



Glacier Bay National Park

Appendixes

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Marine Management Plan & EA

APPENDIXES

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Agness, A. M., K. N. Marshall, J. F. Piatt, J. C. Ha, and G. R. Van Blaricom

- 2013 “Energy cost of vessel disturbance to Kittlitz’s murrelets (*Brachyramphus brevirostris*).” *Marine Ornithology* 40: 1–9.

Alaska Department of Fish and Game (Alaska DFG)

- 2012 Community Subsistence Information System – All Years. Accessed April 2012.
www.adfg.alaska.gov/sb/CSIS/index.cfm?ADFG=harvInfo.resourceRegionData
- 2022 “Anadromous Waters Catalog and Atlas.” Database. 2022. Accessed January 25, 2022.
<https://www.adfg.alaska.gov/sf/sarr/awc/>

Alaska Department of Fish and Game and U.S. Fish and Wildlife Service (ADFG and USFWS)

- 1982 Alaska Department of Fish and Game and U.S. Fish and Wildlife Service. 1982. Master Memorandum of Understanding Between the Alaska Department of Fish and Game Juneau, Alaska and the U.S. Fish and Wildlife Service Department of the Interior Anchorage, Alaska.
http://dnr.alaska.gov/commis/cacfa/documents/FOSDocuments/MasterMOUs/ADFG_USFWS_MMOU.PDF

Alaska Department of Labor (ADOL)

- 2017 Southeast Alaska Population by Age, Sex and Borough/Census Area, 2010 to 2017.

Alaska Shorebird Group

- 2019 Alaska Shorebird Conservation Plan. Version III. Alaska Shorebird Group, Anchorage, AK.

Allen, B. M., and R. P. Angliss

- 2011 Alaska Marine Mammal Stock Assessments, 2010. NOAA Technical Memorandum NMFS/AFSC-223. Seattle: US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center.

Arimitsu, M. L., J. F. Piatt, and M. D. Romano

- 2007 “Distribution of ground-nesting marine birds along shorelines in Glacier Bay, southeastern Alaska: An assessment related to potential disturbance by back-country users.” *U.S. Geological Survey Scientific Investigations Report 2007–5278*, 48 pp.

Avdievitch, N., R. G. Schmitt, and J. A. Coe

- 2020 Inventory map of submarine landslides in Glacier Bay, Glacier Bay National Park and Preserve, Alaska: USGS data release. <https://doi.org/10.5066/P9GCDYT2>

Baker, C. S., and L. M. Herman

- 1989 *Behavioral responses of summering humpback whales to vessel traffic: Experimental and opportunistic observations*. Technical Report NPS-NR-TRS-89-01. Final Report to the National Park Service, Alaska Regional Office. United States Department of the Interior.

Barber, J. R., C. L. Burdett, S. E. Reed, K. A. Warner, C. Formichella, K. R. Crooks, D. M. Theobald, and K. M. Fristrup

- 2011 Anthropogenic noise exposure in protected natural areas: estimating the scale of ecological consequences. *Landscape Ecology*, 26(9): 1281–1295.

Bell, D. V., and L. W. Austin

- 1985 “The game-fishing season and its effects on overwintering wildfowl.” *Biological Conservation* 33:65–80.

Bellrose, F. C.

- 1976 *Ducks, Geese, and Swans of North America*. Second edition. Harrisburg, PA: Stackpole Books.

Betchkal D.H., and V. L. Ward

- 2018 Glacier Bay National Park and Preserve: Acoustic Resource Management Framework. Natural Sounds and Night Skies Division. Denali Park, AK.

Bigg, M. A., P. F. Olesiuk, G. M. Ellis, J. K. B. Ford, and K. C. Balcomb III

- 1990 “Social organization and genealogy of resident killer whales (*Orcinus orca*) in the coastal waters of British Columbia and Washington State,” p. 386-406. In: P. S. Hammond, S. A. Mizroch, and G. P. Donovan (eds.), “Individual Recognition of Cetaceans: Use of Photo-identification and Other Techniques to Estimate Population Parameters.” *Rep. Int. Whal. Comm.* Special Issue 12.

Blair, H. B., N. D. Merchant, A. S. Friedlaender, D. N. Wiley, and S. E. Parks

- 2016 “Evidence for ship noise impacts on humpback whale foraging behaviour.” *Biology Letters* 12(8): 20160005.

Bodkin, J. L., G. G. Esslinger, and D. M. Monson

- 2004 “Foraging depths of sea otters and implications to coastal marine communities.” *Marine Mammal Science* 20(2): 305–321.

Bodkin, J. L., B. E. Ballachey, G. G. Esslinger, K. A. Kloecker, D. H. Monson, and H. A. Coletti

- 2007 “Perspectives on an invading predator – sea otters in Glacier Bay.” US Geological Survey, Alaska Science Center, Anchorage, AK.

Brakel, J. T.

- 1999 “A maritime sense of place: Southeast Alaska fishermen and mainstream nature ideologies.” Thesis. University of Alaska, Fairbanks, AK. <http://hdl.handle.net/111122/8539>

Bright, L.

- 1985 “Patterns of tourism in southeast Alaska: an analysis of the impact of wilderness designations on the tourism industry.” Fairbanks: M.S. Thesis, School of Agriculture and Land Resources Management.

Brown, S., C. Hickey, B. Harrington, and R. Gill

- 2001 *The U.S. Shorebird Conservation Plan*, 2nd edition. Manomet Center for Conservation Sciences, Manomet, MA.

Buxton, R. T., M. F. McKenna, D. Mennitt, K. Fristrup, K. Crooks, L. Angeloni, and G. Wittemyer

- 2017 “Noise pollution is pervasive in US protected areas.” *Science* 356(6337): 531–533.

Calambokidis, J., B. L. Taylor, S. D. Carter, G. H. Steiger, P. K. Dawson, and L. D. Antrim

- 1987 “Distribution and haul-out behavior of harbor seals in Glacier Bay, Alaska.” *Canadian Journal of Zoology*.
https://www.researchgate.net/publication/249539767_Distribution_and_haul-out_behavior_of_harbor_seals_in_Glacier_Bay_Alaska

Clapham, P. J., and J. G. Mead

- 1999 “Megaptera novaeangliae.” *Mammalian Species* (604): 1–9.

Climo, L., and T. Duncan

- 1991 “The status of molting Canada geese in Adams Inlet, Glacier Bay National Park and Preserve, Alaska, in 1991.” Gustavus, AK: Glacier Bay National Park and Preserve.

Coe, J. A., E. K. Bessette-Kirton, and M. Geertsema

- 2018 “Increasing rock-avalanche size and mobility in Glacier Bay National Park and Preserve, Alaska detected from 1984 to 2016 Landsat imagery.” *Landslides* 15(3): 393–407.
<https://link.springer.com/article/10.1007/s10346-017-0879-7>

Council on Environmental Quality (CEQ)

- 2014 Memorandum for Heads of Federal Department and Agencies: Effective Use of Programmatic NEPA reviews. December 18.

Dahlheim, M. E., D. Ellifrit, and J. Swenson

- 1997 *Killer Whales of Southeast Alaska: A Catalogue of Photoidentified Individuals*. Seattle, WA: Day Moon Press. 82 p. + appendixes.

Dahlheim, M. E., A. Schulman-Janiger, N. Black, R. Ternullo, D. Ellifrit, and K. C. Balcomb

- 2008 “Eastern temperate North Pacific offshore killer whales (*Orcinus orca*): occurrence, movements, and insights into feeding ecology.” *Mar. Mammal Sci.* 24(3): 719–729.

Dahlheim, M. E., P. A. White, and J. M. Waite

- 2009 “Cetaceans of southeast Alaska: distribution and seasonal occurrence.” *J. Biogeogr.* 36:410–426.

Dahlheim, M., A. Zerbini, J. Waite, and A. Kennedy

- 2012 Distribution, Abundance, and Trends of Harbor Porpoise (*Phocoena phocoena*): Glacier Bay National Park and Preserve and Adjacent Waters of Icy Strait. National Marine Mammal Laboratory, Seattle, WA.

Deur, D., and T. F. Thornton

- 2014 *Assessing Possible Cruise Ship Impacts On Huna Tlingit Ethnographic Resources In Glacier Bay*. Portland, Oregon: Portland State University-Anthropology Department. Completed under Cooperative Agreement H8W07060001 between Portland State University and the National Park Service.

Doherty, J. L., and C. M. Gabriele

- 2001 “Population characteristics of humpback whales in Glacier Bay and adjacent waters: 2001.” Report to the National Park Service, Gustavus, AK.
- 2004 “Results of humpback whale population monitoring in Glacier Bay and adjacent waters: 2004.” Report to the National Park Service, Gustavus, AK.

Dufresne, A., G. Wolken, C. Hilbert, E. K. Bessette-Kirton, J. A. Coe, M. Geertsema, and G. Ekstrom

- 2019 “The 2016 Lamplugh landslide: Alaska: deposit structures and emplacement dynamics.” *Landslides* 16(12): 2301–2319. <https://doi.org/10.1007/s10346-019-01225-4>

Duncan, T., and L. Climo

- 1991 “Scoter census in the Hugh Miller area, 1991.” Gustavus, AK: Glacier Bay National Park and Preserve.

Erbe, C., S. A. Marley, R. P. Schoeman, J. N. Smith, L. E. Trigg, and C.B. Embling

- 2019 “The effects of ship noise on marine mammals—a review.” *Frontiers in Marine Science* 606.

Etherington, L. L., P. N. Hooge, E. R. Hooge, and D. F. Hill

- 2007 “Oceanography of Glacier Bay, Alaska: Implications for biological patterns in a glacial fjord estuary.” *Estuaries Coast* 30: 927–94.

Ford, J. K. B., G. M. Ellis, and K. C. Balcomb

- 2000 *Killer Whales: The Natural History and Genealogy of Orcinus orca in British Columbia and Washington State*. Second edition. Vancouver, BC, Canada: University of British Columbia Press, 104 p.

Fournet, M. E. H., L. P. Matthews, C. Gabriele, S. Haver, D. Mellinger, and H. Klinck

- 2018 “Humpback whales *Megaptera novaeangliae* alter calling behavior in response to natural sounds and vessel noise.” *Marine Ecology Progress Series* 607, 251–268. <https://doi.org/10.3354/meps12784>

Frankel, A. S., and C. M. Gabriele

- 2017 *Predicting the acoustic exposure of humpback whales from cruise and tour vessel noise in Glacier Bay, Alaska, under different management strategies.* Vol. 34: 397–415, 2017.
<https://doi.org/10.3354/esr00857>

Furr, G., C. Lamborn, A. Sisneros-Kidd, C. Monz, and S. Wesstrom

- 2021 *Backcountry visitor experience and social science indicators for Glacier Bay National Park.* Natural Resource Report NPS/GLBA/NRR—2021/2301. National Park Service, Fort Collins, CO. <https://doi.org/10.36967/nrr-2287258>

Gabriele, C. M., C. W. Clark, A. S. Frankel, and B. Kipple

- 2010 “Glacier Bay’s underwater sound environment: The effects of cruise ship noise on humpback whale habitat.” *Alaska Park Science* 9(2): 12–17.

Gabriele, C. M., J. L. Neilson, J. M. Straley, C. S. Baker, J. A. Cedarleaf, and J. F. Saracco

- 2017 “Natural history, population dynamics, and habitat use of humpback whales over 30 years on an Alaska feeding ground.” *Ecosphere* 8(1).

Gabriele C. M., D. W. Ponirakis, C. W. Clark, J. N. Womble, and P. B. S. Vanselow

- 2018 “Underwater Acoustic Ecology Metrics in an Alaska Marine Protected Area Reveal Marine Mammal Communication Masking and Management Alternatives.” *Front. Mar. Sci.* 5:270.
<https://doi.org/10.3389/fmars.2018.00270>

Gabriele, C.M., D. W. Ponirakis, and H. Klinck

- 2021 “Underwater sound levels in Glacier Bay during reduced vessel traffic due to the COVID-19 pandemic.” *Front. Mar. Sci.* 8:674787.
<https://doi.org/10.3389/fmars.2021.674787>

Gabriele C. M., C. L. Amundson., J. L. Neilson. J. M. Straley, C. S. Baker, and S. L. Danielson

- 2022 “Sharp decline in humpback whale (*Megaptera novaeangliae*) survival and reproductive success in southeastern Alaska during and after the 2014–2016 Northeast Pacific marine heatwave.” *Mamm. Biol.* 102, 1–19. <https://doi.org/10.1007/s42991-021-00187-2>

Galicia, E., and G. A. Baldassarre

- 1997 “Effects of motorized tourboats on the behavior of nonbreeding American flamingos in Yucatan, Mexico.” *Conservation Biology* 11: 1159–1165.

Gende, S.M., Allan, S.E, Incardona, J.P., and Ylitalo, G.M.

- 2020 “Polycyclic Aromatic Hydrocarbons (PAHs) in Marine Waters of Glacier Bay and Skagway Harbor.” Unpublished report, Glacier Bay National Park and Preserve, Gustavus, AK.

Gende, S. M., K. Harris, J. Neilson, and A. N. Hendrix

- 2010 Using Observers to Record Encounters Between Cruise Ships and Humpback Whales. In *Alaska Park Science Glacier Bay Scientific Studies* 9(2): 19–22.

Gende S. M., A. N. Hendrix, K. R. Harris, B. Eichenlaub, J. Nielsen, and S. Pyare

- 2011 “A Bayesian approach for understanding the role of ship speed in whale-ship encounters.” *Ecol Appl* 21: 2232–2240.

Gende, S. A. N. Hendrix, and J. Schmidt

- 2018 “Somewhere between acceptable and sustainable: When do impacts to resources become too large in protected areas?” *Biological Conservation* 223: 138–146.

Goonan, K., C. Monz, B. Bruno, and T. Lewis

- 2015 *Recreation impact monitoring analysis and protocol development: Glacier Bay National Park*. Natural Resource Report NPS/GLBA/NRR—2015/957. National Park Service, Fort Collins, CO.

Haas, G.E., and T. J. Wakefield

- 1998 *National parks and the American public: A national public opinion survey on the national park system*. Washington DC and Fort Collins, CO.: National Parks and Conservation Association and Colorado State University.

Harley, C. D. G., A. R. Hughes, K. M. Hultgren, B. G. Miner, C. J. B. Sorte, C. S. Thornber, L. F. Rodriguez, L. Tomanek, and S. L. Williams

- 2006 The impacts of climate change in coastal marine systems. *Ecology Letters* 9(2): 228–241.

Harris K., and S. Gende

- 2010 Cruise Ship – Humpback Whale Encounters in and Around Glacier Bay National Park and Preserve, Alaska. In *Alaska Park Science Glacier Bay Scientific Studies* 9(2): 23–25.

Hartill, É. C., R. G. Waller, and P.J. Auster

- 2020 “Deep coral habitats of Glacier Bay National Park and Preserve, Alaska.” *PloS one*, 15(8), e0236945.

Holleman, M. and J. Kruse

- 1991 Hunting and Fishing in Southeast Alaska. Alaska Review of Social and Economic Conditions, Institute of Social and Economic Research, University of Alaska Anchorage.

Holt, M. M., D. P. Noren, and C. K. Emmons

- 2011 “Effects of noise levels and call types on the source levels of killer whale calls.” *The Journal of the Acoustical Society of America* 130(5): 3100–3106.

Hoonah Indian Association (HIA)

- 2002 Letter from the Hoonah Indian Association, Hoonah, AK, outlining comments for the proposed Vessel Management Plan, July 11, 2002.

- 2020 Deed of Easement for Chookanhéeni (Berg Bay).

Interagency Working Group on Environmental Justice and NEPA Committee (EJ IWG and NEPA Committee)

- 2016 *Promising Practices for EJ Methodologies in NEPA Reviews*. March 2016.
https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf

International Electrotechnical Commission (IEC)

- 2002 IEC 61672-1: 2002 Electroacoustics–Sound Level Meters–Part, 1.

International Pacific Halibut Commission (IPHC)

- 2022 Annual Report 2021. IPHC-2022-AR2021-R. 66 pp.

International Union for the Conservation of Nature (IUCN)

- 2022 *Megaptera novaeangliae*. The IUCN Red List of Threatened Species. Accessed January 18, 2022. <http://www.iucnredlist.org/details/13006/0>

Jansen, J. K., P. L. Boveng, S. P. Dahle and J. L. Bengtson

- 2010 “Reaction of harbor seals to cruise ships.” *Journal of Wildlife Management* 74: 1186–1194.

Jones, E., T. Oliphant, and P. Peterson

- 2014 {SciPy}: open source scientific tools for {Python}.

Jurasz, C. M., and V. P. Palmer

- 1981 “Censusing and establishing age composition of humpback whales (*Megaptera novaeangliae*), employing photodocumentation in Glacier Bay National Monument, Alaska.” National Park Service, Anchorage, AK.

Keller, K. B., C. M. Gabriele, H. C. Pearson, J. L. Neilson, P. B. S. Vanselow, and E. K. Keller

- 2017 Sighting frequency and distribution of marine mammals opportunistically recorded in Glacier Bay, Alaska and adjacent waters (2005-2014).

Kipple, B.

- 2002 *Southeast Alaska Cruise Ship Underwater Acoustic Noise*. Technical report, Glacier Bay National Park and Preserve. <https://iqoe.org/library/16346>

Kipple, B., and C. Gabriele

- 2003 *Glacier Bay Underwater Noise – August 2000 through August 2002*. Naval Surface Warfare Center – Detachment Bremerton Technical Report NSWCCD-71-TR-2004/521. December.
- 2007 Glacier Bay underwater soundscape. Proceedings of the Fourth Glacier Bay Science Symposium, Gustavus, AK.

Kulesza, C., Y. Le, and S. J. Hollenhorst

- 2013 *National Park Service Visitor Perceptions & Values of Clean Air, Scenic Views, & Dark Night Skies; 1988–2011*. Natural Resource Report NPS/NRSS/ARD/NRR–2013/632.

Laist, D. W., A. R. Knowlton, J. G. Mead, A. S. Collet, and M. Podesta

- 2001 “Collisions Between Ships and Whales.” *Marine Mammal Science* 17(1): 35–75.
<https://doi.org/10.1111/j.1748-7692.2001.tb00980.x>

Leseberg, A., P. A. R., Hockey, and D. Loewenthal

- 2000 “Human disturbance and the chick-rearing ability of African black oystercatchers (*Haematopus moquini*)—A geographical perspective.” *Biological Conservation* 96(3): 379–385.

Lewis, T. M., and E. A. Mathews

- 2000 “Effects of human visitors on the behavior of harbor seals (*Phoca vitulina richardii*) at McBride Glacier Fjord, Glacier Bay National Park.” National Park Service, Gustavus, AK.

Loso, M., A. Arendt, C. Larsen, J. Rich, and N. Murphy

- 2014 Alaskan national park glaciers - status and trends: Final report. Natural Resource Technical Report NPS/AKRO/NRTR—2014/922. National Park Service, Fort Collins, CO.

Loughlin, T. R., M. A. Perez, and R. L. Merrick

- 1987 “*Eumetopias jubatus*.” *Mammalian Species* 283: 1–7.

Lynch, E.

- 2012 *Glacier Bay National Park and Preserve: Acoustical Monitoring 2011*. Natural Resource Technical Report NPS/NRSS/NRTR—2012/XXX. National Park Service, Fort Collins, CO.

Lynch, E., D. Joyce, and K. Fristrup

- 2011 “An assessment of noise audibility and sound levels in US National Parks.” *Landscape Ecology* 26(9): 1297–1309.

Malme, C. I., and P. R. Miles

- 1983 The Acoustic Environment and Noise Exposure of Humpback Whales in Glacier Bay, Alaska. NOAA-National Marine Fisheries Service. Marine Mammal Laboratory.

Marcella, T. M.

- 2014 “Cruise ship disturbance to Kittlitz’s murrelets (*Brachyrampus brevirostris*) in Glacier Bay National Park and Preserve, Alaska.” Thesis. Oregon State University, Corvallis, OR.

Marcella, T. K., S. M. Gende, D. D. Roby, and A. Allignol

- 2017 “Disturbance of a rare seabird by ship-based tourism in a marine protected area.” *PLoS ONE* 12(5): e0176176. <https://doi.org/10.1371/journal.pone.0176176>

Mathews, E. A.

- 2000 *Reactions of Steller sea lions (Eumetopias jubatus) to vessels at a haul-out in Glacier Bay: Progress report.* National Park Service, Glacier Bay National Park and Preserve, Alaska.

Mathews, E. A., and G. W. Pendleton

- 2006 “Declines in harbor seal (*Phoca vitulina*) numbers in Glacier Bay National Park, Alaska, 1992–2002.” *Marine Mammal Science* 22(1): 170–191.

Mathews, E. A. and M. D. Adkison

- 2010 “The role of Steller sea lions in a large population decline of harbor seals.” *Marine Mammal Science* 26: 803–836. <https://doi.org/10.1111/j.1748-7692.2010.00375.x>

Mathews, E. A., J. N. Womble, G. W. Pendleton, L. A. Jemison, J. M. Maniscalco, and G. Streveler

- 2011 “Population growth and colonization of Steller sea lions in the Glacier Bay region of southeastern Alaska: 1970s–2009.” *Marine Mammal Science* 27(4): 852–880.

McDonald, C. D., R. M. Baumgarten, and R. Iachan

- 1995 *Aircraft Management Studies: National Park Service Visitors Survey.* HMMH Report No. 290940.12; NPOA Report No. 94-2, National Park Service, US Department of the Interior.

McDowell Group

- 2020 *Economic Analysis of Whale Watching Tourism in Alaska.* Prepared for National Oceanic and Atmospheric Administration. US Department of Commerce.

McKenna, M., C. Gabriele, and B. Kipple

- 2017 “Effects of marine vessel management on the underwater acoustic environment of Glacier Bay National Park, AK.” Draft Report. *Ocean & Coastal Management* 139 (2017) 102–112.

Mennitt, D., K. M. Fristrup, K. Sherrill, and L. Nelson

- 2013 Mapping sound pressure levels on continental scales using a geospatial sound model. In *Proceedings of Inter-Noise* (pp. 1-11).

Mestre Greve Associates, Division of Landrum and Brown (Mestre Greve Associates)

- 2014 Draft environmental impact report no. 617 John Wayne Airport settlement agreement. Noise Analysis Technical Report, Costa Mesa, CA.

Miller-Klein, E.

- 2017 Memorandum – Sound Certification Testing Lindblad Expeditions National Geographic Quest, A3 Acoustics Inc., July 25, 2017.

Miller-Klein, E.

- 2018 Memorandum – Sound Certification Testing M/V American Constellation, A3 Acoustics Inc., April 2018.

Mölders, N., and S. Gende

- 2015 “Impacts of Cruise-Ship Entry Quotas on Visibility and Air Quality in Glacier Bay.”
Journal of Environmental Protection 6, 1236–1256.
<http://dx.doi.org/10.4236/jep.2015.611109>

Moynahan, B., W. Johnson, D. Schirokauer, L. Sharman, G. Smith, and S. Gende

- 2008 *Vital Signs monitoring plan: Southeast Alaska Network*. Natural Resource Report
NPS/SEAN/NRR—2008/059. National Park Service, Fort Collins, CO.

Muto, M. M., V. T. Helker, B. J. Delean, R. P. Angliss, P. L. Boveng, J. M. Breiwick, B. M. Brost, M. F. Cameron, P. J. Clapham, S. P. Dahle, M. E. Dahlheim, B. S. Fadely, M. C. Ferguson, L. W. Fritz, R. C. Hobbs, Y. V. Ivashchenko, A. S. Kennedy, J. M. London, S. A. Mizroch, R. R. Ream, E. L. Richmond, K. E. W. Shelden, K. L. Sweeney, R. G. Towell, P. R. Wade, J. M. Waite, and A. N. Zerbini

- 2020 Alaska marine mammal stock assessments, 2019. US Dep. Commer., NOAA Tech. Memo.
NMFS-AFSC-404, 395 p.

Nadeau, A. J., K. Allen, A. Davis, S. Gardner, K. Benck, M. Komp, L. Meinke, J. Zanon, and A. Robertson

- 2017 *Glacier Bay National Park and Preserve: Natural Resource Condition Assessment*. Natural
Resource Report NPS/GLBA/NRR—2017/1473. National Park Service, Fort Collins, CO.

National Audubon Society

- 2017 Alaska Watch. List. Highlighting Declining and Vulnerable Bird Populations.
<https://ak.audubon.org/conservation/alaska-watchlist>

National Marines Fisheries Service (NOAA Fisheries)

- 1993 *Designation of Critical Habitat for Steller Sea Lions*. Final Rule. Alaska, West Coast.
Protected Resources Regulations and Actions.
<https://www.fisheries.noaa.gov/action/designation-critical-habitat-steller-sea-lions>
- 2013 “Status review of the eastern distinct population segment of Steller sea lion (*Eumetopias
jubatus*).” National Marine Fisheries Service, Alaska Region, Juneau, AK.
- 2020 “Humpback Whale Central North Pacific Stock Assessment Report.”
- 2022a Humpback Whale. <https://www.fisheries.noaa.gov/species/humpback-whale>.
- 2022b Alaska Marine Mammal Viewing Guidelines and Regulations.
<https://www.fisheries.noaa.gov/alaska/marine-life-viewing-guidelines/alaska-marine-mammal-viewing-guidelines-and-regulations>

National Park Service (NPS)

- 1984 *General Management Plan, Glacier Bay National Park and Preserve, Alaska*. Accessed
November 8, 2022.
<https://parkplanning.nps.gov/document.cfm?parkID=12&projectID=34529&documentID=38134>

- 1995 *Glacier Bay National Park and Preserve Vessel Management Plan and Environmental Assessment*. Anchorage, AK: Department of the Interior, National Park Service, Alaska Region.
- 2003a *Record of Decision (ROD) for Final Environmental Impact Statement for Vessel Quotas and Operating Requirements in Glacier Bay National Park and Preserve*.
<https://parkplanning.nps.gov/document.cfm?parkID=12&documentID=63109>
- 2003b *Final Environmental Impact Assessment for Vessel Quotas and Operating Requirements in Glacier Bay National Park and Preserve*. October.2006
- 2006 NPS Management Policies 2006. Available online at:
https://www.nps.gov/subjects/policy/upload/MP_2006.pdf.
- 2010a Glacier Bay National Park and Preserve, *Foundation Statement*.
- 2010b *Navigating Troubled Waters. A History of Commercial Fishing in Glacier Bay, Alaska*. Prepared for the National Park Service, Glacier Bay National Park and Preserve, Gustavus, AK by James Mackovjak. <http://npshistory.com/publications/glba/navigating-troubled-waters.pdf>
- 2010c Harvest of Glaucous-winged Gull Eggs by Huna Tlingit in Glacier Bay National Park Final Legislative Environmental Impact Statement.
<https://parkplanning.nps.gov/projectHome.cfm?projectID=16968>
- 2013 Bear Management Plan. National Park Service, Glacier Bay National Park and Preserve. On file at park headquarters.
- 2015a *Climate Monitoring Program in Glacier Bay National Park and Preserve. Environmental Assessment*. Glacier Bay National Park and Preserve, Gustavus, AK.
<https://parkplanning.nps.gov/showFile.cfm?projectID=44972&MIMETType=application%252Fpdf&filename=Climate%20Monitoring%20EA%202015%2Epdf&sfid=210941>
- 2015b Glacier Bay National Park and Preserve 2015 Visitor Use Statistics. Gustavus, AK: National Park Service, Glacier Bay National Park and Preserve.
- 2017 State of the Park Report for Glacier Bay National Park and Preserve. State of the Park Series No. 52. National Park Service, Washington DC.
- 2018a *Guidance for Evaluating Visual Resources in Natural Resource Conditions Assessments*. Air Resources Division, Natural Resources Stewardship & Science. August.
- 2018b Glacier Bay National Park and Preserve Acoustic Resource Management Framework, NSNSD/Technical Assistance Request No. 2058. March.
- 2018c *Rebuild Sperry Chalet for the Next 100 Years. Environmental Assessment*. Glacier National Park, Montana, Waterton-Glacier International Peace Park. April.
<https://parkplanning.nps.gov/document.cfm?parkID=61&projectID=78972&documentID=87386>

- 2018d Glacier Bay National Park and Preserve Resource Stewardship Strategy. On file at park headquarters.
- 2019a *Frontcountry Management Plan. Glacier Bay National Park and Preserve. A Renewed Vision for Bartlett Cove Environmental Assessment, Finding of No Significant Impact.* June. <https://www.nps.gov/glba/learn/management/upload/2019-06-27-GLBA-Frontcountry-Management-Plan-part-1-w-maps-web.pdf>
- 2019b Glacier Bay National Park and Preserve 2019 Visitor Use Statistics. Gustavus, AK: National Park Service, Glacier Bay National Park and Preserve.
- 2021 *Acoustic monitoring program.* National Park Service. Accessed January 31, 2022. <https://www.nps.gov/glba/learn/nature/acoustics.htm>
- 2022a Personal communications from the Alternatives Development Workshop Conversation. Conducted on December 9–11, 2021.
- 2022b Annual Park Recreation Visitation Glacier Bay NP & PRES. Accessed November 8, 2022. [https://irma.nps.gov/STATS/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20\(1904%20-%20Last%20Calendar%20Year\)?Park=GLAC](https://irma.nps.gov/STATS/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20(1904%20-%20Last%20Calendar%20Year)?Park=GLAC)
- 2022c Personal Communication. Memo from Davyd Betchkal, NPS Biologist / Alaska Region Soundscape Specialist, to Jacob Poling, Lead Consultant, Technical Principal, Acoustics, Noise & Vibration, WSP, titled GLBA Vessel Quota and Operating Requirements: Abovewater Acoustic Environment. Noise-Free Interval Analysis Update. April 22, 2022.
- 2022d Personal communication with M. B. Moss, Cultural Anthropologist, Glacier Bay National Park and Preserve, during subject matter expert call, April 14, 2022.
- 2022e Glacier Bay National Park and Preserve 2016–2022 Backcountry Permit Data. Gustavus, AK: National Park Service, Glacier Bay National Park and Preserve. <https://irma.nps.gov/Stats/Reports/Park/GLBA>
- Needham, M. D., and B. W. Szuster
- 2011 “Encounter norms, social carrying capacity indicators, and standards of quality at a marine protected area.” *Ocean & Coastal Management* 54(8): 633–641.
- Neilson, J. L., C. M. Gabriele, A. S. Jensen, K. Jackson, and J. M. Straley
- 2012 “Summary of reported whale-vessel collisions in Alaskan waters.” *Journal of Marine Biology* 2012: 1–37.
- Neilson, J. L., C. Gabriele, and P. B. S. Vanselow
- 2013 *Results of humpback whale monitoring in Glacier Bay and adjacent waters 2012: Annual progress report.* Natural Resource Technical Report NPS/GLBA/NRTR—2013/796. National Park Service, Fort Collins, CO.

Neilson, J. L., C. M. Gabriele, and A. R. Bendlin

- 2022 *Glacier Bay & Icy Strait Humpback Whale Population Monitoring: 2021 Update*. National Park Service Resource Brief, Gustavus, Alaska. 7 pp.

Olesiuk, P. F., M. A. Bigg, and G. M. Ellis

- 1990 “Life history and population dynamics of resident killer whales (*Orcinus orca*) in the coastal waters of British Columbia and Washington State.” *Report of the International Whaling Commission* (Special Issue 12): 209–242.

Patterson, T.

- 2010 “Mapping Glacier Bay National Park, Alaska.” National Park Service report. <https://cartographicperspectives.org/index.php/journal/article/download/cp67-patterson/pdf/886#:~:text=NAtIONAL%20PArk%20AUDIeNce,-.NINety%2D%20five%20PerceNt%20Of%20vIsItOrs%20tO%20GLAcIer%20BAy%20ArIve%20ON,thAN%20the%20GeNerAL%20POPULAtION>

Pirhalla, M., S. Gende, and N. Mölders

- 2014 “Fate of particulate matter from cruise-ship emissions in Glacier Bay during the 2008 tourist season.” *Journal of Environmental Protection* 5, 1235–1254. <http://dx.doi.org/10.4236/jep.2014.512118>

Rehberg, M., L. Jemison, J. N. Womble, and G. O. Corry-Crowe

- 2018 Winter movements and long-term dispersal of Steller sea lions in the Glacier Bay region of southeast Alaska. *Endangered Species Research* 37: 11–24.

Rone, B. K., A. N. Zerbini, A. B. Douglas, D. W. Weller, and P. J. Clapham

- 2017 “Abundance and distribution of cetaceans in the Gulf of Alaska.” *Mar. Biol.* 164: 23. <http://dx.doi.org/10.1007/s00227-016-3052-2>

Resource Systems Group (RSG)

- 2019 *Glacier Bay National Park & Preserve socioeconomic monitoring pilot implementation: Summer 2015*. Natural Resource Report NPS/GLBA/NRR—2019/1896. National Park Service, Fort Collins, CO.

Sloan, G.

- 2018 “World’s best cruise destinations: 2018 Cruise Critic award winners,” USA Today, August 4, 28. <https://www.usatoday.com/story/travel/cruises/2018/07/24/best-cruise-destinations-2018-cruise-critic-award-winners/820403002/>

Stanley, J. A., C. A. Radford, and A. G. Jeffs

- 2010 “Induction of settlement in crab megalopae by ambient underwater reef sound.” *Behavioral Ecology* 21: 113–120.

Swanson, J. E., and M. E. Vande Kamp

- 2011 *Effects of Cruise Ships on Visitor Experience in Glacier Bay National Park and Preserve*. Volume 1. Technical Report NPS 132/106449 and Report 5. A Survey of Private Vessel Visitors. In *Effects of Cruise Ships on Visitor Experiences in Glacier Bay National Park and Preserve*. Volume II. Technical Report NPS 132/106449.

Sytsma, M. L., T. Lewis, B. Gardner, and L. R. Prugh

- 2022 “Low levels of outdoor recreation alter wildlife behavior.” *People and Nature*.

Tessler, D. F., J. A. Johnson, B. A. Andres, S. Thomas, and R. B. Lanctot

- 2007 Black Oystercatcher (*Haematopus bachmani*) Conservation Action Plan. International Black Oystercatcher Working Group, US Fish and Wildlife Service, Manomet Center for Conservation Sciences, Manomet, MA. 115 pp. http://www.whsrn.org/shorebirds/conservation_plans.html

Tessler, D. F., J. A. Johnson, B. A. Andres, S. Thomas, and R. B. Lanctot

- 2014 “A global assessment of the conservation status of the black oystercatcher (*Haematopus bachmani*).” *International Wader Studies* 20: 83–9.

Tuite, C. H., P. R. Hanson, and M. Owen

- 1984 “Some ecological factors affecting winter wildfowl distribution on inland waters in England and Wales, and the influence of water-based recreation.” *Journal of Applied Ecology* 21:41–62.

US Environmental Protection Agency (USEPA)

- 2018 Criteria air pollutants. <https://www.epa.gov/criteria-air-pollutants>
- 2020 NAAQS designation process. <https://www.epa.gov/criteria-air-pollutants/naaqs-designations-process>
- 2022 EJScreen: Environmental Justice Screening and Mapping Tool. Accessed February 24, 2022. <https://www.epa.gov/ejscreen>

US Fish and Wildlife Services (USFWS)

- 2008 Short-tailed Albatross Recovery Plan. Anchorage, AK, 105 pp.
- 2013 Southwest Alaska distinct population segment of the northern sea otter (*Enhydra lutris kenyoni*) recovery plan. US Fish and Wildlife Service, Marine Mammals Management Office, Anchorage, AK.
- 2014 “Northern sea otter (*Enhydra lutris kenyoni*): Southeast Alaska stock.” US Fish and Wildlife Service, Anchorage, AK.

van Vliet, G.

- 2005 Observation of a large post-breeding aggregation of black oystercatchers (*Haematopus bachmani*) at a traditional site within Glacier Bay National Park, Alaska. Unpublished report, Glacier Bay National Park and Preserve, Gustavus, AK.

Vermeij, M. J., K. L. Marhaver, C. M. Huijbers, I. Nagelerken, and S. D. Simpson

2010 Coral larvae move toward reef sounds. *PLoS ONE* 5(5): 1–5.

Wade, P. R., T. J. Quinn II, J. Barlow, C. S. Baker, A. M. Burdin, J. Calambokidis, P. J. Clapham, E. A. Falcone, J. K. B. Ford, C. M. Gabriele, D. K. Mattila, L. Rojas-Bracho, J. M. Straley, and B. Taylor

2016 Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas. Paper SC/66b/IA/21 Submitted to the Scientific Committee of the International Whaling Commission, June 2016, Bled, Slovenia. <https://archive.iwc.int/?r=6042&k=52b35dc844>.

Waterman, J.

2021 *More than a quarter of this national park is covered by glaciers*. National Geographic. <https://www.nationalgeographic.com/travel/article/more-than-a-quarter-of-this-national-park-is-covered-in-glaciers>

Webb, K. R., and S. M. Gende

2015 “Activity patterns and speeds of large cruise ships in Southeast Alaska.” *Coastal Management* 43(1): 67–83.

Welty, J. C.

1975 *The Life of Birds*. Second edition. Philadelphia, PA: W. B. Saunders Company.

Wik, D. O., and G. Streveler

1967 Birds of Glacier Bay National Monument. National Park Service.

Williams, P. J., M. B. Hooten, G. G. Esslinger, J. N. Womble, L. Bodkin, and M. R. Bower

2019 The rise of an apex predator following deglaciation. *Diversity and Distributions* 25(6): 895–908.

Williams, S. H., S. M. Gende, P. M. Lukacs, and K. Webb

2016 “Factors affecting whale detection from large ships in Alaska with implications for whale avoidance.” *Endangered Species Research* 30, 209–223.

Wolfe, R. J., J. A. Fall, and M. Riedel

2009 *The subsistence harvest of harbor seals and sea lions by Alaska Natives in 2008*. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 347, Juneau, AK.

Womble, J. N., M. F. Wouldson, and J. N. Sigler

2009 “Linking seasonal distribution patterns with prey availability in a central-place forager, the Steller sea lion.” *Journal of Biogeography* 36: 439–451.

- Womble, J. N., G. W. Pendleton, E. A. Mathews, G. M. Blundell, N. M. Bool, and S. M. Gende
2010 “Harbor seal (*Phoca vitulina richardii*) decline continues in the rapidly changing landscape of Glacier Bay National Park, Alaska 1992–2008.” *Marine Mammal Science* 26(3): 686–697.
- Womble, J. N., and S. M. Gende
2013 “Post-breeding season migrations of a top predator, the harbor seal (*Phoca vitulina richardii*), from a marine protected area in Alaska.” *PLoS ONE* 8(2):e55386.
- Womble, J. N., J. M. Ver Hoef, S. M. Gende, and E. A. Mathews
2020a “Calibrating and adjusting counts of harbor seals in a tidewater glacier fjord to estimate abundance and trends 1992 to 2017.” *Ecosphere* 11(4): e03111. 10.1002/ecs2.3111.
- Womble J. N., P. J. Williams, X. Lu X, L. F. Taylor, and G. G. Esslinger
2020b *Spatio-temporal abundance of sea otters in Glacier Bay National Park from 1993 to 2018*. Natural Resource Data Series. NPSS/SEAN/NRDS—2020/1283. National Park Service. Fort Collins, CO.
- Womble, J. N., P. J. Williams, R. W. McNabb, A. Prakash, R. Gens, B. S. Sedinger, and C. R. Acevedo
2021 Harbor Seals as Sentinels of Ice Dynamics in Tidewater Glacier Fjords. *Frontiers in Marine Science*, p.410. <https://doi.org/10.3389/fmars.2021.634541>
- Young, C., S. M. Gende, and J. T. Harvey
2014 “Effects of vessels on harbor seals in Glacier Bay National Park.” *Tourism in Marine Environments* 10(1-2): 5–20.

APPENDIX B - IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

NOTE: Appendix can be accessed in the Environmental Assessment dated November 30, 2022.

APPENDIX C - ALTERNATIVES CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

NOTE: Appendix can be accessed in the Environmental Assessment dated November 30, 2022.

APPENDIX D - MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

The following mitigation measures and best management practices support the day-to-day and operational implementation of the plan and its finalized NEPA decisions to ensure protection of the park's fundamental resources and values. The NPS has the authority to implement the mitigation measures presented in this appendix under the Organic Act, The National Historic Preservation Act, NPS *Management Policies 2006*, park-specific regulations at 36 CFR Part 13 Subpart N, and other federal and state applicable requirements.

GENERAL RESOURCE PROTECTION PRACTICES

One of the greatest risks to park waters, wildlife, Tlingit Homeland, and visitor enjoyment are the risks associated with grounding and sinking of vessels and/or discharge of fuels, hazardous materials, and other wastes that are spilled into park waters. For this reason, the park would focus on prevention, education and navigational resources for vessel captains and crew, monitoring and enforcement, the immediate reporting of incidents to park personnel, and coordinated response preparedness. Specific ongoing measures include:

- Continue to reduce the need to ship diesel fuel into Glacier Bay to power the park diesel-powered generator system in Bartlett Cove by optimizing the overall grid use of Falls Creek hydropower and increasing the energy efficiency of park facilities and fleet (including marine vessels). Also encourage technological solutions and operating practices that better protect the marine environment (e.g., carrying less harmful fuels, adopting petroleum-free alternative energy sources).
- Continue to collaborate on ensuring the accessibility of current data on biological, physical, geological, and sensitive cultural sites along coastlines to support prioritization of response in the event of a spill, recognizing that the park's dynamic shorelines are important natural transition zones between marine and land ecosystems. Build on past baseline data collection efforts (e.g., Coast Walker, ShoreZone Program) and leverage opportunities to partner on future programs of data collection, storage, and accessibility.
- Continue the operation of the park's Field Incident Response Team and maintain response plans and the necessary equipment to quickly respond to vessel spills in the park. Enhance response capacity with ongoing training, cooperative exercises, and equipment upgrades. Apply the Science of Oil Spills and other tools to analyze spills and make risk-based decisions and minimize or reduce environmental damage from both incidents and response activities. Develop park-specific strategies to support response safety (for those aboard distress vessels and for responders) and to practically respond to unfolding situations in a dynamic marine environment (improve vessel stability or expedite salvage).
- Continue to study geohazards and work to minimize the chance of a tsunami-induced vessel incident (e.g., early warning systems, hazard maps, NPS mooring site selection for floating raft/seasonally moored vessel or fuel barge). Develop coordinated response strategies with partners for mass rescue or stranding incidents.

- Maintain communication systems that enable the sharing of pertinent information quickly and efficiently during incidents and support Incident Command hazard-response training and joint exercises in coordination with local, tribal, state, federal, and commercial partners.
- Monitor vessel use patterns in park waters using AIS and other tools that can identify potential future management concerns.
- Actively enforce maritime law and federal regulations that protect public safety and living marine resources (e.g., US Coast Guard vessel and operator certifications, US Environmental Protection Agency environmental standards, NOAA enforcement of Marine Mammal Viewing Guidelines and Regulations).
- Proactively collect and dispose of abandoned property, including litter, fishing gear, or otherwise (36 CFR § 13.45).
- Prosecute the abandoning of boats, cargo, property, or illegal dumping in park waters to the fullest extent allowed under the law or contracts and seek maximum fines and penalties for damages to remediate impacts to park resources. Develop a salvage coordination response plan to effectively work with key parties to reduce impacts to resources and visitors. If a vessel is damaged and must be salvaged, enforce prompt removal through the park permitting process.

PRIVATE VESSELS

- Continue to require that private vessel operators receive, through the Glacier Bay Visitor Information Station, an orientation to the marine environment, local operating conditions, and regulations when getting a permit to enter Glacier Bay.
- Provide education to ensure the proper use, care, and disposal of hazardous materials brought into the park, such as chemicals, preservatives, batteries, and refrigerants, and to support boaters' responsible handling of wastes.

ADMINISTRATIVE VESSELS AND PARK MARINE OPERATIONS

- Upgrade the marine fleet for energy efficiency and to pilot emerging technology (e.g., away from combustion engines and toward electric engines). Optimizes the use of local renewable energy (Falls Creek Hydropower) by taking advantage of off-peak night-time low-energy use.
- Carefully plan and implement NPS administrative motorized vessel use for optimal efficiency and sensitivity to minimize impacts to park resources and values including fuel consumption, air and water pollution, above- and below-water noise pollution, and visual impact. The park would explore emerging technology for vessels that would meet this overall objective and seek to coordinate park missions with vessel sustainability and fuel use in mind.
- Reduce fuel handling via fuel barge or jugs as a normal part of marine field operations and standardize park vessels to incorporate catchments for inadvertently spilled fuels.
- Reduce refueling at sea by increasing vessel fuel capacity to meet the mission whenever possible and by reducing the dependence on and evaluating alternatives to the mid-bay fuel barge.
- Add the capability for vessels to use portable fuel tanks when additional capacity is required, rather than dispensing fuel from jerry cans or the fuel barge whenever possible.

VESSELS CONTRACTED TO PROVIDE COMMERCIAL SERVICES (AND AS APPLICABLE, PRIVATE VESSELS LONGER THAN 79 FEET)

- Compete commercial services contracts to higher standards of sustainability and operational efficiency and ensure that contract standards are enforced through a standardized compliance system.
- Provide a customized orientation to commercial vessel operators on the conditions, hazards, and resource concerns in park waters.
- Through the commercial services contracts, encourage carriage of lighter higher quality distillate fuels such as marine gas oil over bunkering of heavy fuel oil, and the proactive application of technological solutions and operating practices that protect the marine environment.
- Require a local industry-point of contact by which all issues and conditions related to discharge (incidental, small- and large-scale) in Glacier Bay are immediately reported.
- Ensure, through annual monitoring of concession contracts, that oil spill response plans for commercial vessels are reviewed annually, are appropriate, and represent the best available technology and preparedness for mitigating a spill or potential grounding should one occur.
- Conduct scenario and response exercises annually with the industry and partners specific to mid to large sized commercial vessels running aground with possible discharge of oil or other hazardous materials.
- Continue a Glacier Bay Cruise Ship Environmental Monitoring and Compliance program, whereby independent marine engineers or vessel inspectors are contracted to randomly board large cruise ships to inspect operations, risk management procedures, permits, and compliance to contract-specific operating requirements.
- Inform tour and charter vessel operators that are more likely to take near-shore routes (as opposed to typical mid-channel routes taken by large cruise ships) of newly identified navigational hazards, particularly in response to rapidly changing conditions in and near the tidewater glacial areas.

CULTURAL RESOURCES

The NPS would conduct National Historic Preservation Act Section 106 reviews prior to implementation of some programmatic actions, where appropriate. This may include a site-specific inventory, buffers to mitigate impacts to archeological materials, and existing development area surveys prior to upgrades where sites have not previously been surveyed.

Unless specifically authorized, disturbance of historic or cultural features would not occur; artifacts would not be collected; management actions and activities (e.g., terrestrial or seafloor installations) would avoid and buffer cultural sites; and if archeological or historic resources are discovered, work would stop at the discovery site, the discovery would be protected as required and the park Superintendent or park Archeologist would be notified as soon as possible. Following inadvertent discoveries that halt work, resources would be identified and documented and if they cannot be preserved in situ, an appropriate mitigation strategy would be developed. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 United States Code 3001) of 1990

would be followed. If non-Indian human remains were discovered, standard reporting procedures to notify appropriate authorities would be followed, as would all applicable federal, state, and local laws.

All projects with the potential for ground disturbance or any adverse effects would undergo site-specific planning and compliance procedures. Adverse impacts to archeological or ethnographic resources would be avoided to the extent possible in accordance with the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation*.

To appropriately preserve and protect national register-listed or eligible historic cultural landscape features, traditional cultural properties, and ethnographic resources, areas of potential effect would be identified and fully recorded prior to implementation of proposed projects.

Park staff would continue to develop inventories for and oversee research regarding archeological, historic, and ethnographic resources to better understand and manage the resources, including the development of maritime cultural landscapes. Park staff would conduct any needed archeological or other resource-specific surveys and National Register of Historic Places evaluations and identify recommended treatments. The results of these efforts would be incorporated into comprehensive planning and resource assessments, as well as site-specific planning, mitigation, and environmental analysis.

Known archeological sites would be routinely monitored to assess and document the effects of natural processes, human activities, and visual impacts associated with proposed projects on the resources. Archeological resources would be left undisturbed and preserved in a stable condition to prevent degradation and loss of research values unless intervention could be justified based on compelling research, interpretation, site protection, or park development needs. Recovered archeological materials and associated records would be treated in accordance with *NPS Management Policies 2006*, *NPS Museum Handbook*, and 36 CFR § 79.

Prior to site selection for oceanographic research moorings, a review of shipwrecks in Alaskan waters would be undertaken to ensure that no known shipwrecks are located within or near the proposed deployment. The review would be based on internet web searches and entries archived at appropriate online sites. Removable non-permanent moorings would be prioritized when possible as they do not represent potential future artifact assemblages, nor do they add extraneous cultural material and waste to a pristine marine environment. If a non-retrievable mooring is utilized, the mooring anchor would be engraved with the year it was deposited and all associated federal permit numbers so that if recovered the project, purpose, and date can be readily determined. It is recommended the location information of each mooring be recorded in project reports with the greatest accuracy possible.

As appropriate, archeological, and ethnographic inventories and monitoring would precede any ground disturbance, installation, or proposed project in a potential Traditional Cultural Property. Significant archeological resources would be avoided to the greatest extent possible during installation. If such resources could not be avoided, an appropriate mitigation strategy (e.g., the excavation, recordation, and mapping of cultural remains prior to disturbance to ensure that important archeological data is recovered and documented) would be developed in consultation with the Alaska State Historic Preservation Office, associated Alaska Native tribal representatives, and other concerned parties as necessary.

To minimize visual and auditory intrusions on cultural resources from modern development, the NPS would use screening or sensitive designs that would be compatible with historic resources and cultural landscapes and not intrude on ethnographic resources. If adverse impacts could not be avoided, impacts would be mitigated through a consultation process with all interested parties. In the case that mitigations

do not sufficiently address adverse impacts, the park would reconsider the scope of the proposed undertaking.

The NPS would consult with associated Alaska Native tribal representatives to develop and accomplish park programs in a way that respects the beliefs, traditions, and other cultural values of the tribes who have ancestral ties to park lands. The NPS recognizes the past and present connections of associated tribes with park lands and that potential resources, places, and traces of tribal use are important parts of the cultural environment to be preserved, protected, and interpreted as appropriate.

The park would cooperate with partners, park neighbors, and other stakeholders to establish and enforce measures to prevent and reduce human impacts, such as vandalism and looting, on cultural resources.

FISH AND MARINE INVERTEBRATES

Specific to recreational and allowed commercial harvesting of fish and marine invertebrates, the park would monitor for both immediate and long-term impacts to fish populations, marine invertebrates, and their associated habitats. This includes collecting data to estimate abundance, spatial distributions, and biometrics in park waters to inform park management decisions and ongoing efforts to preserve pristine water quality and the health of food webs. Knowledge of natural distributions, densities, age class distributions, and the behavior of harvested and non-harvested species that may be impacted from harvesting will be applied to prevent unacceptable impacts to park resources or natural processes.

The park would consult and collaborate with state and federal fisheries management agencies to help conserve harvested species, including continuing to pursue an Alaska Department of Fish and Game and NPS cooperatively developed fisheries management plan for commercial fisheries in park waters outside of Glacier Bay as directed by Congress. The NPS would explore new research opportunities and continue collaborations with partners, park neighbors, and other stakeholders. This may include projects focused on data consolidation, fisheries, species and habitat monitoring, and science specific to microplastics, harmful algal blooms, ocean acidification, or other ocean health indicators.

Federal Subsistence fisheries are not allowed in Glacier Bay. Fishing in Glacier Bay by park visitors is a recreational activity. Recognizing this, the park will prioritize the experiential nature of this activity over harvest goals.

For visitors participating in recreational angling and harvest of invertebrates, the park would apply the following mitigations:

- Provide details on the best available conservation fishing practices to visitors and charter fishing concessionaires to share with visitors including a focus on catch and release fishing.
- Collaborate with the Alaska Department of Fish and Game to clearly communicate to the public the allowed recreational gear types, seasons, closures, and licensing requirements for recreational fishing in the park (including the absence of federal subsistence fisheries as the park is closed to ANILCA Title VIII subsistence uses) .
- Communicate State of Alaska fish consumption guidelines associated with toxins such as mercury.
- Help interpret for park visitors the abundance of fish and marine invertebrate populations in and near Glacier Bay in the context conservation decisions that had impacts to human livelihoods

(such as described in *Navigating Troubled Waters: A History of Commercial Fishing in Glacier Bay, Alaska* [NPS 2010b]).

- Communicate risks from biological toxins to visitors and continue to investigate harmful algal blooms that may increase risk to visitors that fish and collect marine invertebrates.
- Develop science briefings to instill visitor respect for and knowledge of the aquatic environment, the food web, and long-lived species in the park (halibut, scallops, rockfish) that are more prone to harvest or other environmental pressures.
- Educate visitors on proper disposal of fish waste, and work with regional partners to minimize attraction of wildlife associated with fish processing discharge activities.

MARINE MAMMALS AND SEABIRDS

The NPS would monitor humpback whales, sea otters, harbor seals, Steller sea lions, and seabirds to estimate abundance, trends, and spatial distribution and to provide current data to inform park management decisions in Glacier Bay. The park would increase efforts to better understand marine mammals and seabirds within the Icy Strait/Cross Sound and Outer Coast Zones by exploring new research opportunities and continuing collaborations with external partners. This may include projects focused on data consolidation, the creation of species lists for the outer coast, etc.

The park has specific vessel operating regulations to protect humpback whales, Steller sea lions hauled out on land or rock, harbor seals hauled out on ice and in the water, and nesting seabird colonies. In addition, temporary and spatial protection measures (36 CFR § 13.50) may be implemented to protect marine mammals and seabirds and their habitats anywhere in the park. For example, the park may designate temporary whale waters (areas with vessel speed limits and/or course restrictions) to reduce the disruption of feeding humpback whales and to lower the risk of whale/vessel collisions. If a marine mammal or seabird becomes a candidate or listed species under the ESA, additional monitoring and spatial/temporal management restrictions may be implemented to reduce mortality and overall disturbance.

The NPS would continue to require the operator(s) of all motorized vessels entering Glacier Bay to complete an annual boater orientation and all visitors utilizing nonmotorized vessels and staying overnight in Glacier Bay to complete an annual backcountry camping orientation through the Glacier Bay Visitor Information Station. During these orientation processes, both visitor groups get an overview of the park's regulations within CFR and the annual Park Compendium as well updates on seasonal or area closures. In addition to sharing information on park regulations, park staff would continue to educate vessel operators on the NOAA Alaska Marine Mammal Viewing Guidelines and Regulations (NOAA Fisheries 2022b) and best practices for minimizing disturbance to nesting seabirds as well as molting seabirds.

The NPS would work on ways to effectively communicate with commercial operators (e.g., annual meetings with tour vessel companies) to provide updated resource information and summaries of marine regulations so that they may understand park regulations and share in goals of marine stewardship.

Vertical buoy lines associated with vessel anchors, moorings, and some types of fishing gear pose an entanglement risk to marine mammals, especially the baleen whale species known to frequent the project area (i.e., humpback whales, minke whales). Therefore, to reduce the risk of a whale becoming entangled in the park, the following mitigations would be implemented:

- Prior to deploying NPS moorings in park waters, the park whale biologists must be consulted for the best available information (including Whale Alert) regarding current humpback whale "hot spots" to avoid deployment in high whale-use areas.
- If any of the NPS moorings in Glacier Bay go missing, the park whale biologists would initiate a search of the area for a potentially entangled whale.
- If marine mammal entanglement in a NPS mooring is observed, park staff would implement strategies to reduce risk of entanglement, such as changing the location of moorings or experimenting with devices to alert whales to the presence of an obstacle.
- Vertical length of NPS moorings would be minimized when possible, and the integration of ropeless technologies would be explored when feasible. The park would use weak-link or other technologies when possible to maximize the possibility of self-release in the case of marine mammal entanglement. Depending upon the mooring type and location, additional mitigations may be required.
- During project design, the composition and configuration of NPS moorings would be done in consultation with NPS marine mammal subject matter experts. Post-installation, an accurate schematic design of each NPS mooring would be provided to the park's Compliance Team for documentation and to aid in entanglement response.

TERRESTRIAL WILDLIFE, BIRDS, AND VEGETATION

The NPS would continue to educate visitors about where they may encounter nesting birds, nest identification, nesting bird behavior, and appropriate responses (such as moving elsewhere) to minimize disturbance to nesting birds. Spatial or temporal closures would continue to be implemented in places where foot traffic or other human presence is detrimental or disturbing to nesting birds or hauled out marine mammals, or if bear kills or other factors create a human safety risk (36 CFR § 13.50). If changes in nesting success and survivorship because of disturbance were observed, park staff would implement strategies to reduce human impacts on bird populations or marine mammals on land, such as increasing informational signage at the VIS and information online or implementing spatial or temporal closures.

The NPS would continue to educate visitors on best wildlife viewing practices from vessels to minimize terrestrial wildlife disturbance. If concentration of wildlife activity occurs (e.g., high bear activity near a salmon stream or whale carcass), spatial or temporal closures may be implemented to limit approach distances of vessels to the shoreline or prevent foot traffic from off-vessel shoreline activities to minimize disturbance of terrestrial wildlife at critical feeding locations.

The NPS would conduct surveys prior to vegetation disturbance (e.g., for installation of communication infrastructure) to ensure species of concern are not present. With respect to nesting birds, vegetation disturbance or removal would be conducted outside nesting periods (April 15 to July 15 or longer depending on species) to the extent practicable if the project site harbors protected species that could be adversely impacted by construction.

Mitigations for both fixed-wing and helicopter flights to minimize effects to wildlife are captured in the "Wilderness Character" section below.

The park would co-locate new AIS infrastructure with existing installations (i.e., very high frequency [VHF] radio repeaters, climate monitoring stations), thus reducing the overall footprint of installations and potential impacts to vegetation and terrestrial wildlife.

SEAFLOOR

Anchor design for oceanographic moorings and floating cabin/seasonally moored vessels would be chosen based on substrate type, proposed location, and depth. The NPS would incorporate design features for mooring facilities that eliminate bottom chain scouring and minimize the contact footprint with the seabed and reduce impacts to wildlife living along the seafloor. Moorings would be installed on flat substrates, not on a slope, to minimize impacts to the seafloor, sensitive coral, and other marine species. All tethered and removable equipment would be actively managed to minimize litter, debris, and possible entanglement. The park would explore the use of long-term anchoring systems for floating rafts and oceanographic moorings to minimize the need to reset anchors seasonally.

The park would explore the use of alternative methods that minimize seafloor disturbance and habitat damage that can be caused by dragging gear, dropping large anchors, or grappling along the seafloor (e.g., anchors, fishing nets/gear, retrieval of lost items). Alternative methods may include surveying the seafloor using a remotely operated underwater vehicle, video, or SCUBA diving.

The NPS will minimize the impacts of all activities to the seafloor cognizant that this is a park resource of critical nature to many species.

ACOUSTIC ENVIRONMENT

All NPS administrative motorized vessel use would be carefully planned and implemented for optimal efficiency and sensitivity to minimize impacts to the natural soundscape from motorized vessels. The park would explore emerging technology for types of administrative use vessels and engines that would have lower impacts to the natural soundscape and other factors.

National parks are considered by the Federal Aviation Administration as “Noise-Sensitive Areas.” Under the Federal Aviation Administration’s Circular 91-36D Visual Flight Rules, pilots are encouraged to fly at altitudes higher than the minimum permitted by regulation and on flight paths which would reduce aircraft noise in these noise-sensitive areas. In developing an operations plan for helicopter use associated with park operations, the NPS would recommend a preferred route over water with ocean approaches for each site, if safe and possible. Airborne noise from vessels is further regulated per 36 CFR § 3.15.

The NPS would implement standard noise abatement measures during construction, maintenance, and administrative activities. Standard noise abatement measures may include the following elements: a schedule that minimizes impacts on adjacent noise-sensitive users; the use of best available noise control techniques wherever feasible; the use of quieter impact tools when feasible; the use of hand tools rather than gas or electric powered tools when feasible; the placement of stationary noise sources as far from sensitive uses as possible; and the use of noise-muffling, shielding, or fencing.

The NPS would retain quiet hours restrictions currently in place at popular anchorages and educate motorized vessel operators on best practices for use of generators when anchored to minimize effects to the acoustic environment. For commercial vessels, use of generators may be managed through their contract operating conditions, and the park can leverage the competitive contract process to ask applicants to demonstrate specific ways they can help reduce vessel impacts to the acoustic environment that could in turn reduce impacts to park visitors and wildlife.

The NPS would advise visitors and park staff about the impact of loud vehicles, motors, and other unnecessary noise disturbances (e.g., radios) within the park.

The NPS would continue to monitor and evaluate airborne sound levels from human activities according to indicators identified in the plan. Calibrated noise signatures from commercial, administrative, and private vessels may also be collected for simulations that estimate the prevalence of manmade noise in parts of the park where acoustic monitoring stations are not present.

The NPS would continue to monitor and evaluate underwater sound levels from motorized vessels according to indicators identified in the plan. Calibrated underwater noise signatures from commercial, administrative, and private vessels may also be collected for simulations that estimate the prevalence of underwater sounds in parts of the park where hydrophone moorings are not present. The NPS may pursue collaborations to estimate and address the effects of underwater noise on marine mammal communication and biology.

INVASIVE SPECIES

Marine Invasive Species

Several marine invasive species are present or expanding their range toward coastal Alaska, including European green crabs, Atlantic salmon, and solitary and colonial tunicates.

- The NPS would educate visitors, commercial operators, and operators of administrative vessels on best practices to minimize the risk of introducing marine invasive species to the park including: keeping hulls clear, particularly before arriving in park waters; reporting observations of suspected marine invasive species promptly to the park and Alaska Department of Fish and Game; preventing the discharge of bilge and ballast water into park waters unless it has been treated to kill organisms and remove toxins.
- Educate mariners on specific resource concerns and existing regulations that make the discharge of bilge and ballast water into park waters illegal unless it has been treated to kill organisms and remove toxins. Enforce illegal discharges.
- Monitor for invasive marine species when and where appropriate (e.g., Bartlett Cove) for early detection, control, and mitigation of impacts on resources.
- The NPS will stay informed of observations of invasive species in the region so that action can be taken to monitor for the potential arrival of an invasive species and mitigate impacts, as necessary.

Terrestrial Invasive Species

During all installation activities, best practices for invasive plants management would be employed, including:

- Minimize new soil disturbance and select previously disturbed areas for associated construction staging and stockpiling.
- Fence or clearly mark and enforce disturbance zones during construction to prevent disturbances to vegetation outside construction limits.
- Clean clothing and equipment carefully whenever moving between locations in the park to prevent the introduction/spread of the seeds/propagules of non-native invasive organisms—both terrestrial and aquatic.

- Ensure project personnel make daily checks of clothing, footwear, and equipment to ensure no exotic plant seeds and no off-site soil is transported to the work site.
- Pressure-wash equipment offsite thoroughly to ensure all equipment and machinery are clean and weed-free before being brought into the park and secondarily the project area.
- Obtain all fill, rock, topsoil, or other earth materials from certified weed-free sites.

VISITOR USE AND EXPERIENCE

All NPS administrative motorized vessel use would be carefully planned and implemented for optimal efficiency and sensitivity to minimize impacts on visitor experience, including the sights and sounds of motorized vessels. This includes, but is not limited to, scheduling operations requiring more intensive motorized activity to low-visitor seasons and coordinating across divisions to look for opportunities to share trips to minimize the overall amount of vessel traffic.

Implement timely and accurate communication with visitors regarding significant permitted activities that may be apparent to visitors and cause potential impacts to visitor experience via new releases, visitor contacts, web and social media, and the NPS mobile application.

The NPS will strive to ensure that the public has adequate information to make safe decisions related to vessel operations in the park. Boater orientations are critical to a safe and enjoyable visit, as are resources that enhance operator situational awareness (weather reports, chart updates, etc.), and help visitors understand park purposes and resource protection requirements (closures).

To the extent possible, the NPS will provide in-person vessel orientation opportunities to enhance communication and encourage stewardship by operators.

The park strives for efficient customer service and transparent permitting and will continue to monitor the success of visitor serving operations, including the private vessel permitting system.

Search and rescue operations in the park can be complex and often require substantial time to mobilize due to scarcity of NPS search and rescue resources and the remoteness of many backcountry areas of the park. The NPS will continue to partner with other agencies, including with the US Coast Guard, for marine search and rescue operations in the park, while enhancing park and regional capacity to respond.

WILDERNESS CHARACTER

The mitigations below primarily address programmatic actions in designated wilderness included in this plan that are associated with managing the marine environments of the park. Proposed activities connected with managing the marine environment (VHF radio and AIS communication upgrades) may occur in designated Wilderness terrestrial areas at existing sites. All NPS activities in designated Wilderness are analyzed for impact to wilderness character. All activities involving structures and other 4(c) Wilderness Act prohibitions are analyzed using a Minimum Requirements Analysis.

Activities would be limited to the minimum necessary to meet the objectives of the action. Specific restrictions may affect the approval of transportation means, field work timing and frequency, group size, base camp locations, installations or structures, and the use of motorized equipment.

Helicopter flights would be limited to trips that address essential park objectives, with maximum efficiency per visit (coordinated with other co-located installation and maintenance activities), so the park could continue to minimize impacts to wilderness character. Helicopter use and landings would require

advance approval from the Superintendent and appropriate compliance review. If deemed the minimum tool necessary to accomplish the actions, helicopter flights would be kept to the minimum number required to accomplish field activities. The project lead would be required to give advance notice to the park dispatch center and provide expected dates, times, and locations of helicopter activities. All helicopter activity would be logged (date, time, coordinates of landing site(s)) with data sent to the wilderness coordinator within 30 days of activity.

The park would develop an operational plan for helicopter use in advance of trips to minimize impacts based on local knowledge of visitor and wildlife activities. This would allow joint planning of flight paths/routes in advance that minimize the impacts on wilderness character. Mitigations include but are not limited to:

- Minimizing flight duration using the most efficient and direct route.
- Setting minimum altitude to 1,000 feet above and away from terrain, while also avoiding coastline travel where helicopters would be seen and heard by the concentration of park visitors and wilderness users on park beaches and within narrow fjords where sounds would be pronounced.
- Minimizing the amount of time on the ground.
- Employing environmental best practices (fuel handling, waste, minimize installations and footprints).

Effort would be made to minimize disturbance of wildlife (e.g., mountain goats, Steller sea lions, harbor seals) by:

- Choosing travel routes that minimize helicopter and fixed wing transit over known wildlife hotspots (e.g., open alpine goat habitat, rookeries, and major haul-outs).
- Designating one person in flight to notify pilot of wildlife observations.
- Maintaining a minimum of 1,500 meters (1.5 kilometers/0.93 miles) vertical and horizontal distance from mountain goat habitat. Pilots would not hover over, circle, harass, or pursue wildlife in any way.
- Maintaining a minimum of 915 meters (0.9 kilometers/0.57 miles) vertical and horizontal distance between aircraft and major rookery and haul-out terrestrial zones for Steller sea lions (NOAA Fisheries 1993).
- Avoiding known bald eagle nests and maintaining a minimum 400 meters (0.4 kilometers/0.25-miles) clearance from all active known eagle nests. All nests are considered active March 1–May 31, and occupied nests are considered active through August 31.
- Reporting any observed wildlife disturbances to the NPS.

The Wilderness Act prohibits permanent or temporary structures and installations of any kind to retain the primeval character of designated wilderness areas. All equipment left in the field must be specifically authorized in advance. Mitigations related to installations include but are not limited to:

- Camouflage installations as appropriate to minimize effects to the viewscape.
- Minimize the number and duration of field activities.

- Minimize ground disturbance to the smallest practicable footprint.
- Document authorized installations consistent with protocol developed by the Alaska Regional Office for installations in wilderness. Report global positioning system (GPS) coordinates and dates of all installations to the wilderness coordinator to be included in the park’s database.
- Remove installations once no longer needed.
- Use nonmotorized tools to the extent practicable; however, motorized tools may be used if considered the minimum tool required to accomplish mission objectives.

Installations would be labeled with an engraving (preferred), paint pen, or removable label. Installations should be as unobtrusive as possible and should not interfere with visitor enjoyment of the park.

Implement mitigation measures and best management practices identified under “Acoustic Environment” to reduce adverse impacts to wilderness character from anthropogenic noise sources.

Floating cabins/seasonally moored vessels would be designed to blend in with the natural surroundings (e.g., size would not exceed what is necessary for intended mission, neutral colors) to minimize the sight and sound of rafts/seasonally moored vessels and associated use from outside wilderness.

TLINGIT HOMELAND VALUES

The NPS would work with tribes to develop educational materials including social media posts, websites, printed materials, videos, and on-site orientations directed at educating vessel operators and passengers about Tlingit Homeland and appropriate and respectful behavior in Homeland.

The NPS would continue to partner with tribal entities to provide, when possible, shipboard cultural programming on cruise ships and tour boats focused on educating visitors about Tlingit Homeland values.

APPENDIX E - IMPACT METHODOLOGIES

NOTE: Appendix can be accessed in the Environmental Assessment dated November 30, 2022.

APPENDIX F - ALASKA NATIONAL INTEREST LANDS CONSERVATION ACT SECTION 810 ANALYSIS

SUMMARY EVALUATION AND FINDINGS

Introduction

This section was prepared to comply with Title VIII, Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980. It summarizes an evaluation of the potential restrictions to subsistence activities that could result from implementation of the Marine Management Plan in Glacier Bay National Park. The EA describes the range of alternatives considered and the FONSI describes the selected action.

The Evaluation Process

Section 810(a) of ANILCA states:

“In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands . . . the head of the Federal agency . . . over such lands . . . shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency:

1. Gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to Section 805;
2. Gives notice of, and holds, a hearing in the vicinity of the area involved; and
3. Determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity would involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps would be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.”

Presidential proclamations in 1925 and 1939 established and expanded Glacier Bay National Monument. In 1980, Title II of ANILCA created new units and additions to existing units of the National Park System in Alaska. ANILCA Section 203 provides for the administration of lands, waters, and interests therein withdrawn or reserved for the former Glacier Bay National Monument to be incorporated within and made a part of Glacier Bay National Park subject to valid existing rights.

Federal law and regulations prohibit ANILCA Title VIII subsistence uses on federal public lands in the park only. However, ANILCA (Section 1313) and Title 36 CFR § 13.41 authorize subsistence uses on federal lands in the preserve.

ANILCA Section 816 (a) states:

“All national parks and park monuments in Alaska shall be closed to the taking of wildlife except for subsistence uses to the extent specifically permitted by this Act. Subsistence uses and sport fishing shall be authorized in such areas by the Secretary and carried out in accordance with the requirements of this title and other applicable laws of the United States and the State of Alaska.”

With regards to the preserve, Section 1313 of ANILCA states:

“A National Preserve in Alaska shall be administered and managed as a unit of the National Park System in the same manner as a national park except as otherwise provided in this Act and except that the taking of fish and wildlife for sport purposes and subsistence uses, and trapping shall be allowed in a national preserve under applicable State and Federal law and regulation. Consistent with the provisions of Section 816, within national preserves the Secretary may designate zones where and periods when no hunting, fishing, trapping, or entry may be permitted for reasons of public safety, administration, floral and faunal protection, or public use and enjoyment. Except in emergencies, any regulations prescribing such restrictions relating to hunting, fishing, or trapping shall be put into effect only after consultation with the appropriate State agency having responsibility over hunting, fishing, and trapping activities.”

ANILCA Section 1314 (c) states:

“The taking of fish and wildlife in all conservation system units; and in national conservation areas, national recreation areas, and national forests, shall be carried out in accordance with the provisions of this Act and other applicable State and Federal law. Those areas designated as national parks or national park system monuments in the State shall be closed to the taking of fish and wildlife, except that:

1. notwithstanding any other provision of this Act, the Secretary shall administer those units of the National Park System and those additions to existing units, established by this Act and which permit subsistence uses, to provide an opportunity for the continuance of such uses by local rural residents; and
2. fishing shall be permitted by the Secretary in accordance with the provisions of this Act and other applicable State and Federal law.”

The potential for significant restrictions must be evaluated for the proposed action's effect upon “. . . subsistence uses and needs, the availability of other lands for the purposes sought to be achieved and other alternatives which would reduce or eliminate the use . . .” (ANILCA § 810(a)).

Proposed Action on Federal Lands

The plan proposes a broad marine management framework for the NPS to manage approximately 537,000 acres of park waters and focuses on resource preservation and conditions needed for visitors to access, understand, enjoy, and appreciate the significant and fundamental park resources and values that merited national designation. The EA analyzes actions within the plan that are subject to NEPA compliance. For purposes of the analysis, the marine waters of the plan and EA include those lands, waters, and biological communities below mean high tide within three proposed management subzones: Glacier Bay, Icy Strait/Cross Sound, and the Outer Coast.

Alternatives that meet the purpose and need for taking action are detailed in chapter 2 of the EA. The NPS identified alternative D as the preferred alternative in the EA. Customary and traditional subsistence use on NPS park lands would continue where authorized by federal law under all alternatives.

Under alternative D – selected action, the NPS will seek to implement the following programmatic and site-specific actions (some of which were common to all action alternatives in the EA):

Programmatic actions under the selected action:

- Designate subzones to the 1984 General Management Plan Non-Wilderness Waters Zone.
- Establish new vessel definitions.
- Install floating cabins/seasonally moored vessels, communication upgrades, and monitoring stations.

Site-specific actions under the selected action:

- Update vessel management conditions including quotas and operating requirements, including:
 - Decrease private vessel permit durations from a current maximum of seven days (six nights) to five days (four nights) per permit.
 - Expand the private vessel permit season to begin on May 1 and end on September 30 while retaining the quota season of June 1–August 31.
 - Establish a more transparent process of permit conditions and confirmations.
- Establish indicators, thresholds and corrective management actions to meet desired conditions for the marine environment.

Site-specific actions under the selected action:

- Delineate a lottery system with specific dates and protocols to allocate 25 private vessel permits as either advance-notice or short-notice permits during the quota season.
- Establish specific operating requirements for certain locations and dates:
 - Upper Muir Inlet will be designated as nonmotorized waters from May 1 through July 15. This one-month extension for Upper Muir Inlet will align with the early season private permit season dates and with designated Wilderness water nonmotorized start dates. Wachusett Inlet will be designated as nonmotorized waters from July 16 through September 15 with a 15-day extension to align with designated Wilderness water nonmotorized end dates.
 - Only nonmotorized vessels and motorized vessels in the private, charter, and administrative classes are allowed in the East Arm/Muir Inlet north of 58°50.4' N latitude (a line running west from the Dirt Glacier outwash).
 - Adapt operating requirements for lower-impact vessels.

Affected Environment

Subsistence uses, as defined by ANILCA Section 810, means:

“The customary and traditional use by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.”

Subsistence activities include hunting, fishing, trapping, and collecting berries, edible plants, wood or other materials.

Other important subsistence use areas within the region include Icy Strait, Excursion Inlet, Cross Sound, Port Frederick, and Tongass National Forest. Most of the rural communities of southeastern Alaska rely on renewable natural resources for at least a portion of their subsistence needs. About one-third of the rural communities of the region take at least half of their meat and fish by hunting and fishing (Holleman and Kruse 1992).

Residents of such communities as Gustavus (population of 655), Hoonah (931), Elfin Cove (24), Pelican (98), Excursion Inlet (40), Sitka (8,458), and Yakutat (662) engage in subsistence uses near the boundaries of the park (ADOL 2017). Community subsistence resource activities include hunting, fishing, and gathering gull eggs, shellfish, firewood, wild plants, and berries. Historical resource utilization patterns, such as gull egg gathering, fish camps or communal marine mammal and deer hunts, are linked to traditional social and subsistence use patterns. Sharing of resource occurs between communities, as well as within communities throughout the region.

ANILCA and NPS regulations authorize subsistence use of resources in all Alaska national parks, monuments and preserves, except pre-ANILCA reserved federal conservation units including Glacier Bay National Park. ANILCA provides a preference for local rural residents over other consumptive users should a shortage of subsistence resources occur, and allocation of harvest becomes necessary (ANILCA § 804).

The main subsistence species, by edible weight, are salmon, deer, non-salmon fish, marine invertebrates, bears (black and brown), moose, and seals. Local people use a variety of salmon (chum, coho, pink, and sockeye), while halibut, herring, smelt, cod, greenling, lingcod, char, and Dolly Varden are also used for subsistence purposes (Alaska DFG 2012).

ANILCA and NPS regulations authorize subsistence use of resources in the preserve and prohibit subsistence uses in the park (codified in 36 CFR § 13). Legislation enacted in 2000 (Public Law 106-455) and a legislative environmental impact statement authorize the limited harvest of glaucous-winged gull eggs by the Huna Tlingit in the park under a management plan cooperatively developed by the NPS and the Hoonah Indian Association, the federally recognized tribe of the Huna Tlingit. Glacier Bay is the traditional Homeland of the Huna Tlingit who traditionally harvested eggs prior to park establishment. The practice was curtailed in the 1960s as the Migratory Bird Treaty Act and federal regulations prohibited it. Current US Fish and Wildlife Service regulations allow residents of Hoonah and Yakutat to gather glaucous-winged gull eggs on National Forest lands in Icy Strait and Cross Sound, including Middle Pass Rock near the Inian Islands, Table Rock in Cross Sound, and other traditional locations on Yakobi Island between May 15 and June 30. The land and waters of the park remain closed to all federal subsistence harvesting.

Subsistence Uses and Needs Evaluation

To determine the potential impact on existing subsistence activities, three evaluation criteria were analyzed relative to existing subsistence resources that could be impacted.

The Evaluation Criteria are:

- the potential to reduce important subsistence fish and wildlife populations by (a) reductions in numbers; (b) redistribution of subsistence resources; or (c) habitat losses;
- the affect the action might have on subsistence fishing or hunting access; and

- the potential to increase fishing or hunting competition for subsistence resources.

The Potential to Reduce Populations:

- The implementation of the plan, including the NPS selected action, is not expected to adversely affect or significantly restrict the distribution or migration patterns of subsistence resources on federal public lands within the region. Therefore, no change in the availability of subsistence resources is anticipated as a result of the implementation of the selected action.

Restriction of Access:

- The selected action is not expected to significantly restrict Title VIII traditional subsistence use patterns on federal public lands within the region. No restrictions or changes in subsistence access are proposed in the selected action. The park is closed to ANILCA Title VIII subsistence uses.

Increase in Competition:

- The preferred alternative is not expected to significantly increase competition for subsistence resources on federal public lands within the region. Provisions of ANILCA and NPS regulations mandate that if and when it is necessary to restrict the taking of fish or wildlife, subsistence users will have priority over other user groups (ANILCA § 804).

Availability of Other Lands

Choosing a different alternative instead of the selected action would not decrease the impacts to park resources for subsistence. The selected action is consistent with the mandates of ANILCA, including Title VIII, and the NPS Organic Act.

Alternative Considered

The EA describes and analyzes the alternatives considered in chapter 2. The range of alternatives is consistent with NPS mandates, ANILCA, and the purposes for which the park and preserve were established. No other alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes were identified.

Findings

This analysis concludes that the selected action would not result in a significant restriction of subsistence uses.

APPENDIX G - SELECT LAWS, REGULATIONS, POLICIES, AND GUIDANCE

As an agency, the NPS has a long legacy of protecting Glacier Bay and its resources, unimpaired for the enjoyment, education, and inspiration of this and future generations. Associated with the Marine Management Plan, the NPS reaffirms its enduring commitment to implement the laws, regulations, policies, and guidance that will conserve park waters as a national treasure for future generations. Select laws, regulations, policies, and guidance by topic area include:*

ACOUSTIC ENVIRONMENT

Director's Order #47
Noise Control Act
Alaska National Interest Lands Conservation Act

AIR QUALITY

Clean Air Act
NPS Organic Act
Alaska National Interest Lands Conservation Act

AQUATIC AND MARINE RESOURCES

Anadromous Fish Conservation Act
Clean Water Act
Endangered Species Act
Fish and Wildlife Coordination Act
Magnuson-Stevens Fishery Conservation and Management Act
Marine Mammal Protection Act
Marine Protection, Research, and Sanctuaries Act
North Pacific Halibut Act
Pacific Salmon Treaty
Water Resources Development Act
Omnibus Parks and Public Lands Management Act (1996)
Glacier Bay National Park Resource Management Act (2000)
Public Law 105-277 as amended by Public Law 106-31
Public Law 107-63 (2001)
Alaska National Interest Lands Conservation Act
Alaska v. United States (545 U.S. 75, 125 S. Ct. at 2153)
Non-Conflicting State of Alaska Fishing Regulations
Executive Order 13158 – Marine Protected Areas

CULTURAL, HISTORIC, AND ARCHAEOLOGICAL RESOURCES

Archaeological Resources Protection Act
Director's Order 28
National Historic Preservation Act
NPS Organic Act
Alaska National Interest Lands Conservation Act

ENERGY REQUIREMENTS AND CONSERVATION

Energy Policy Act
Energy Independence and Security Act
Executive Orders 13031, 13123, 13149
Alaska National Interest Lands Conservation Act

NATIVE ALASKAN TRIBAL SOVEREIGNTY, SELF-DETERMINATION, CONSULTATION, AND COORDINATION

1995 NPS Hoonah Indian Association Memorandum of Understanding (MOU)
2002 NPS Yakutat Tlingit Tribe MOU
Executive Orders 13007 and 13175
Indigenous Traditional Ecological Knowledge and Federal Decision-Making Memorandum
DOI Secretarial Orders 3206, 3175, 3342, 3403 (including co-stewardship Policy Memorandum 22-03)
NPS Director's Orders 66 and 71B
Hoonah Indian Association Reserved Rights in Berg Bay
Huna Tlingit Traditional Gull Egg Use Act, 2014 (Public Law 113-142)
Alaska National Interest Lands Conservation Act
DOI Policy on Alaska Native Land Claims Act Corporation
Consultation for actions substantially affecting their land, water areas, resources, and programs

NATIVE SPECIES AND EXOTICS MANAGEMENT

Alaska Region Invasive Plant Management Plan
National Invasive Species Act
Alaska National Interest Lands Conservation Act
Executive Order 13751

PARK OPERATIONS

NPS Organic Act
Alaska National Interest Lands Conservation Act
Park GMP
Pollution Prevention Act
Occupational Safety and Health Act
Resource Conservation and Recovery Act

PARK PURPOSES

Park Foundation Document
Organic Act (1916)
Presidential Proclamations 1733 (1925), 2330 (1939), 3089 (1955)
Alaska v. United States (545 U.S. 75, 125 S. Ct. at 2153)
Alaska National Interest Lands Conservation Act (1980), including Senate Committee Report 96-413, p.137).
Park General Management Plan (1984)
Glacier Bay Fisheries Act (1999)
Glacier Bay National Park Resource Management Act (2000)
Public Law 107-63 (155 Stat 414) (2001)
Federal Register, List of National System Marine Protected Areas (Document Number E9-9335)

PUBLIC HEALTH AND SAFETY

Pollution Prevention Act
Resource Conservation and Recovery Act
Alaska National Interest Lands Conservation Act

SOCIOECONOMIC RESOURCES

Alaska National Interest Lands Conservation Act
NPS Director's Orders 2 and 12

THREATENED AND ENDANGERED SPECIES AND ECOLOGICALLY CRITICAL AREAS

Endangered Species Act
National Environmental Policy Act
NPS Endangered Species Reference Manual 77-8
NPS Organic Act
Alaska National Interest Lands Conservation Act

VISITOR USE AND EXPERIENCE

NPS Organic Act
The National Parks and Recreation Act of 1978 (54 USC§ 100502)
Alaska National Interest Lands Conservation Act
Park Foundation Document
Park GMP
Park Frontcountry Management Plan
Park Backcountry and Wilderness Management Plan (In Preparation)

WATER QUALITY, HYDROLOGY

Clean Water Act
Executive Order 12088
Erosion and Sedimentation Control Act
Alaska National Interest Lands Conservation Act

WETLANDS

Clean Water Act
Executive Orders 12088, 11990
NPS Director's Order 77-2
Alaska National Interest Lands Conservation Act

WILDLIFE AND HABITAT MANAGEMENT

NPS Organic Act
Alaska National Interest Lands Conservation Act
NPS /ADF&G Master MOU (1982)
Migratory Bird Conservation Act and Migratory Bird Treaty Act
Park Bear Management Plan

*This list was prepared in 2023 and is included for planning reference only. The NPS makes no claims, promises or guarantees about its accuracy, adequacy, or completeness. Further, it also assumes the comprehensive application of the NPS Management Policies (2006), the National Environmental Policy Act and park-specific plans and requirements.

APPENDIX H - PLANNING TEAM AND CONSULTATION LIST

Glacier Bay National Park and Preserve would like to express sincere thanks towards all who contributed their time and expertise in the preparation of this plan. Below left are the names of the main contributors inside the National Park Service. Below right are interests and entities outside the agency, contacted to request consultation during the planning process, and/or during the 30-day public and agency review:

NPS PLANNING CONTRIBUTIONS

PARK PLANNING TEAM

Philip Hooge, Superintendent
Tom Schaff, Deputy Superintendent
Wendy Bredow, Chief Ranger
Melanie Berg and Joni Seay, Commercial Services Team
Laura Buchheit and Matthew Cahill, Interpretation Team
Lisa Etherington and Sean Eagan, Chief of Resource Management
Christine Gabriele, Senior Resource Management Scientist
Jacob Ohlson, Chief of Maintenance
Elizabeth Withers, Administrative Officer
Sara Doyle, Outdoor Recreation Planner
Mary Beth Moss, Cultural Anthropologist / Tribal Liaison
Wes Bacon-Schulte, Archeologist
Scott Gende, Senior Scientist
Janet Neilson, Marine Wildlife Biologist
Tania Lewis, Terrestrial Wildlife Biologist
Craig Murdoch, Fisheries Biologist
Jamie Womble, Biologist
Margaret Hazen and Joseph Whelan, Supervisory Park Rangers
Cheryl Cook, Small Craft Operator

NPS EXPERTISE

Kelly Daigle and Gretchen Pinkham, Environmental Quality
Division Project Managers
Rachel Collins and Kelly Horvath, Denver Service Center Visitor
Use Project Specialists
Danielle Lehle and Alexa Miles, Denver Service Center Natural
Resource Specialists
Sarah Conlin, Alaska Region Planning Portfolio Manager
Elizabeth Bella, Alaska Region Environmental Planning and
Compliance Team Lead
Leah Schofield and Joan Kluwe, Alaska Region Environmental
Coordinators
Brenna McGown, Alaska Region Outdoor Recreation Planner
Bella Furr, Park Environmental Protection Specialist

GUIDING POLICY

*The **Marine Management Plan** is part of an NPS planning portfolio with individual plans, studies, and inventories that together guide park decision-making.*

*The **Environmental Assessment** was developed consistent with National Environmental Policy Act (NEPA) of 1969, and Council on Environmental Quality (CEQ) implementing regulations: Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-making (NPS 2011) and its accompanying handbook (NPS 2015a).*

TRIBES AND EXTERNAL CONSULTATION LIST

TRIBAL CONSULTATION

Hoonah Indian Association
Yakutat Tlingit Tribe

ALASKA NATIVE INTERESTS

Alaska Native Voices
Cook Inlet Region Inc. (Gustavus landowner)
Huna Totem Corporation
Sealaska Corporation

GATEWAY COMMUNITY INTERESTS

City of Gustavus
Gustavus Visitors Association
City of Hoonah
Travel Juneau

ADVOCACY INTERESTS

National Parks Conservation Association
Friends of Glacier Bay
Alaska Travel Industry Association
The Wilderness Society

COMMERCIAL PARTNERS

Aramark, Incorporated (Glacier Bay Lodge contract)
Allen Marine Tours (Dayboat sub-contract)
Park contract holders (various)

AGENCIES

Alaska State Historic Preservation Office (SHPO)
US Fish & Wildlife Service
Alaska Department of Fish and Game
Alaska Department of Natural Resources,
ANILCA Program
National Marine Fisheries Service

ELECTED OFFICIALS

Lisa Murkowski, United States Senator
Dan Sullivan, United States Senator
Mary Peltola, United States Representative
Jesse Kiehl, Alaska State Representative
Sara Hannan, Alaska State Representative
Andi Story, Alaska State Representative

Gunalchéesh to Dzéiwsh, James Crippen, McGill University and Yukon Native Language Centre; K'ashGé, Daphne Wright; Kèyishí (Keiyishí), Bessie Cooley; Yeilt'ooch' Tláa, Collyne Bunn; and Xeetli.Éesh, Lyle James for assistance with Tlingit language and orthography.