

CALIFORNIA COASTAL COMMISSION

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March 10, 2016

Cicely Muldoon
Superintendent
Point Reyes National Seashore
1 Bear Valley Rd.
Point Reyes Station, CA 94956

Re: **CD-0001-15**, National Park Service, Point Reyes National Seashore, Consistency Determination for restoration of Drakes Estero

Dear Superintendent Muldoon:

Please accept this letter as notification of the Executive Director of the California Coastal Commission's approval of the March 9, 2016 Drakes Estero Eelgrass Monitoring and Mitigation Plan. This plan complies fully with Condition 1 of Consistency Determination No. CD-0001-15 and as such, the Drakes Estero restoration project remains consistent to the maximum extent practicable with the California Coastal Management Program.

If you have any questions, please feel free to call me at (415) 904-5502.

Sincerely,

A handwritten signature in black ink, appearing to read "Cassidy Teufel".

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

cc via email: Bryan Matsumoto, U.S. Army Corps of Engineers
Becky Ota, California Department of Fish and Wildlife
Korie Shaeffer, National Marine Fisheries Service
Fred Hetzel, State Water Resources Control Board

Drakes Estero Eelgrass Monitoring and Mitigation Plan

(Based on the 2014 California Eelgrass Mitigation Policy and Implementing Guidelines)

1. Introduction

In order to demonstrate that the Drakes Estero Restoration Project adheres to the State of California and National Marine Fisheries Service (NMFS) policies of no net loss of eelgrass habitat and function in California, the National Park Service will implement a comprehensive pre and post eelgrass survey program that targets four specific restoration responses. All sampling areas will also have paired reference plots.

- First, we will document the response (change in percent cover along transects) of eelgrass in areas where oyster rack stringers have fallen to the estero floor and are precluding eelgrass growth.
- Second, we will survey eelgrass cover around 15 random sets of “bents” defined as 3 posts and the attached cross members in sediment pre and post removal.
- Third, we will record eelgrass cover under all 12 oyster racks that currently have little to no eelgrass under them, but do have eelgrass growing adjacent to the racks
- Finally, we will quantify eelgrass cover under and adjacent the proposed floating dock before installation and after removal. This dock design and location will be chosen to minimize eelgrass impacts.

This suite of surveys will allow NPS to quantify:

- actual impacts to eelgrass from post and cross member removal, which may be different from the approved estimates.
- recovery of eelgrass from areas shaded/smothered by stringers on the estero floor.
- recovery of eelgrass impacted around post and cross member removal areas.
- eelgrass recruitment and growth in restored habitat under racks.

This monitoring is not an attempt to document the total areal response of eelgrass to the restoration in the project area. Rather it is a targeted plan to document actual project impacts to eelgrass and assess the amount of eelgrass growth in the areas where eelgrass is most likely to grow within the footprint of the former racks (areas adjacent to existing eelgrass beds that have minimal oyster shell debris) and whether the restoration activities have achieved the 1.2:1 eelgrass mitigation requirement. Failure to document that recovery of eelgrass exceeds actual impacts by at least 20% (a 1.2:1 restoration to impact ratio) shall result in consultation with NMFS and CCC to initiate supplemental restoration activities sufficient to achieve this minimum eelgrass mitigation ratio. Eelgrass monitoring carried out independently by the California Department of Fish and Game (Appendix C) will provide

additional insight into project and estero-wide eelgrass responses to restoration, but is not designed to provide the level of detail needed to determine if minimum eelgrass mitigation requirements have been met.

While eelgrass is widespread in Drakes Estero, the specific project area primarily occurs within the footprint of 12' wide oyster racks. Therefore, monitoring using aerial imagery may be difficult to utilize to track fine scale changes in eelgrass cover (e.g., areas around individual posts). Furthermore, obtaining high quality aerial images with persistent winds, limited mid-day low tides, and generally low water clarity makes aerial imagery flights difficult to schedule and often result in poor visibility. We therefore propose to utilize underwater surveys and imagery (video and stills) to quantify the area and percent cover of eelgrass at posts, cross members, collapsed stringers, under racks that have little to no eelgrass underneath but are potential eelgrass habitat as indicated by eelgrass currently growing adjacent to the racks.

1.1 Description of the Project Area –

- 1.1.1 The Drakes Estero Restoration Project is intended to remove all aquaculture infrastructure and marine debris and to restore conditions supporting natural ecological and hydrologic process within Drakes Estero. The restoration actions include removal of wooden racks, debris, and other infrastructure, as well as development and implementation of long-term monitoring programs to document the ecological response and transition of Drakes Estero to the cessation of aquaculture activities and restoration. A complete description can be found in the Project Description section of the Consistency Determination.

1.2 Results of Preliminary Eelgrass Surveys and Projected Eelgrass Impacts - Table 1.

Table 1. Summary of Cumulative and eelgrass impact areas. Posts, deadmen, and stringers have an impact area equal to their dimensional footprint (2"x6" per post, 2"x12" per linear foot of Deadman, and 4" wide by length of stringers). Deadmen are not included for Racks 4A, and 8A-C. Plastic and wire debris is all in the shell debris footprint, so it is not summed in the total. The debris experiment area is subtracted from the Shell debris area. All values are estimated from underwater video footage from 71 of the 95 racks. Level of error for eelgrass cover, stringers on estero floor, shell debris, and plastic/wire is unknown, but is likely less than 25%.

| Component | Cumulative Impact Area | | Eelgrass Impact Area | |
|---|------------------------|-------------|----------------------|-------------|
| | Sq Ft | Acres | Sq Ft | Acres |
| <i>Within Rack Footprint</i> | | | | |
| Posts (assume 1.3 SF/post) | 8,713 | 0.20 | 3,572 | 0.08 |
| Bottom Cross-member (assume 1 SF/LF) | 30,072 | 0.69 | 12,726 | 0.29 |
| Stringers on Estero Floor (total area of boards covering bed of Estero) | 11,928 | 0.27 | 6,232 | 0.14 |
| Moderate/Heavy Aquaculture and Shell Debris | 103,830 | 2.38 | 0 | 0.00 |
| Aquaculture Debris – Bag, Tube and String Cleanup* | 41,818 | 0.96 | 0 | 0.00 |
| In-Situ Shell Experimental Treatment* | 21,800 | 0.50 | | 0.00 |
| Total Impact Area within Rack Footprint | 154,542 | 3.55 | 22,530 | 0.52 |
| Total Project Area within Rack Footprint | 308,016 | 7.07 | 126,287 | 2.90 |
| <i>Outside Rack Footprint</i> | | | | |
| Dock and Anchors [#] | 3,200 | 0.07 | 3,200 | 0.07 |
| Oyster Mat Removal | 16,988 | 0.39 | 0 | 0.00 |
| Manila Clam Treatment (Bed 17) | 21,344 | 0.49 | 0 | 0.00 |
| TOTAL IMPACT AREA | 196,075 | 4.50 | 25,730 | 0.59 |
| TOTAL PROJECT AREA | 349,549 | 8.02 | 129,487 | 2.97 |
| *areas within Total Moderate and Heavy Shell Debris Area | | | | |
| *see text for calculation of eelgrass impact | | | | |

2. Monitoring Plan

2.1 Field Methods

Surveys will be conducted by snorkelers via video and still images during the eelgrass growing season immediately (< 60 days) pre and post project. So as not to delay post removal surveys by more than 60 days, the post-project surveys will be carried out progressively as removal work occurs in each group of racks,. Percent cover of eelgrass will be estimated from quadrats and transects (see Table 4) by placing systematic points on images (quadrats or transects) obtained in the field.

All sample types (stringer, rack, post & cross member, and dock) will be paired with reference quadrats or plots to assess Percent cover and density targets. Reference quadrates/transects will be immediately adjacent to the racks or floating dock. Turion density will only be recorded for shallow dock areas.

Table 2. Eelgrass monitoring and reporting schedule. Because the project will take place over several months, surveys will be staggered in time by work site to meet this 60 day pre and post requirements. If the eelgrass coverage at One year is not 120% of any eelgrass impacted by the project, NPS will consult with CCC and NMFS for additional mitigation planning.

| Survey | Time |
|---|-----------------------------------|
| Pre-project | < 60 days pre-project initiation |
| Immediate Post | < 60 days post-project completion |
| Impact Reporting and consult with CCC | 30 days post project completion |
| One year Post Survey | one year post project completion |
| One year reporting and consult with CCC | 15 months post-project completion |

Surveys (except dock surveys) will be conducted during mid to high tides to maximize water clarity, minimize sediment entrained by tidal currents, and minimize potential disturbance to hauled-out harbor seals. Surveys will be conducted under an NPS research and collection permit and any use of motorized boats will be authorized under a National Park Service Minimum Tool Authorization.

2.2 Stringers on the Estero Floor

Stringers on the estero floor will be removed allowing eelgrass to grow into areas previously shaded and smothered by the wood. We estimate that there are 0.14 acres of bottom area covered by these stringers. We will video and take still images along transects over the length of these collapsed stringers to assess pre and post project and one year percent cover of eelgrass.

2.3 Post and Cross Member Eelgrass Monitoring

Based on pilot field tests, we estimate that each post removal in eelgrass will impact 1.3sf, and each cross member buried in sediment will impact 1 sf per linear foot in eelgrass. To assess these assumptions and document regrowth of eelgrass after infrastructure removal, we will establish quadrats that are 1m x 5m around 15 random sets of “bents” defined as 3 posts and the attached cross member. The entire quadrat will be photographed and eelgrass cover calculated. See Figure 1 for a schematic. Quadrat corners will be marked with short PVC posts that remain submerged at all tides. Fifteen additional reference quadrats will be placed adjacent to the sample sites.

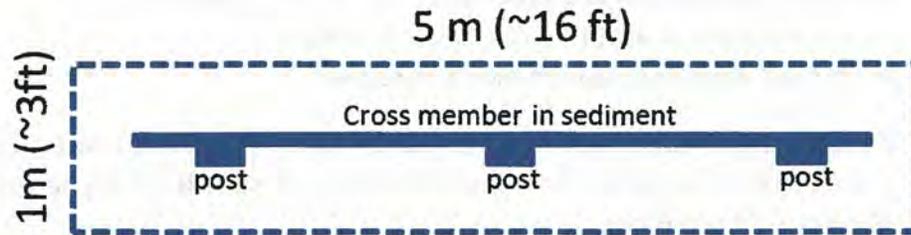


Figure 1. View from above of proposed eelgrass coverage quadrat. Cross member is a horizontal 2"x6" that is 12-14 ft. long. Vertical posts are 2"x6" and generally 10' long based on a small sample.

2.4 Rack Removal and Bottom Treatment Areas

NPS staff will snorkel along the length of 12 racks that were recently active, have eelgrass growing adjacent, and have little to no visible oyster shell or marine debris on the bottom. Thus, these are good candidates for eelgrass regrowth. Transects will be swum in two directions, down the center of the rack and returning along a randomly chosen side of the rack. To revisit transects after rack removal, the start and end points for transects will be marked with PVC poles that remain submerged below the waterline at all tides. Thus, we will be surveying all the rack area to calculate the area and density of eelgrass pre and post project, and at one year.

Table 3. Twelve racks in Drakes Estero that have little to no aquaculture debris underneath and eelgrass currently growing adjacent.

| Rack | bents | length (ft) | area (ft ²) | acres |
|--------------|------------|-------------|-------------------------|-------------|
| 4A | 21 | 252 | 3024 | 0.07 |
| 4B | 23 | 276 | 3312 | 0.08 |
| 4E | 26 | 312 | 3744 | 0.09 |
| 4I | 10 | 120 | 1440 | 0.03 |
| 6K | 18 | 216 | 2592 | 0.06 |
| 9A | 10 | 120 | 1440 | 0.03 |
| 11B | 14 | 168 | 2016 | 0.05 |
| 11E | 13 | 156 | 1872 | 0.04 |
| 11I | 24 | 288 | 3456 | 0.08 |
| 11J | 24 | 288 | 3456 | 0.08 |
| 38B | 13 | 156 | 1872 | 0.04 |
| <u>38C</u> | <u>24</u> | <u>288</u> | <u>3456</u> | <u>0.08</u> |
| SUM → | 220 | 2640 | 31680 | 0.73 |

The surveys will report (as per the NMFS Eelgrass Mitigation Guidelines):

- a) Spatial distribution of eelgrass under the 12 racks/transects.
- b) Aerial extent in square meters in the 12 transects.
- c) Percent vegetated cover in the 12 transects.

Due to logistical limitations and to minimize risk (avoid Scuba), turion (shoot) density will not be recorded on snorkel surveys, as we will use the percent vegetated cover to assess response.

Rack corners will be marked with short PVC posts that remain submerged at all tides. A meter tape will be placed along the axis of each rack footprint during surveys to guide swimmers and photopoints. Twelve additional reference transects will be monitored adjacent to the racks.

2.5 Temporary Floating Dock

The temporary floating dock may be placed over an area of eelgrass habitat with some existing eelgrass (currently estimated at < 50% cover, but assumed as 100% cover for purposes of permitting) (Figure 2). (An alternate site is also being assessed for suitability (deep water access) that would drastically reduce any eelgrass impact.) It is anticipated that eelgrass will rapidly recolonize the floating dock area after removal of the dock. To quantify eelgrass impacted and regrowth after dock removal, NPS will use a small skiff and GPS to map the 1) spatial distribution 2) aerial extent, and 3) percent cover and turion density of eelgrass prior to dock deployment (during the growing season), and eelgrass recovery after 12 months. Mapping will be done within the footprint of the proposed dock area and an adjacent 5 m buffer. For percent cover, the planned survey technique will be to select 20 random 2x2 m quadrats within the footprint at the two sampling periods. For the 5 m buffer surrounding the dock will also have 10 random 2x2 m quadrats sampled at all three time periods. Both of these sampling regimes will be random within each strata to ensure that the overall footprint of the dock is represented. Because it is not feasible to reliably mark permanent quadrats under a floating dock that would likely disturb the markers, these quadrats will be randomized for each new survey.

3. **Restoration Schedule:** See Project Description in Consistency Determination. Currently scheduled for July 1, 2016 – February 1, 2017.

Table 4. Summary of sampling areas, methods, quantities, and estimated impacts and restoration of eelgrass. Estimated demonstrated mitigation ration is 2.26:1. This differs from the overall project estimate because we are monitoring only a subset of the entire treatment area. Those values may be calculated from complementary surveys by California Department of Fish and Wildlife.

| Survey Area | Survey Type | Size | Sample Size (treatment\ reference) | Estimated eelgrass impact(ac) | Anticipated eelgrass restored (ac) |
|-------------------------|--------------------|-------------|---|--------------------------------------|---|
| Stringers | transect | variable | 15/15 | 0.14 | 0.14 |
| Posts and Cross members | quadrats | 1x5m | 15/15 | 0.37 | 0.37 |
| Racks | transects | variable | 12/12 | 0.00 | 0.73 |
| Floating Dock | quadrats | 2x2m | 20/10 | 0.07 | 0.07 |
| Total | | | 62/52 | 0.58 | 1.31 |

Table 5. Estimated annual project days in field and office (2 person crew).

| Type | Field days | Office Days | Sampling Sessions | Project Days |
|-------------------------|-------------------|--------------------|--------------------------|---------------------|
| Stringer plots | 3 | 2 | 3 | 15 |
| Cross member/post plots | 3 | 2 | 3 | 15 |
| Rack transects | 6 | 3 | 3 | 27 |
| Dock plots* | 1 | 1 | 3 | 6 |
| TOTAL | 13 | 7 | 11 | 61 |

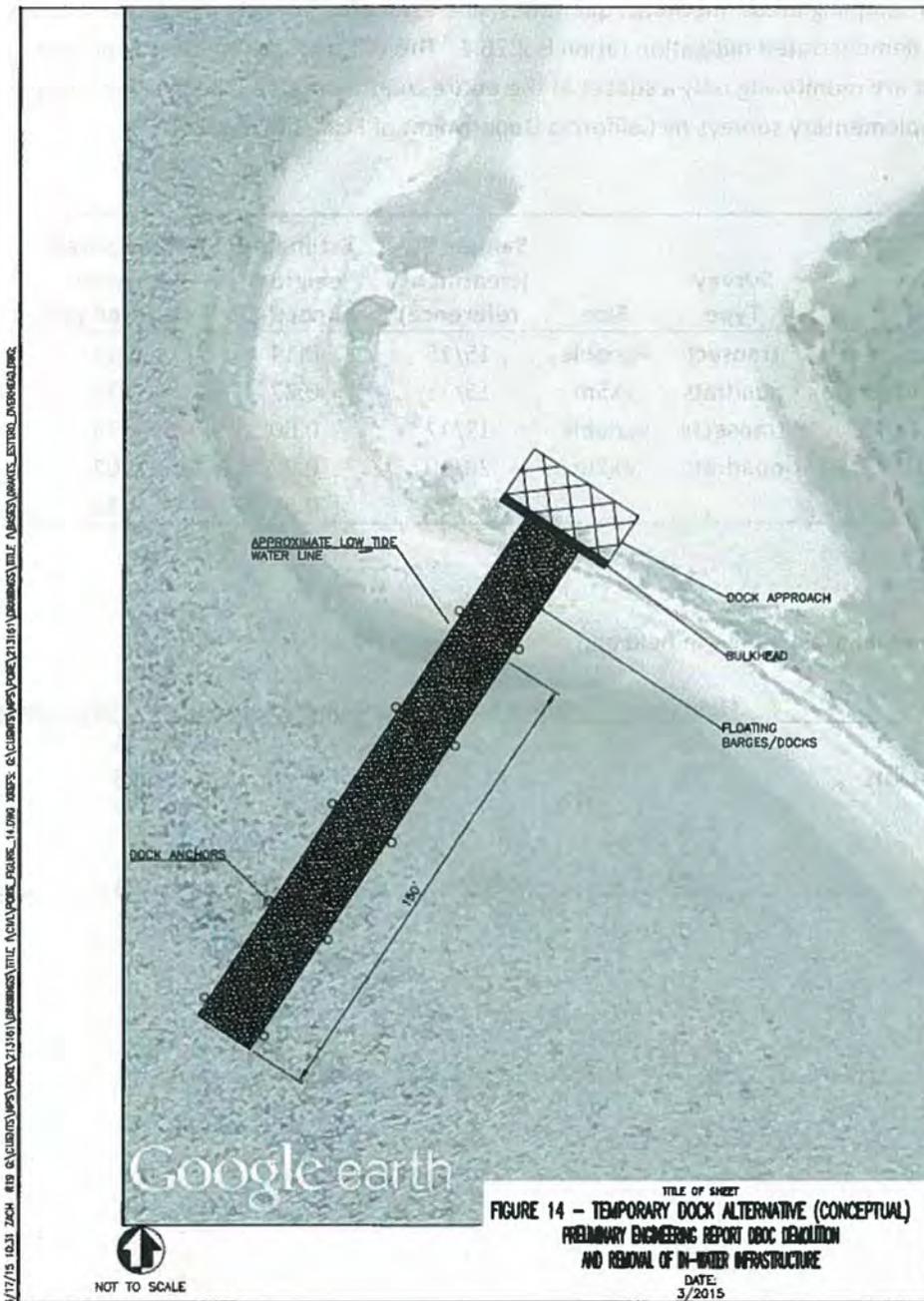


Figure 2. Conceptual design of temporary 150 ft x 20 ft floating dock. The plan also assumes 200 SF of impact associated the anchors for the dock. It is estimated that the entire dock area may affect eelgrass. Twenty 2x2 m random quadrats will be used to assess percent cover within the dock footprint and an additional 10 2x2m random quadrats will determine eelgrass density in the 5 m buffer around the dock. To further reduce impacts, NPS may also move the dock ~30 m northward if there is lower eelgrass cover and deeper water.

4. Analysis

Determination of eelgrass area will be accomplished by converting sample (transects or quadrats) percent cover to a mean (\pm error) cover which is then converted to area of all treatment areas. For example, post samples will be extrapolated to the area of all post (0.08 acres) that were removed from eelgrass. Conversely, the stringers on the estero floor in eelgrass will be completely surveyed by transects (0.29 acres). Growth of eelgrass under the 12 racks will be directly calculated. Last, the 20 quadrats in the temporary dock footprint and the 10 quadrats in the buffer will be distributed to represent the entire dock footprint and buffer area. For all survey types all cases, a direct comparison of eelgrass acreage pre and post project, will be compared to control plots/transects to calculate change in eelgrass cover (and mitigation requirements) corrected for any large scale changes in eelgrass cover shown by the control areas. This change in acreage will not represent the overall project impacts or change in eelgrass for the entire project area, but will rather demonstrate whether the mitigation requirements have been met.

Because of low variability within sample types, the number of quadrats and transects chosen should have enough power to demonstrate significant differences in eelgrass cover since eelgrass under racks monitored will generally be low to no cover. Thus, this low variability in initial conditions will increase power to detect changes over time.

5. Project Monitoring Schedule - See Table 1

- 6. NMFS and CCC Coordination** - NPS will coordinate with NMFS and CCC prior to and post field surveys. Reports summarizing eelgrass conditions and milestones in Table 1 will be provided within 30 days after completion of immediate post project sampling. Upon approval of this report by NMFS and CCC staff, the total area of eelgrass impacts will be used as the basis for mitigation milestones. The following year, a post-project report documenting actual project impacts to eelgrass and providing an assessment of the total area of eelgrass lost as a result of project activities will be submitted to NMFS and CCC staff for review and approval within 90 days of the completion of the year 1 surveys activities (see Table 2).

Pre survey and annual reports that detail eelgrass cover and evaluate performance milestones are listed in Table 2.

7. Alternative Mitigation Planning

After discussions with NMFS and CCC, we anticipate that the restoration component of this project will satisfy the mitigation ratio of greater than 1.2:1, and therefore are not developing a detailed mitigation plan at this time. However, if the monitoring surveys proposed here do not demonstrate at least a 1.2:1 net increase in eelgrass cover, NPS will

further consult with CCC and NMFS on development of additional mitigation strategies such as transplanting eelgrass into rack footprints. Reporting submitted after year one (see Table 1) will provide CCC and NMFS with enough information on restoration amounts and status to determine if additional mitigation is warranted. This additional mitigation would be carried out by transplanting eelgrass into unvegetated areas per the protocols and methods established in the CEMP. The total amount of additional mitigation would be determined by CCC and NMFS staff by evaluating the total documented project impacts to eelgrass and the restoration of eelgrass documented after two years. Any shortfall in achieving the 1.2:1 (restoration:impact) ratio after one year and maintaining it for an additional year would trigger the need for additional mitigation.

8. Adjustment of estimates of eelgrass impact.

The post-project impact assessment surveys (Table 2) will be used to confirm or modify the impact area estimate included in the consistency determination. The amount of required mitigation will be based on the total impact established through these surveys. We have assumed a likely ceiling for impact (Table 1), but actual impacts may be higher or lower. If the post-project assessment surveys reveal that impacts under stringers, posts, cross members, and the dock were less than estimated in Table 1 of the project description, then the estimates for eelgrass impact (and required restoration ratios/areas) will also be reduced by the difference. Conversely, larger impacts will require additional mitigation area fulfilling the 1.2 :1 ratio (See section 7 above).