

**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, t~~This debate has focused on ~~two main~~the broad 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~~This 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).

Comment [DW1]: The policy question should be taken out of this scientific student to shield the MMC from accusations of politicking. By framing the question as a broad one about human activities in general, it avoids insinuating that this is an investigation of the oyster farm, but shows that it is instead an assessment of impacts on harbor seals. (MC)

Comment [KL2]: Why is question #2 here? Drakes Estero is not a designated wilderness area, it is potential wilderness. The only thing that should be considered by the MMC is question 1. **Delete this question and reword this section.**

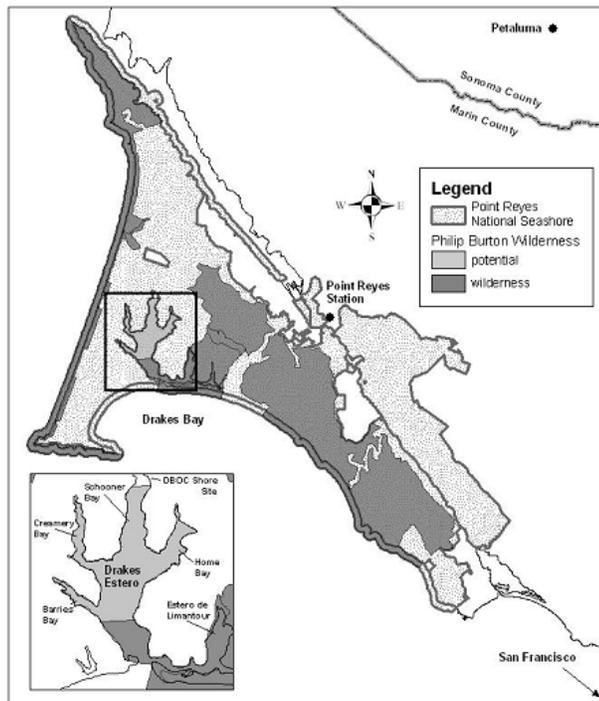


Figure 1. Drake's Estero is located within the Point Reyes National Seashore in Marin County, California. Inset provides larger view of Drake's Estero and shows the location of Drake's Bay Oyster Company. Map provided by courtesy of David Press, NPS.

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).

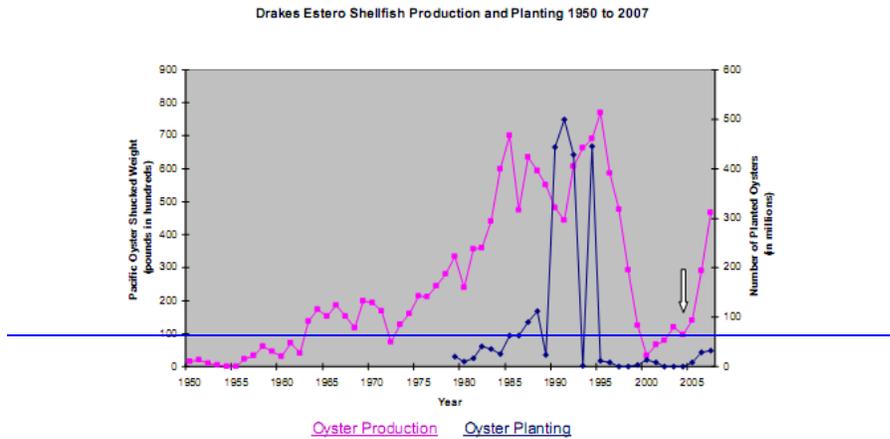


Figure 6. Drakes Estero Oyster Planting and Production 1950-2007. Shucked weight = 100 oysters/gal x 8.5 lbs/gal. Oyster shucked weight is calculated from Shellfish Harvest Tax Reports which are filed monthly for all state water bottom leases. Arrow indicates the year (2005) in which DBOC assumed operation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

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
- **the oyster farm.** Shellfish have been cultured in Drake's Estero since the 1930s. Historically, the shellfish species produced include Pacific oysters, European Flat oysters, Olympia oysters, Kumamoto oysters, Manila clams and purple hinged rock scallops. Currently, the Drakes Bay Oyster farm cultures Pacific oysters and Manila clams. These are non-native species that do not spawn independently in Drake's Ester 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).

Comment [DW3]: Having oyster farming listed as first and primary risk factor is misleading – again appears as though MMC is investigating oyster farm, when it is actually investigating harbor seal disturbance and population health in DE – big difference in perception. Recommend MMC uses Kevin's reworking of this section – rework risk factors to remove MMC from pre-judging what is most important before looking at the data. (MC)

Comment [KL4]: It is misleading to have a bold section discussing oyster farming as the primary risk factor to harbor seals in Drakes Estero. Why have the most significant causes of disturbance simply in a list of "other risk factors?".

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Comment [KL5]: These species were grown historically. Only Pacific oysters and Manila clams are currently cultured in Drakes Estero.

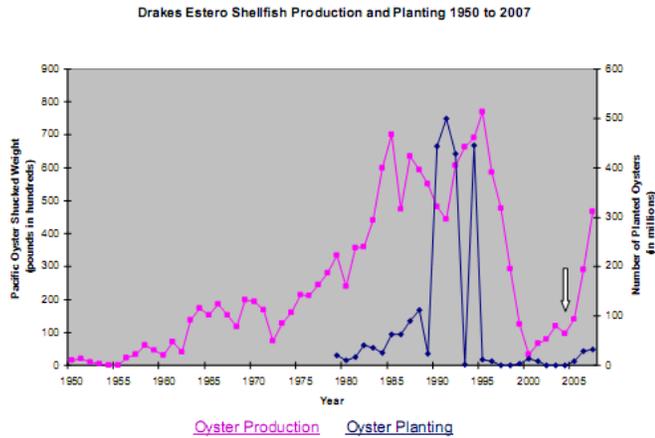


Figure 6. Drakes Estero Oyster Planting and Production 1950-2007. Shucked weight = 100 oysters/gal x 8.5 lbs/gal. Oyster shucked weight is calculated from Shellfish Harvest Tax Reports which are filed monthly for all state water bottom leases. Arrow indicates the year (2005) in which DBOC assumed operation 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 [DW6]: Recommend removing this graph and putting in list of materials. Not appropriate to include when no other data is included here (esp no info on kayaks, predators, etc), and when basic NPS database hasn't even been assessed/validated yet by MMC. Prejudicial, and misleading. (MC)

Other Risk Factors: 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.

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COMMISSION REVIEW

The Commission's primary focus and duties are the protection and conservation of marine mammals. The controversy over how and to what degree human activities impact harbor seals at Drakes Estero has multiple elements, and has caused a great deal of confusion at the local, state, and national levels. Though the proposal submitted to us requested a review focused on one particular possible source of impacts, this review instead seeks to assess the array of possible sources which may impact the harbor seals. In this review, the Commission aims to create an open and transparent process where stakeholders, scientists, and panel members can come together to collect and assess the available data on the health and wellness of harbor seals in Drake Estero, agree upon what

~~conclusions can be drawn from that data, and recommend possible improvements in management and areas for further study.~~

~~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. Human activities in the estero will be identified and assessed for their impact on harbor seals.~~ Most importantly, the Commission believes that protecting harbor seals in the estero will 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.

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

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

Comment [KL7]: Dr. Thompson is not independent with respect to this study and, therefore, can not be a member of this panel.

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

Comment [KL8]: Another day of public meetings when in Point Reyes will need to be added to fully execute the second responsibility of the panel: “evaluate the strengths and weaknesses of those data”. It will take an entire day for presentations from NPS, DBOC, as well as other invited parties, to inform the panel on this critical, fundamental issue. This must occur before any analysis is made because it may affect the baseline understanding of the study panel. **Add a bullet point with a day described for this purpose.**

- 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 about harbor seals, 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, Dr. Corey Goodman, John Hulls, Sierra Club, National Parks Conservation Association, Marin County Board of Supervisors and the California Coastal Commission. Presentations for this section are to address only the second goal of the review: to evaluate the strengths and weaknesses of the current Drakes Estero data, including information gaps. 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 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 for this section are to address any other aspects of the study. 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.

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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.

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

- 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.
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- 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.

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 related to harbor seal disturbances at Drakes Estero.

<u>1920s</u>	<u>Harbor seal populations in California Drakes Estero near extinction (1912?)</u>
<u>Early 1930s</u>	Drake’s Estero <u>supports-is home to</u> an oyster farm owned and operated by the Johnson family until 2005
<u>1962</u>	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.)
<u>1976</u>	Congress passed the Point Reyes Wilderness Act designating Drake’s Estero as ‘potential wilderness.’ The designation granted the oyster farm a <u>special</u> -federal lease to continue operation until 2012, <u>with a contractual option to renew after 2012 with a Special Use Permit. (This is a common process, also used to continue leases of nearby ranches indefinitely)</u> Pub. L. 94-544, Oct. 18, 1976 and Pub. L. 94-567, Oct. 20, 1976 (16 U.S.C. 459c et seq.)
<u>1991-1992</u>	<u>National Park Service, National Marine Fisheries Service, California Department of Fish and Game, and the Johnson’s Oyster Company met and agreed to a series of operating procedures to minimize the disturbance to harbor seals resulting from oyster operations. This 1992 Record of Agreement is still in effect today. Main provisions of the agreement included alternate boat traffic routes during the pupping season and amended oyster seeding dates around pupping season. 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 that no take was occurring as a result of the operations of Johnson Oyster Company and an agreement was reached. The main provisions of the agreement closed the main channel of the estero to boat traffic from March 15th through June 30th and the lateral channel to boat traffic from March 15th through June 1st</u>
<u>2003</u>	<u>California Coastal Commission issued a cease and desist order to Johnson Oyster Company (order number: CCC-03-CD-12)</u>
<u>2004</u>	<u>NPS records evidence of coyote preying on newborn pups in Drakes Estero.</u>
<u>2004</u>	<u>San Francisco Area Network of Parks releases “Pinniped Long-Term Monitoring Program” (Hester, Allen, et. al.) which describes the NPS monitoring program for pinniped populations.</u>
<u>2004</u>	<u>California Fish and Game Commission renewed the Johnson Oyster Company shellfish lease for 25 years, due to expire in 2029 (Lease #438-01 and 438-02)</u>

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Comment [KL9]: To our knowledge, there was never any consideration of closing the oyster farm. The NPS was concerned about the impact JOC operations on harbor seals. The interagency group agreed that there was no take occurring. This description overstates the 1991-1992 concerns. Call Tom Moore, CDFG, who was at the meetings, to confirm.

Comment [DW10]: Recommend removing reference to C&D order to Johnson’s. Did not deal with current oyster farm, or with harbor seals. (MC)

<u>2005</u>	<u>NPS releases Version 2.0 of the “San Francisco Bay Area Network Inventory and Monitoring Program Data Management Plan “(prepared by David Press, GGNRA)</u>
<u>2005</u>	<u>NPS identifies causes of disturbance in Drakes Estero for 2005 as follows: “birds (22.2%) were the most frequent cause, followed by non-motor boats (19.4%), humans (16.7%), and aircraft (16.7%) (pg 6, “Harbor Seal Monitoring at Point Reyes National Seashore and Golden Gate National Recreational Area Annual Report 2005”)</u>
<u>2005</u>	<u>The Lunny family purchased the oyster farm. The Lunnys cleaned up the farm and focused on environmental stewardship.</u>
<u>2006</u> 2005	<u>NPS identifies causes of disturbance in Drakes Estero for 2006 as follows: “Drakes Estero had the highest pup and molt numbers, and one of the highest levels of disturbance...After [July 1] 50% of disturbances were a result of these non-motorboats [kayaks and canoes]. Prior to July 1st most disturbances were of unknown cause, 47%. Surveyors documented a bobcat and coyote disturbing seals on sandbars in drakes estero. Other sources included low flying large birds... hikers and clam diggers.. and kayaks.” (pg 9, “Harbor Seal Monitoring San Francisco Bay Area Annual Report 2006”)Kevin Lunny<u>The Lunny family purchased the oyster farm and petitioned the Coastal Commission for a special use permit to continue operating the farm. The Mr. Lunnys agreed to clean up the farm and began negotiations with the National Park Service to extend the federal lease past 2012</u></u>
<u>2006 - 2007</u>	<u>National Park Service issued multiple versions of a report entitled “Drakes Estero: A Sheltered Wilderness Estuary.” The report accused the oyster farm of serious harm to harbor seals at Drakes Estero.</u>
<u>May 2007</u> May 2006 – 2007	<u>Marin County Board of Supervisors held a hearing. One item on the docket was a letter to Senator Feinstein asking for her help assessing the Park Service claims against the oyster farm. NPS testified that day that oyster farm had caused an 80% decline in harbor seals, caused pups to die, and the detrimental impact on seals from the farm was a “national emergency.”National Park Service issued multiple versions of 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</u>
<u>May 2007 - present</u> May 2007	<u>Dr. Goodman¹ claimed misconduct by the National Park Service. Goodman viewed NPS data and found data did not support claims of harm by oyster farm.Marin County Board of Supervisors held a hearing to determine its position on continuation of the Drakes Bay Oyster Farm in the estero</u>
<u>Dec 2007</u> Sep 2007	<u>California Coastal Commission and Drakes Bay Oyster Company agree to Consent Order (order number: CCC-07-CD-11). Goodman¹ claimed misconduct by the National Park Service</u>
<u>Dec 2007</u> Nov 2007	<u>Goodman wrote to the National Academies of Science and claimed scientific misconduct against the National Park Service.California Coastal Commission held a hearing on the cease and desist order (order number: CCC-07-CD-11)</u>
<u>May 2008</u> Dec 2007	<u>Becker² et al. manuscript was accepted to Marine Mammal Science. Paper claimed to show negative correlation between oyster farm production levels<u>activities and harbor seal population, but contained fundamental data errors.</u>Goodman wrote to the</u>

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Comment [KL11]: The CCC does not issue special use permits. The oyster farm pre-dates the Coastal Act. DBOC is currently negotiating with CCC for a Coastal Development Permit.

Comment [KL12]: Harm to eel grass beds... If the Marine Mammal Commission wants to talk about alleged harm to celgrass, then why not sedimentation? Why not fish species richness and diversity? There were many claims made by PRNS of environmental harm caused by the oyster farm. Only harbor seals should be referenced for the purpose of this panel.

	National Academies of Science and claimed scientific misconduct
Sep 2008	Goodman wrote to and presented to National Academies of Science panel
May 2008	Becker²-et al. manuscript was accepted to Marine Mammal Science
Sep 2008	Goodman wrote to and presented to National Academies of Science panel

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-accusations of harm in 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
June 2009 May 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 The Marine Mammal Center wrote to Senator Feinstein to support the National Park Service wilderness plan for the estero
July 2009 June 2009	Marine Mammal Commission wrote to National Parks Conservation Association and Sierra Club to inform them that the Commission would conduct an independent review 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
Aug 2009 July 2009	Marine Mammal Commission staff visited Point Reyes National Seashore in preparation for the review 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

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Comment [DW13]: Deleted section on TMMC letter. Since MMC is not dealing with policy aspect, and TMMC did not produce data and is instead commenting its opinion on a policy issue, inclusion of this letter is inappropriate

Comment [DW14]: Since MMC is not dealing with policy aspect, and TMMC did not produce data and is instead commenting its opinion on a policy issue, inclusion of this letter is inappropriate

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