habitat. We therefore agree that "[t]he ecological effects of invasive tunicates introduced to sea grass…remain unassessed, but in general, the majority of introduced epibionts have negative effects on marine flora" (Williams 2007), as well as with the NRC report, which states that *D. vexillum* is "an ecological threat to many native and nonnative invertebrate taxa (Osman and Whitlatch, 2007; Mercer et al., 2009)."

Mariculture Impacts on the Potential Comeback of the Native Oyster

Another potentially harmful impact of oyster mariculture in Drakes Bay is that the presence of the farmed Pacific oyster, *Crassostrea gigas,* may repress the rehabilitation of the native Olympia oyster, *Ostrea lurida*. A study conducted by Trimble et al. showed that *C. gigas* acts as a " recruitment sink" for *O. lurida* because *O. lurida* preferentially attaches to *C. gigas'* shells even under conditions unfavorable to its survival, so that those attached in unfavorable conditions die before reaching maturation (Trimble et al, 2009). In addition, *C. gigas* competes with *O. lurida* directly for food and space. (Trimble et al).

Considering the negative impact that *C. gigas* has on the growth of *O. lurida,* the possibility that *C. gigas* could grow independent of mariculture care and invade non-mariculture areas of the estero should be carefully examined. According to the NRC study, there is a risk that the non-native oysters cultured in Drakes Estero might establish "self-sustaining populations" (NRC at 5). One factor that indicates the seriousness of this potential problem is the action requested by the Coastal Conservancy concerning the eradication of *C. gigas* in San Francisco Bay, and their efforts to "restore native oysters" there. According to the Conservancy, which was willing to provide up to $225,000 to the San Francisco Estuary Institute for non-native oyster eradication in San Francisco Bay, " [t]he establishment and spread of the exotic oyster *C. gigas* could threaten species that are critical to these restoration efforts and to achieving sub-tidal goals by potentially...competing with native oysters." (Coastal Conservancy. 2008,). Clearly, invasive spread of *C. gigas* is viewed as a serious problem in San Francisco Bay, so research should be conducted to show whether or not there are enough similarities between San Francisco Bay and Drakes Estero to warrant an similar conclusion, focusing particularly on the presence of hard substrates and *C. gigas*' ability to flourish without large areas of these hard substrates. Ocean floor composition, tidal strength, bathymetric layers, and other differences between San Francisco Bay and Drakes Estero that would indicate whether or not the environment of Drakes Estero would be conducive to the rapid spread of feral *C gigas* should be researched thoroughly to allow for more concrete conclusions. However, in the absence of this data, it is sreasonable to conclude that *C. gigas* does have some potential to become independent in Drakes Estero, and that this possibility should be considered a serious threat to the potential rehabilitation of *O. lurida* in the area.

Mariculture Impacts on Fish

Oyster mariculture's impact on fish is also a matter that should be considered carefully. While the only study examining fish populations and oyster mariculture in Drakes Estero (Wechsler, 2004) did not have statistically significant results, studies elsewhere have suggested that oyster mariculture increases the fish population size and lacks a significant effect on species distribution. For example, a study performed in Humboldt Bay, California, compared fish densities and Simpson's Diversity Index for populations of fish living in eelgrass, on open mudflats, and in the vicinity of oyster long-lines (Pinnix et al, 2005). The study concluded that more fish were harbored by oyster long-lines than by eelgrass, and that the oyster mariculture did not appear to have a negative impact on fish diversity. A second study, conducted in North Carolina, showed that densities of fish were as high over plastic bottom netting used to cover infaunal cultured clams as in eelgrass beds. (Powers et al). It concluded that "[u]tilization by juvenile fishes was 3 times greater in seagrass and 3 to 7 times greater in epibiota on mesh in clam leases than on sandflat habitat." (Powers et. al). Based on this evidence, it seems unlikely that oyster mariculture in Drakes Estero will decrease fish densities; however, research should be conducted to show whether or not specific species of fish are negatively impacted by the increase in numbers of fish harbored by oyster culturing apparatus.

Mariculture Impacts on Water Quality

A final matter of concern is the interpretation of the impacts of the interaction between oysters and water quality. Oysters feed by filtering particulates from the water column; high oyster density, such as in an oyster mariculture area, can depress turbidity and decrease algal blooms. Essentially, oysters serve as buffers against influxes of suspended particulate matter and nutrients caused by run-off, etc. (De Angelis, 1986), thus enhancing and sustaining water clarity. Oyster mariculture has been shown to increase water clarity by aiding in the transfer of suspended particulate matter from the water column into sediments (Mazouni et al., 1996).

However, while high oyster populations have been shown to improve water clarity (generally assumed to coincide with water quality), the extent and actual impact of this alteration must be considered. According to a study performed on sediments in Drakes Estero, the risk of eutrophication is naturally very low due to the high rate of tidal flushing (Anima, 1990-1991), meaning that the oyster mariculture is likely not providing an essential ecosystem service, and their removal would be unlikely to result in decreased water quality. While this may not be enough evidence to entirely dismiss the oyster mariculture's potential to buffer against a sudden influx of suspended sedimentation during run-off of stormwaters as proposed by Jackson et al. (2001), it definitely calls the perceived necessity of the oyster cultures into question. More study must be done in Drakes Estero to establish whether the benefits traditionally associated with oyster mariculture have actual impacts there. In addition, more research would need to be performed in order to determine the consequences of such an impact; although improved water clarity sounds inherently good, any forced alteration to an ecosystem is bound to have unintended ramifications that may be difficult to diagnose or retract.

Mariculture Impacts on Harbor Seals

One subject area in which the National Park Service has collected more Estero-specific data is harbor seal population and distribution. However, seal monitoring and data collection also leave much to be desired. For example, pictures, which could have been very useful in determining how mariculture has affected seals, were not relied on in the DEIS because collection "was not based on documented protocols and procedures" (DEIS at 181). The NRC report points out that none of the seal research done in Drakes Estero in the last 30 years has been intended to show the relationship between oyster mariculture and seals (NRC at 41). It notes that the effects of disturbances on the seal behavior during the breeding season would only be evident with sustained, long-term monitoring (NRC at 49). The DEIS mentions the review of the effects of human activities on harbor seals in Drake's Estero by the Marine Mammal Commission and notes it will be taken into consideration when it is released (EIS at 181). The Commission recently released that review and we summarize it's conclusions at page 11 of our Comment.

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CORRESPONDENCE ID: 52047
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POINT REYES NS

December 5, 2011

Point Reyes National Seashore
ATTN: DBOC SUP DEIS
1 Bear Valley Road
Point Reyes Station, CA 94956

To Whom It May Concern:

I am the founder and owner of Hog Island Oyster Company. I have been involved in the farming and sales (both retail and wholesale) in Tomales Bay and the San Francisco Bay area for over 30 years. I have deep concerns regarding the conclusions of the Draft Environmental Impact Statement (DEIS) issued by the National Parks Service on the proposed Drakes Bay Oyster Company (DBOC) Special use permit. The DEIS is flawed for the many reasons described in the comment letter submitted by the Pacific Coast Shellfish Growers Association. I agree with the PCSGA's comments on and the analysis of the DEIS. I do not wish to repeat the PCSGA's comments here. However, I will emphasize some of the key points made in that letter, as well as add some of my own.

The effects of the project, to extend the DBOC land based lease, must be evaluated based upon existing conditions. The DEIS erroneously uses a speculative baseline of no oyster farm having ever existed. I have had some experience in mariculture permitting activities, and I have never seen this approach. The National Park Service needs to reanalyze the project based on the existing ecosystem functions that are provided by the existing shellfish farm.

The DEIS is defective because it fails to recognize the environmental benefits of oyster aquaculture. In fact, the DEIS's disregard for science demonstrating the positive interactions between shellfish aquaculture and the surrounding environment is inconsistent with NOAA's Marine Aquaculture Policy, released in June 2011. That policy recognizes the inherent compatibility of shellfish aquaculture with the environment when done sustainably, and advocates making unbiased aquaculture management decisions based upon the best scientific information available.

For example, numerous studies have shown that oysters, being filter feeders, improve water clarity and quality, allowing more light penetration. This in turn, helps eelgrass growth. I have seen this firsthand in the areas where we have been

20215 hwy 1 po box 829 marshall, CA 94940 phone 415 663 9218 fax 415 663 9246

farming shellfish in Tomales Bay. California Department of Fish and Game staff in conversations over the years have confirmed this point. Eelgrass beds in Tomales Bay and Drakes Estero, especially around areas of shellfish cultivation, are healthy, flourishing and at historically high levels.

Oyster aquaculture provides three-dimensional habitat. Fish and other wildlife prefer the diverse habitat offered by a mix of eelgrass, aquaculture gear, and mudflats, compared to any one of those habitat-types alone. We have had students do surveys of our culture gear, and they have found over 1200 organisms per culture bag, comprising almost 100 species of flora and fauna.

Shellfish aquaculture provides many unique ecosystem services. Removing the Drakes Bay Oyster Company operations would eliminate these valuable ecosystem services in an area surrounded by ranches and their attendant run off. This could potentially harm the environment. The DEIS, by ignoring the ecosystem services provided by the existing shellfish farm, does not contain the best scientific information available.

The DEIS must be corrected to include the common knowledge and scientific research that proves harbor seals habituate to non-threatening human activity. We pass by hauled out harbor seals with our boats on a regular basis. They do not react to our boats, as they have grown used to them. However, I have observed the seals being disturbed by hikers and kayakers approaching too closely, or slowing down and stopping in the seals' vicinity. In fact I have had conversations with Dr. Sarah Allen, from the NPS about this same phenomenon occurring in Drake's Estero. I have also reviewed most of the studies associated with human-harbor seal interactions in Drake's Estero, and it is clear to me that the oyster farming activities in no way effect the harbor seal population there. There are also many scientific papers that provide clear support that harbor seals habituate to non-threatening human activities. I also attended, and gave testimony at the public hearing that the Marine Mammal Commission held in Point Reyes. I heard the six experts speak, and talked to most of them afterwards, and the consensus was that harbor seals do indeed habituate to passing boats, that the current shellfish farming operations were having little or no effect on the harbor seal population. They all agreed that a collaborative adaptive management plan could, and should easily be put into place to address any concerns that the NPS may still have.

The economics effects section of the DEIS is woefully inadequate, and based purely on speculation, and must be redone. NOT ONE AREA SHELLFISH FARMER OR SEAFOOD DISTRIBUTOR THAT I KNOW OF WAS CONTACTED. Our company, and the other companies in Tomales Bay, has never been able to meet the local demand for shellfish. This is fact, not "speculation" as the DEIS wrongly implied. We already buy shellfish from outside our region. In fact, our company purchases oysters from DBOC. Closing DBOC will cause a loss of local shellfish production that cannot be replaced.

The DEIS incorrectly suggests that Tomales Bay growers could expand operations to make up for the loss of Drake's Bay Oyster Company production, and that we could hire the laid off DBOC workers. Both of these statements are false, and must be corrected. The production in Drake's Estero is equal to or greater than all the production in Tomales Bay; the growers in Tomales Bay are all operating at or near capacity on our existing leases, and new lease areas are very limited.

We have hoped to expand our operations in Tomales Bay, but due to the onerous and expensive permit process, have found that nearly impossible. Shellfish farmers are highly regulated. Establishing a new shellfish farm involves obtaining permits and approvals at the local, state and federal levels. Estimates for permits and environmental consulting for a new lease in Tomales Bay (which are capped at 5 acres) are well in excess of $100,000, and could easily take over 3 years to complete. The current difficulty of obtaining permits will only increase up and down the entire West Coast, as the erroneous conclusions reached in the DEIS have the potential to migrate into the decision making processes of other agencies.

Shellfish companies of all sizes provide local jobs that are particularly important to rural communities. Our company currently employs over 25 people at our Tomales Bay facility, and another 80 in the San Francisco Bay area. As much as we would like to, we would not be able to absorb any of the laid off workers from DBOC. Those jobs would be lost to the West Marin community.

Our company, Tomales Bay Oyster Company and Drakes Bay Oyster Company all provide an important visitor serving function. People have the opportunity to visit a shellfish farm, learn about sustainable aquaculture, and purchase products that are healthy and produced in an environmentally sustainable manor (don't ask me – try *Seafood Watch*, *FishWise* or *Food and Water Watch Smart Seafood*). Our sites on Tomales Bay are near capacity. We cannot accommodate the 50,000+ annual visitors that would come to us if DBOC was shut down.

The DEIS has failed to provide any reasonable justification for the NPS plan to usurp State authority. DBOC's lease arrangement with the California Department of Fish and Game (CDFG) must not be changed or disrespected. The current CDFG leases in Drakes Estero do not expire until 2029. DBOC simply needs a valid NPS permit to use the onshore facilities. In fact, NPS does not have the expertise to manage shellfish aquaculture – that has long been the purview of CDFG, and should remain so. I have been intimately involved in a revision of the State shellfish leases, with the object of covering the costs of the CDFG shellfish program. DBOC's leases in Drake's Estero represent approximately 55% of the CDFG leased water bottom in the State. If NPS evicts DBOC, or forces the State to relinquish its rights, the entire financial burden of the program would shift to the remaining growers. The DEIS must consider the adverse impact this would have on the State's other growers.

I support the Collaborative Management Alternative – a 10 year extension of the Special Use Permit with Option for Extension; Rehabilitation of Existing Facilities; and Construction of New Processing Facilities. This alternative supports a landscape that is ecologically and economically sustainable. It is consistent with the National Shellfish Initiative and with the Point Reyes National Seashore General Management Plan. It would provide a great opportunity to do collaborative scientific research, as recommended by the NRC and the MMC.

I also happen to spend a significant amount of time around Drakes Estero. I surf the waves at its mouth, and hike the beaches. I think it is a wonderful place just as it is, with the Drakes Bay Oyster Company there. I hope you see it the same way.

Sincerely,

John Finger
President, CEO

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epic

Keeping Northwest California wild since 1977

December 7, 2011

Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

RE: Comments on the Draft Environmental Impact Statement for the Drakes Bay Oyster Company Special Use Permit

Dear Responsible Official,

I am writing on behalf of the Environmental Protection Information Center ("EPIC"), a nonprofit organization that works to protect and restore ancient forests, watersheds, coastal estuaries, and native species in Northern California. EPIC submits the following comments to the Department of the Interior regarding Drakes Estero in Point Reyes National Seashore.

EPIC supports Alternative A in the DEIS, which allows for Drakes Estero to finally gain wilderness designation as Congress intended in the 1976 Point Reyes Wilderness Act. Drakes Estero is a unique and crucially important wildlife area, a vital stop on the Pacific Flyway for migrating birds, a refuge and birthplace for harbor seals, a critical native fish nursery, and habitat for endangered species.

Congress and the public have long intended that Drakes Estero be given the highest federal level of protection as a wilderness area when the commercial oyster permit expires in 2012. By selecting Alternative A, the Park Service will fulfill the Point Reyes wilderness promise, and be consistent with National Park Service laws and policies. The Park Service's environmental review shows that Alternative A best protects wildlife and the National Park experience.

Our wilderness areas and national parks are for wildlife, wild land conservation and for the American public to enjoy. Wilderness areas and national parks are not for commercial exploitation. Drakes Estero is the only marine wilderness on the West Coast, and is irreplaceable, while oysters can be grown elsewhere.

Federal law and policy require full wilderness protection for Drakes Estero in 2012 and prohibit the Park Service from issuing a new special use permit to the Drakes Bay Oyster Company ("DBOC"). The Point Reyes National Seashore was created "to save and preserve, for

Environmental Protection Information Center
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Fax: (707) 822-7712
www.wildcalifornia.org

the purposes of public recreation, benefit, and inspiration" a portion of the nation's diminishing seashore. The Seashore's 1962 authorizing legislation requires the Park Service to administer the Seashore "without impairment of its natural values" and in a manner that is "supportive of the maximum protection, restoration, and preservation of the natural environment."

The Wilderness Act of 1964 recognizes and defines wilderness as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Wilderness is further defined as an area of "federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions."

The 1976 Point Reyes Wilderness Act reaffirms the 1962 and 1964 laws and added language to the Seashore's authorizing legislation which "underscores the intention that the Seashore is to be managed for the protection of its natural environment and values." The Point Reyes Wilderness Act designates the waters of Drakes Estero and the adjoining intertidal land as "potential wilderness."

The term "potential wilderness" is defined in legislative history as "a category of lands which are essentially of wilderness character, but retain sufficient non-conforming structures, activities, uses or private rights so as to preclude immediate wilderness classification." The legislative history provides an explicit statement of Congressional intent regarding the importance of removing all non-conforming uses, including the oyster operation in Drakes Estero from areas designated as "potential wilderness."

We urge you to make the right decision for Drakes Estero by finally ensuring that the area be protected as wilderness.

Sincerely,

Gary Graham Hughes
Executive Director

Andrew Orahoske
Conservation Director

Environmental Protection Information Center
145 G Street, Suite A
Arcata, CA 95521
Tel: (707) 822-7711
www.wildcalifornia.org

----------cut here----------

Comment Form

Park: Point Reyes National Seashore

Project: Drakes Bay Oyster Company Special Use Permit Environmental Impact Statement

Document: Draft Environmental Impact Statement Drakes Bay Oyster Company Special Use Permit

* indicates required fields

City:* [redacted] State/Province:* [redacted]

Postal Code

First Name: Emily Middle Initial: P

Last Name: Thompson

Address: [redacted]

Country:

Email:

___ (Check here if you want your contact information kept private.)

Comments or Requests:

I support a renewable Special Use Permit for Drakes Bay Oyster Company.

CORRESPONDENCE ID: 52049

DEC 09 2011
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POINT REYES NS

Dear Sec. Salazar,

Please protect the Drake's Estero wildlife refuge as long promised. I support alternative "A". The deal was made & should be honored

If we make an exception here, others will challenge & privatization and commercialization will follow.

Thank you.
Debra Adair

[redacted]