

**REVIEW OF HARBOR SEAL AND HUMAN INTERACTIONS
IN DRAKE'S ESTERO CALIFORNIA**

MARINE MAMMAL COMMISSION

DRAFT TERMS OF REFERENCE



Drake's Estero, Point Reyes National Seashore, California. (photo by Robert Campbell)

PROBLEM STATEMENT

For several decades, central California has witnessed a debate about the potential effects of certain human activities on Drake's Estero in Point Reyes National Seashore, which is managed by the U.S. National Park Service. In many respects, this debate has focused on two main questions:

- (1) Do oyster farming and other human activities have potentially significant effects on the Drake's Estero harbor seal population and
- (2) Should aquaculture be allowed in a designated wilderness area.

The first of these questions should be addressed through scientific investigation, whereas the second question is a matter of policy beyond the scope of this review.

GENERAL BACKGROUND

Drake's Estero: Drake's Estero is an expansive estuary in Marin County on the Pacific coast of California, about 40 km (25 miles) northwest of San Francisco. The Estero is protected as a part of the Point Reyes National Seashore. (Figure 1 – from the National Academy of Sciences report).

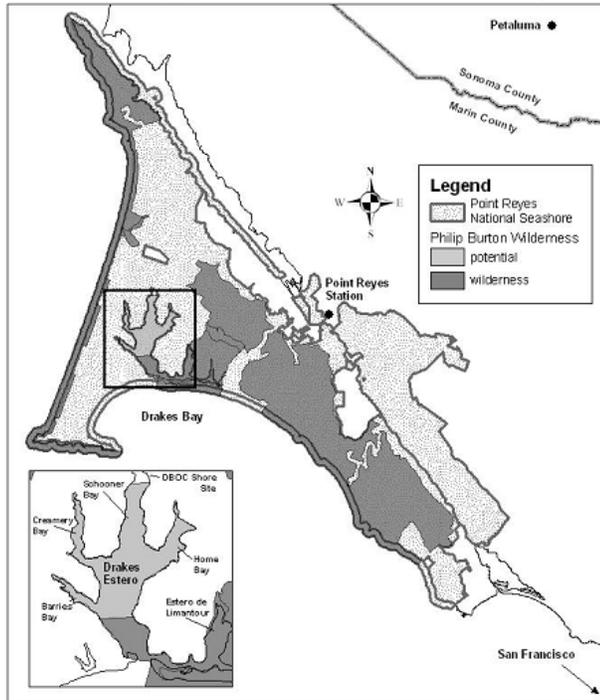


Figure 1. Drake's Estero is located within the Point Reyes National Seashore in Marin County, California. Inset provides larger view of Drake's Estero and shows the location of Drake's Bay Oyster Company. Map provided by courtesy of David Press, NPS.

Comment [DMG1]: Is it reasonable to pose the question as "What are the effects" and let others judge whether those are significant or otherwise?

Comment [DMG2]: From the standpoint of NPS, all anthropogenic ecological effects are of significance as a departure from natural conditions.

Comment [DMG3]: Technically, the estero itself is presently "potential wilderness," and would convert to disnated wilderness when the non-conforming commercial use (mariculture) is removed. However, to the extent possible given the oyster operation, the park manages the estero to the same standard as wilderness.

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Harbor Seals: Harbor seals inhabit nearshore and estuarine areas from Baja California to Alaska. They do not make extensive pelagic migrations but may travel 300 to 500 km on occasion to find food (Herder 1986). The seals haul out year round to rest, breed and molt on sandbars, rocky outcrops and offshore islands along the coast. In the past, the population in Drake's Estero has been thought to represent about 20 percent of the total California population, which has recently been estimated to be about 34,000 (Caretta et al. 2008). However, whether the number of seals using the estero approaches 6,800 is not yet clear. The harbor seal population in Drake's Estero is estimated to produce 300 to 500 pups annually, which is somewhat less than might be expected from an overall population of 6,800 seals. Seal use of the estero is highest during the breeding and molting seasons and location and timing of haul out vary with time of day, tide level, current direction, weather, season, year, disease outbreaks, disturbances from other wildlife, and human activities (Allen et al. 1984, Yochem et al. 1987, Suryan and Harvey 1999, Thompson et al. 2001, Grigg et al. 2004, Hayward et al. 2005, Seuront and Prinzivalli 2005).

The Oyster Farm: Shellfish have been cultured in Drake's Estero since the 1930s. Historically and currently, the shellfish species produced include Pacific oysters, Kumamoto oysters, Manila clams and purple hinged rock scallops. These are non-native species that do not spawn independently in Drake's Estero because the water temperature is too cold. The farm produces its own oyster seed on site. Oyster production numbers are depicted in the following figure (from the National Academy of Sciences report).

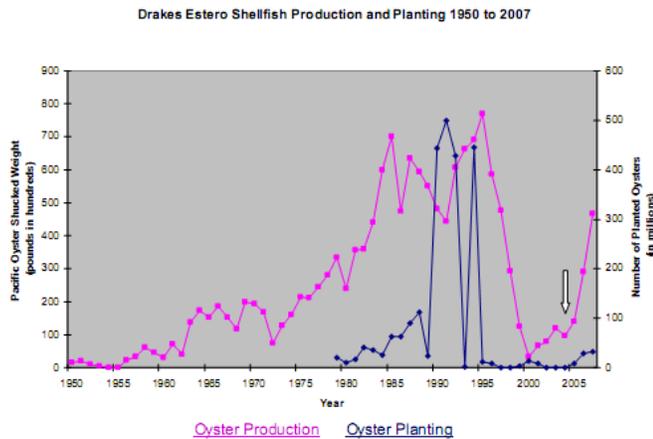


Figure 6. Drakes Estero Oyster Planting and Production 1950-2007. Shucked weight = 100 oysters/gal x 8.5 lbs/gal. Oyster shucked weight is calculated from Shellfish Harvest Tax Reports which are filed monthly for all state water bottom leases. Arrow indicates the year (2005) in which DBOC assumed operation of the oyster farm. Oyster production and planting values were obtained from Tom Moore, Marine Region Aquaculture Coordinator, California Department of Fish and Game).

Comment [DMG4]: I believe that 20% refers to the entire Pt. Reyes population, not just the estero.

Comment [DMG5]: The harbor seal population in Drake's Estero is estimated to produce 300-500 pups with a maximum count of adults/juveniles of around 1,800 seals

Comment [DMG6]: More accurately: "Seal use at haul out sites is usually highest...."

Comment [DMG7]: And with reproductive status

Comment [DMG8]: FYI-This species is not permitted by CDFG

Comment [DMG9]: However NRC report warns of potential for naturalization

Other Risk Factors: Although much of the concern regarding human effects on harbor seals has focused on oyster farming, a number of other human activities may pose risks to the seals. They include, but are not limited to—

- **kayakers** who may disturb seals in the water or at haul-out sites. Kayak access to the estero is prohibited during the peak pupping season, which is between March and June;
- **hikers** who also may disturb seals, particularly where one of the hiking trails passes close to one of the seal haul-out sites. Hikers are allowed to use hiking trails year-round;
- **predators** (e.g., coyotes) that have access to one haul-out site from land and may kill seal pups or disturb hauled out seals; and
- **disease, contaminants, and other environmental factors**, all of which may affect the health of the seals in the estero. Intermittent agricultural run-off may introduce contaminants or disease. No such effects have been documented, but the seals experienced unexplained mortality in the estero or nearby areas in 1997, 2000 (a few individual adult animals in both years), and 2008 (about 35 pups), and potential effects of disease and/or contaminants have not been conclusively ruled out.

COMMISSION REVIEW

The question of whether oyster farming should continue in Drake’s Estero has been reviewed at local (i.e., Marin County Board of Supervisors), state (i.e., California Coastal Commission), and federal (i.e., National Park Service, National Research Council) levels. A brief timeline of events related to this controversy is appended to these terms of reference. The controversy has multiple elements and, as noted above, some fall within the realm of policy while others fall within the realm of science.

Request To Commission: On 9 June 2009 the National Parks Conservation Association and Sierra Club wrote to the Marine Mammal Commission requesting that the Commission “...review the findings of the National Academy of Sciences report and clarify for the public and policy makers the extent of concern that exists from oyster operations on harbor seals, as well as and the application of applicable policies and use of the precautionary principle in management implementation.”

Commission Response: On 1 July 2009 the Commission responded that it would review “...these circumstances and their implications for harbor seal conservation. Within the context of its duties set forth in the Marine Mammal Protection Act, the Commission believes that it may have a useful role to play in this situation. Therefore it has decided to conduct an independent review.”

Review Goal and Objectives: The Commission agreed to conduct the review based on its primary concern that the harbor seals using the estero are being protected from human activities in accordance with the Marine Mammal Protection Act. Although the National Research Council did not find strong evidence of an effect of oyster farming, it did find a sufficient basis for concern. In addition, if other human activities are affecting the seals, then those activities also should be addressed. Most importantly, the Commission believes that protecting harbor seals in the estero will

Comment [DMG10]: Not coyotes

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Comment [DMG11]: All non-DBOC boats are prohibited. N.B. Power boats, except for those of the DBOC and rarely NPS rescue and research boats, are restricted year round in the Wilderness areas of Drakes Estero following wilderness legislation. Access to the Estero by motorboat is severely limited to emergencies and /or requires minimum tool environmental compliance process.

Comment [DMG12]: Not aware of such a trail. However, hikers regularly walk along the beaches and have direct access to several of the haul out sites near the mouth of the estero, including Estero de Limantour and Drakes Beach. NPS has posted signs for many years provided by the NMFS quoting regulations and guidance for not disturbing marine mammals.

Comment [DMG13]: Coyotes recolonized Point Reyes in the mid-1990s after being extirpated for many decades. NPS considers coyotes and their predation to be a natural and appropriate part of this ecosystem. They have access to all haul out sites that attach to the mainland and not just one site. Coyotes have not been observed on intertidal sandbars that do not attach to the mainland during low tides, the areas where females with pups occur in higher proportion

Comment [DMG14]: What are the sources of this information? The 2000 mortality event appeared to be limited to Tomales Point and not in Drakes Estero. Contaminant spills have the potential to affect seals and their environment

require ongoing vigilance by resource managers and those who engage in activities in or around the estero. In conducting this review, the Commission will seek to solicit, consider, and address the various viewpoints of all stakeholders in a constructive manner to ensure the conservation of the seals and the health of their habitat.

To that end, the Commission will focus its review on the question of whether oyster farming or other human activities are having significant adverse effects on harbor seals in Drake’s Estero. The review will (1) use existing data, (2) evaluate the strengths and weaknesses of those data, including information gaps, and (3) recommend research and management activities to reduce scientific uncertainty and insure the protection of harbor seals and their habitat.

Comment [DMG15]: As definitions of “significant” vary, hope you’ll define the term

Review Process and Timeline:

Activity	Completion Date
Commission will establish and convene an internal steering committee	September 2009
Steering committee will complete a draft Terms of Reference for the review	November 2009
Steering committee will identify candidates for the review panel	November 2009
Steering committee will solicit all research data from the National Park Service and other parties involved	November 2009
Commission staff will organize data received for the review panel	November 2009
Review panel members will familiarize themselves with the pertinent data and documents	November – December 2009
Commission will convene a review panel meeting at Point Reyes National Seashore	January – March 2010
Each review panel member will submit an independent written report to the Commission	April – May 2010
Commission will produce and distribute a final review report	June 2010

Comment [DMG16]: NPS requests that the panel, if possible, evaluate the current NPS marine mammal management plan and methods of protection for the seals, including efficacy of signage and closures as they pertain to Drakes Estero seals.

Steering Committee: The steering committee consists of—

- John Reynolds, PhD., Chair, Marine Mammal Commission
- Vera Alexander, PhD., Commissioner
- Paul Dayton, Ph.D., Commissioner
- Tim Ragen, PhD., Executive Director
- Michael Gosliner, Esq., General Counsel
- Samantha Simmons, PhD., Assistant Scientific Program Director

Proposed Panel Members*:

Peter Boveng, Ph.D., National Marine Mammal Laboratory
Sean Hayes, Ph.D., National Marine Fisheries Service
Steven Jeffries, Washington Department of Fish and Wildlife
Robert Small, Ph.D., Alaska Department of Fish and Game
Paul Thompson, Ph.D., University of Aberdeen
Michael Walsh, D.V.M., University of Florida

* The Commission is considering the addition of one more panel member with statistical expertise

Panel Review: The panel review will consist of a three- to four-day meeting at Point Reyes National Seashore including—

- a one-day site visit to the estero to tour the oyster farm, see Drake's Estero from where the National Park Service collects data, and take a boat to see the haul-out sites and oyster rack and bag placements;
- one day of invited, data-based presentations from involved parties including National Park Service, Drakes Bay Oyster Company, California Department of Fish and Game, Sierra Club, National Parks Conservation Association, Marin County Board of Supervisors and the California Coastal Commission. Presentations and other meetings will be open to the public and, except as noted below, will be followed by an opportunity for public comment;
- one day for the panel to review and discuss the data and presentations. This meeting will be open to the public; a public comment period may be provided, but public participation in the discussions is not anticipated; and, if needed,
- one day for further discussion in public session or to revisit the estero if needed. If time permits after adjourning the meeting, individual panel members may begin drafting their reports.

Comment [DMG17]: Visiting the estero by motor boat requires a authorization under the Wilderness Act. To avoid disturbing seals, NPS recommends limiting visits of the estero by boat to the months December through February. Advance scheduling of the panel's field visit to Drakes Estero will require review of local tide charts to ensure that the oyster mariculture area and the harbor seal haul out sites are visible on a good low tide.

Comment [DMG18]: Not fully clear what you mean.

Panel Reports: Each panel member will submit an individual report to the Commission. In general, the report will specify the member's views of the strengths and weaknesses of the existing data, any conclusions to be drawn from the existing data, important gaps in the existing data, and recommendations for future study. The reports also will address a series of specific questions identified by the Commission and/or the panel members during the course of the review.

Comment [DMG19]: Would there be any chance for NPS to review or comment on these?

Commission Report: The Commission will prepare its report based on its interpretation of the separate reports of the individual panel members, each of which will be appended to the final report. The report will be submitted to all parties involved in the review and made available to the public. It will highlight the same topics discussed in the reports of the individual panel members.

LITERATURE CITED

Comment [DMG20]: You're missing Herder 1986.

- Allen, S.G., D.G. Ainley, and G.W. Page. 1984. The effect of disturbance on harbor seal haul-out patterns at Bolinas Lagoon, California. *Fisheries Bulletin* 82:493–500.
- Caretta, J.V., K.A. Forney, M.S. Lowry, J. Barlow, J. Baker, D. Johnston, B. Hanson, M.M. Muto, D. Lynch, and L. Carswell. 2008. U.S. Pacific Marine Mammal Stock Assessments: 2008. US Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-434
- Grigg, E.K., S.G. Allen, D.E. Green, and H. Markowitz. 2004. Harbor seal, *Phoca vitulina richardsi*, population trends in the San Francisco Bay Estuary, 1970–2002. *California Fish and Game* 90:51–70.
- Hayward, J.L., S.M. Henson, C.J. Logan, C.R. Parris, M.W. Meyer, and B. Dennis. 2005. Predicting numbers of hauled out harbour seals: A mathematical model. *Journal of Applied Ecology* 42:108–117.
- National Academies Press, National Research Council of the National Academies, "Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore, California". Committee on Best Practices for Shellfish Mariculture and the Effects of Commercial Activities in Drakes Estero, Pt. Reyes National Seashore, California. (2009).
- Seuront, L., and P. Prinzevalli. 2005. Dramatic decline of a Dover Strait harbour seal (*Phoca vitulina*) population exposed to transient industrial disturbance. *Global Marine Environment* 2:21.
- Suryan, R.M., and J. T. Harvey. 1999. Variability in reactions of Pacific harbor seals, *Phoca vitulina richardii*, to disturbance. *Fisheries Bulletin* 97:332–339.
- Thompson, P.M., S. Van Parijs, and K. T. Kovacs. 2001. Local declines in the abundance of harbour seals: Implications for the designation and monitoring of protected areas. *Journal of Applied Ecology* 38:117–125.
- Yochem, P. K., B. S. Stewart, R.L. DeLong and D. P. Demaster. 1987. Diel haul-out patterns and site fidelity of harbor seals (*Phoca vitulina richardii*) on San Miguel island, California, in autumn. *Marine Mammal Science* 3:323–333.

Comment [DMG21]: Additional references potentially of interest:

Allen, S. G., C. A. Ribic and J. E. Kjelmyr. 1988. Herd segregation in harbor seals at Point Reyes, California. *Calif. Fish and Game*. 74:55-59.

Allen, S.G., H.R. Huber, C.A. Ribic, and D. G. Ainley. 1989. Population dynamics of harbor seals in the Gulf of the Farallones, California. *Calif. Fish and Game*, 75:224-232.

Bohorquez, A.S. 2002. Pupping phenology and haul out patterns of harbor seals (*Phoca vitulina richardii*) in San Francisco Bay. MA in Biology. San Francisco State University.

Page, G. W. and S. G. Allen. 1985. Affected Mammals - Part 3. in: The impacts of the T/V Puerto Rican oil spill on marine birds and mammal populations in the Gulf of the Farallones, 6-19 November, 1984. A special scientific report produced by the Point Reyes Bird Observatory. 70 pp.

NPS. 2003. Interim technical guidance on assessing impacts and impairment to natural resources. NPS Technical Report.

APPENDIX

The following is a brief timeline of events related to the question of whether oyster farming is having an affect on harbor seals in Drake's Estero or should be continued in a wilderness area.

Early 1930s	Drake's Estero supports an oyster farm owned and operated by the Johnson family until 2005
1962	Congress established the Point Reyes National Seashore with the oyster farm and 15 dairy farms within the Park. Pub. L. 87-657, Sept. 13, 1962, 76 Stat. 538 (16 U.S.C. 459c et seq.)
1976	Congress passed the Point Reyes Wilderness Act designating Drake's Estero as 'potential wilderness.' The designation granted the oyster farm a special federal lease to continue operation until 2012. Pub. L. 94-544, Oct. 18, 1976 and Pub. L. 94-567, Oct. 20, 1976 (16 U.S.C. 459c et seq.)
1991-1992	California Department of Health Services issued a draft management plan for shellfishing in Drake's Estero. The draft plan raised concerns about the potential impacts of shellfishing on marine mammals with regard to 'takes' under the Marine Mammal Protection Act. These issues were referred to the National Marine Fisheries Service and resulted in two meetings (12/9/1991 and 1/15/1992) of the National Park Service, California Department of Fish and Game, California Public Health Services, and National Marine Fisheries Service. The meetings resulted in a consensus agreement allowing the continued operation of the Johnson Oyster Company. The main provisions of the agreement closed the main channel of the estero to boat traffic from March 15 th through June 30 th and the lateral channel to boat traffic from March 15 th through June 1st
2003	California Coastal Commission issued a cease and desist order to Johnson Oyster Company (order number: CCC-03-CD-12)
2005	Kevin Lunny purchased the oyster farm and petitioned the Coastal Commission for a special-use permit to continue operating the farm. Mr. Lunny agreed to clean up the farm and began negotiations with the National Park Service to extend the federal lease past 2012
May 2007	National Park Service issued a report entitled "Drakes Estero: A Sheltered Wilderness Estuary." The report included allegations of a negative impact of the oyster farm on the numbers of harbor seals and damage to eel grass beds
May 2007	Marin County Board of Supervisors held a hearing to determine its position on continuation of the Drakes Bay Oyster Farm in the estero
Sep 2007	Goodman ¹ claimed misconduct by the National Park Service
Nov 2007	California Coastal Commission held a hearing on the cease and desist order (order number: CCC-07-CD-11)
Dec 2007	Goodman wrote to the National Academies of Science and claimed scientific misconduct
May 2008	Becker ² et al. manuscript was accepted to Marine Mammal Science
Sep 2008	Goodman wrote to and presented to National Academies of Science panel

Comment [DMG22]: The NPS purchased the Johnson Oyster Company (JOC) in 1972 and provided a Reservation of Use and Occupancy (RUO; not a lease) that extended to 2012. Change 1976 to 1972 for reference to operation of the oyster company to 2012.

Comment [DMG23]: Congress passed the Point Reyes Wilderness Act in 1976, and noted that the oyster operation would run out to 2012. The legislative history (House Report 94-1680) indicates Congressional intent:

"it is the intention that those lands and waters designated as potential wilderness will be essentially managed as wilderness, to the extent possible, with efforts to steadily continue to remove all obstacles to the eventual conversion of these land and waters to wilderness status." (House Report 94-1680)

Comment [DMG24]: 2005 –JOC was under a court order to clean up the site. Mr. Lunny assumed responsibility for the court order at the time of purchase. NPS informed and provided Mr. Lunny with a legal opinion that the RUO could not be extended beyond 2012 before he purchased the company, and therefore, there was no negotiation with Mr. Lunny to extend the RUO beyond 2012.

Comment [DMG25]: The NPS park news document entitled "Drakes Estero: A Sheltered Wilderness Estuary" was posted on the NPS Point Reyes National Seashore website in October 2006. The document was updated in May 2007 and reposted on the website.

Appendix, continued.

Sep 2008	Hulls ³ wrote to the National Academies of Science panel to present an analysis using the National Park Service database and rebutting the findings of the National Park Service and the Becker et al. paper
Sep 2008	Hulls wrote to the editor of Marine Mammal Science to question the findings of Becker et al.
Sep 2008	Goodman wrote to the National Academies of Sciences panel to rebut the findings of Becker et al.
Jan 2009	Marine Mammal Science published the Becker et al. paper
Feb 2009	National Parks Conservation Association and Sierra Club wrote to the National Academies of Science panel regarding the Drake's Estero report
May 2009	National Academies of Science published its final Drake's Estero report
May 2009	Senator Feinstein wrote to Secretary of the Interior Salazar to highlight some of the findings of the National Academies of Science report
May 2009	Sierra Club wrote to the Marine Mammal Commission and National Marine Mammal Laboratory regarding effects of oyster farming on harbor seals and management under the Marine Mammal Protection Act
May 2009	The Marine Mammal Center wrote to Senator Feinstein to support the National Park Service wilderness plan for the estero
June 2009	National Parks Conservation Association and Sierra Club wrote to the Marine Mammal Commission to request a review of matters pertaining to harbor seal protection at Drake's Estero
July 2009	Marine Mammal Commission wrote to National Parks Conservation Association and Sierra Club to inform them that the Commission would conduct an independent review
Aug 2009	Marine Mammal Commission staff visited Point Reyes National Seashore in preparation for the review

Comment [DMG26]: Additional items perhaps of interest:

NPS contacted the Marine Mammal Commission in April 2007 asserting harbor seal disturbances by the oyster company in Drakes Estero.

The Executive Director of the Marine Mammal Commission wrote a letter of interest to the NPS in May 2007 regarding the issue.

Spring 2007 NPS contacted NMF'S about permitting of the oyster company for Incidental Harassment under the Marine Mammal Protection Act.

October 2008 – Editor of MMS had the Becker et al. paper re-peer reviewed. The paper remained accepted and the editor stated that “there is no basis for pulling the paper on the grounds of scientific misconduct.”

Comment [DMG27]: Haven't seen this. May I have a copy?

Comment [DMG28]: Ditto. Could you share a copy?

Comment [DMG29]: Goodman wrote to MMS claiming scientific misconduct and requesting that the Becker et al. paper be pulled for re-review.

¹ Corey Goodman, PhD., Individual (private citizen) Marshall, CA

² Ben Becker, National Parks Service, Point Reyes, CA

³ John Hulls, Individual (private citizen) Point Reyes, CA