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Dear Concerned Agencies: We wish to bring to your attention our concerns about marine mammal protections in the pre-publication copy of the National Academy Of Science's (NAS) Report of Shellfish Mariculture in Drakes Estero, Point Reyes National Seashore. We believe that NAS harbor seal conclusions create confusion regarding the Marine Mammal Protection Act (MMPA) and National Park Service (NPS) policy and law. Unless clarified, the NAS Report could inadvertently lead to more permissive, but unjustified, management policies that could increase harassment of protected marine mammals.

“Cause-and-Effect” in Regulatory vs Management Actions

The NAS Report appears to attempt to draw a distinction between data required for a “regulatory action” (an independently verifiable cause-and-effect impact on population) and data required for a “management action” (reasonable inference showing a potential impact on population). However, NPS is not, as described by the NAS (pg 9) a “regulatory” agency, but instead is a “management” agency, thus the logic by which NAS presumes that NPS should be held to “regulatory” standards has no basis. Furthermore, cause-and-effect may be appropriate for laboratory biology and necessary in a court of law but it is inappropriate for wildlife biology and confounding to effective wildlife management. The reliance on cause and effect undermines the precautionary rationale for the MMPA, which defines prohibited Level “B” harassment as “any act of pursuit, torment, or annoyance which...has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” If sensitive species were to be managed by this NAS strict cause-and-effect standard, the result would be no precautionary management action until extremely expensive, long-term, and likely still inconclusive studies could be undertaken during which time the resources under stress would continue to suffer decline.

Cause-and-effect also counters NPS policy that requires protection of resources even when science is incomplete, and moves the burden of proof onto management agencies to prove impact rather than onto users to mitigate impact. NPS ordinarily requires an application wishing to transfer operating rights in a park to pay for and conduct an environmental study to determine potential environmental impacts and to mitigate those found. In this case, NPS undertook the burden of proof to document potential impacts itself and propose management actions to mitigate those impacts. However, the strict cause-and-effect relationships proposed by NAS would not apply to a National Environmental Policy Act (NEPA) study done by the applicant and thus should not apply to NPS here.

NPS Harbor Seal Monitoring Program inappropriately dismissed as insufficient support for precautionary management action

NAS dismisses observations arising from the NPS Seal Monitoring Program as misleading (pg 57):

“Versions III and IV of *Drakes Estero: A Sheltered Wilderness Estuary* state that oyster culture operations have resulted in an 80% decline in harbor seals “at one area” in Drakes Estero. This description is misleading because it implies that there has been a decline in the seal population at Drakes Estero whereas what has been observed is a reduction in the use of some of the haul-out subsites during the breeding season. In addition, the 80% value represents a selective presentation of subsite use that does not place this information into context with the spatially replicated and longer-term count data throughout the Drakes Estero colony and the Point Reyes region.”

However the NAS statement is itself misleading because it ignores the fact that the one referenced site is one of only a few sites preferred by female seals for pupping and also ignores the clarifying statement in the referenced *Sheltered Wilderness* that documentation of long-term impacts would require more focused study.

It is simply not within the mandate of NPS or the MMPA to allow the oyster operation to continue site-specific seal pupping disturbances inferred by its Monitoring Program but take no management action until the completion of a long-term study on the potential impact from disturbances on overall seal population.

The NAS also dismisses the NPS Disturbance data as unreliable (pg 36)

“Perhaps the most important confounding factor in any monitoring database, but especially one staffed by volunteers, is the potential for simple recording errors, such as date, time, or tide level. Such an error would generally have little or no effect on the overall trends identified in the database, but would make it difficult to reconstruct the exact events recorded during any individual survey. It is not possible for the committee to resolve the controversy over individual survey sheets, but the focus on these observations highlights how this type of monitoring program is best utilized to indicate potential disturbance problems (that might result in decreased use of a haul-out habitat) rather than to quantify them definitively. The latter would require a data collection system that could be independently verified, such as time and date stamped photographs. This verification is especially important in circumstances where there is an indication of a source of disturbance that could lead to a regulatory action, as was the case with disturbances attributed to DBOC.”

However, NAS fails to acknowledge that individuals with a profit motive in the outcome provided the conflicting data that comprises the other side of the referenced controversy. Thus the most important confounding factor in the analysis of this NPS Monitoring database is not, as the NAS claims, volunteer competence on the NPS side, but rather the he-said-she-said controversies that have arisen over almost every piece of data that could be construed as negative to

the oyster company. The NPS monitoring program was never equipped to provide the independently verifiable data needed to resolve this pattern of conflict. However, that does not mean that the NAS should dismiss the NPS program entirely. That NPS was able to use a program designed to monitor long-term population to also infer potential impact by the oyster operation is a tribute to adaptive use of taxpayer money to guide reasonable management action. Even if the data is inadequate as evidence in a court of law to sustain fines and penalties in a regulatory action, it still provided valuable resource management guidance.

The NAS Report (Pg 58) notes: Some oyster rack and oyster bag areas within Drake Estero are located within 500 m of sand flats used by harbor seals as haul-out sites. Based upon the findings in the studies outlined above [but not the NPS Monitoring Program] and the informal observations of biologists who study seals, visits to these areas by oyster farm workers can be expected to lead to the short-term disturbance of any seals using these haulout areas at the time.” It is not clear why the NAS chose to cite non-NPS data from elsewhere to infer disturbance at 500 meters yet dismisses NPS Monitoring Program data from Drakes Estero itself as inferring disturbance at 50 meters (see Bed 17 projecting into the seal protection area on the CCC map on page 12).

The NAS Report conflicts with the MMPA definition of harassment as alteration of behavior and thus its dismissal of the NPS Monitoring Program’s identified impacts at even one site conflicts with the precautionary principle that has been the basis of the MMPA from inception. The Report also conflicts with NPS management policy that states "In cases of uncertainty as to the impacts of activities on park natural resources, the protection of natural resources will predominate” (NPS 9/18/07 Clarification document). The NPS Monitoring Program conforms to both NPS management policy and to the MMPA and provides at least an inference of potential impact that should not be dismissed as adequate support for precautionary management action.

NPS Becker Study inappropriately dismissed as insufficient support for precautionary management action

Similarly, the NAS dismisses the Becker Study as inadequate based in part on a he-said-she-said controversy raised by individuals with an economic interest in the outcome (emphasis ours):

“Becker and colleagues did not have the official oyster harvest level for 2008 and hence did not include this 2008 datum in the statistical analyses. However, the relationship between the 2008 projected harvest and 2008 seal counts deviates from the pattern of the 11 previous years sufficiently as to call into question whether mariculture intensity would still be a statistically significant contributor to explaining patterns of seal use of upper-estero haul-outs had the analyses included the full 12 years of data (from 1997-2008). In the paper, Becker et al. (2009) acknowledge the marked deviation of the 2008 data from the previous 11 years. The authors attribute the departure from the previous pattern to new regulations...

issued by the California Coastal Commission which closed the lateral channel to the oyster farm's boats during the pupping season beginning in 2008 and further explain that this new restriction led to less disturbance of the seals and thus less displacement from their haul-out sites. However, this explanation is misleading because the previous owner of the oyster farm operated under a 1992 agreement to prohibit boat traffic in the main and lateral channels during the pupping season (DOI, 2008) and the current owners maintain that they have voluntarily complied with the 1992 agreement." (pg 33):

However, the NAS characterization of Becker's 2008 data explanation is itself misleading because the NAS fails to acknowledge that the 1992 Agreement differed significantly from the Coastal Commission (CCC) regulations. In fact, DBOC (pg 13) in their 9/27/07 response to the CCC requested that the three 9/11/07 scientific recommendations that formed the basis of the CCC harbor seal regulations be "deleted" and replaced with the 1992 Agreement, so clearly DBOC recognized the important differences between these sets of regulations:

	1992 Agreement	CCC Regulations
Lateral Channel	Closure 3/15-6/1	Closure 3/1-6/30
Hauled Out Seals	No Buffer	100-yd buffer
Mapped Haul Outs	Only haul outs; no buffer	Haul outs plus 100-yd buffer

Additionally, the map in the 1992 Agreement (page 10) shows beds wholly outside seal haulouts on which no buffers are noted, whereas the map in the CCC Regulation (page 12) shows bags as much as 50 yards within a seal protection area (bed 17). The location of the beds in the CCC map is consistent with the NPS Clarification Document that notes: "Two oyster bag arrays (approximately 5 acres) were within a regular harbor seal haul out site, and one other oyster bag site was within 50 meters of a regular harbor seal haul out site (NPS Trip Report April 13, 2007)." The location of these bags inside seal protection areas is not a he-said-she-said controversy, but rather was confirmed by DBOC by signature of the Consent Order on 11/29/07.

Furthermore, the 9/07 CCC Consent order also states (pg 19): "Within 60 days of issuance of this Consent Order, Respondents shall submit a plan outlining the removal of all equipment and materials located in these areas." Thus by the start of the 2008 pupping season (3/1/08), bags within the buffer-enlarged seal protection areas were withdrawn, which is consistent with the Becker explanation that the CCC order significantly mitigated disturbances and notwithstanding the grower's claim of compliance with the 1992 Agreement. The 1992 map necessarily represents a static configuration to which the oyster grower may have adhered to in 2007, but the 2007 CCC map presents updated data that reflects that seal haulout locations may have altered somewhat due to sandbar instability or due to the passage of years prior to DBOC purchase when areas abandoned by the former grower may have been re-colonized by seals. The NAS criticism of Becker's explanation for the deviation in the 2008 data ignores these important facts.

The NAS (pg 57) also faults the Becker study on three additional points:

“First, it is important to recognize that the analysis showing a relationship between mariculture activities and a decline in the mean seal attendance at two of three haul-out subsites in Drakes Estero does not demonstrate cause and effect.” But the reliance on cause-and-effect undermines the precautionary rationale for the Marine Mammal Protection Act, counters NPS policy that requires protection of resources even when science is incomplete. This inappropriately moves the burden of proof onto management agencies to prove impact rather than onto users to mitigate impact.

“Second, the use of oyster production level as a proxy for mariculture activities that displace or disturb seals may be confounded by changes in culture methods or management practices. “ But this ignores the statement of the oyster grower in his 9/27/07 letter to the CCC (pg 3): “we point out that we are growing oysters on the same islands, beaches and sandbars as they have been grown for decades. What we do is not new. How we do it is not new.” It is not clear why the NAS offers deference to oyster grower data claims when they conflict with NAS data, yet chooses to ignore grower claims when they support NPS data.

“Third, demonstrating changes in mean attendance at seal haul-out subsites is not equivalent to demonstrating a decline in the seal population at Drakes Estero.” However, this NAS description is misleading because it implies that there have been changes at sub-sites prejudicially selected by Becker from among many equivalent sub-sites whereas Becker reports changes at two sub-sites closest to mariculture operations that were preferentially selected by female seals with pups because the sub-sites are among the few that are detached from the mainland. Becker does not claim to study all anthropogenic disturbances including at sub-sites attached to the mainland, which have lower numbers of females and pups. Potential impacts from mariculturists can and should be mitigated regardless of impacts from other sources. To imply, as NAS appears to have done, that no single impact should be studied and mitigated until all impacts have been studied and mitigated, would effectively result in no protection. While a study of impacts from an attempted expansion of oyster beds into pupping sites, which was mitigated within a year by subsequent CCC regulation, cannot possibly demonstrate long-term impacts on population, it would seem that measurable reductions at two of the few preferred pupping sites should not simply be dismissed.

The NAS Report conflicts with the MMPA definition of harassment as any alteration of behavior and thus its dismissal of Becker’s site-specific study conflicts with the precautionary principle that has been the basis of the MMPA from its beginning as well as with NPS management policy that states “In cases of uncertainty as to the impacts of activities on park natural resources, the protection of natural resources will predominate.” The NPS Becker study conforms to both NPS management policy and to the MMPA and provides at least an inference of potential impact that should not be dismissed as adequate support for precautionary management action.

MMPA definition of harassment as “alteration of behavior” inappropriately dismissed as insufficient support for precautionary management action

The NAS dismisses head alerts as a response variable (pg 32): “Although a head alert indicates a potential for a more serious response, it is less likely to represent an action that depresses fitness or has a negative population-level consequence, and may be less informative as a response variable (Jansen et al. 2006).” We believe the NAS dismissal is based on an unrealistic assumption that current science is able to distinguish between responses that are biologically significant and others that are not. For example, Walker, Boersma, Wingfield (2005) found that (emphasis ours) “penguin chicks appear to show a heightened adrenocortical response to handling stress in nests exposed to tourists... This field endocrine approach identified a stressor not observed through monitoring behavior alone.”

Furthermore, the referenced Jansen study focused only on the “enter water” response (ie dismissed the “head alert” and “approach water” responses) because Jansen was analyzing seals that were flushed into glacial water that rarely exceeded 5-7 C° and “the smallest pups...faced low temperature stress at less than 10 C°.” Water temperatures in Drakes Estero always exceed 10 C°, which makes Jansen’s focus only on the “enter water” response inapplicable to Drakes.

The NAS Report conflicts with the MMPA definition of harassment as any alteration of behavior and thus its dismissal of head alters conflicts with the precautionary principle that has been the basis of the MMPA from its beginning as well as with NPS management policy that states “In cases of uncertainty as to the impacts of activities on park natural resources, the protection of natural resources will predominate.” The NPS data on head alters conforms to both NPS management policy and to the MMPA and provides at least an inference of potential impact that should not be dismissed as adequate support for precautionary management action.

Site-specific seal impacts inappropriately dismissed as insufficient support for precautionary management action

The NAS Report dismisses NPS site-specific disturbance data because there is no documentation that these result in population changes. However, the distribution of the seals among sub-sites is critical information because females with pups prefer the same sand bars where the oyster operation in 2007 expanded to new areas (that were claimed as having been previously cultivated). If females with pups are unable to use these preferred sub-sites due to oyster operations, then we believe it is reasonable to infer that they would be forced to shift to other sub-sites lower in habitat quality important to pup-raising, such as those sites that under certain tide, wind or wave conditions may be occasionally connected to the mainland. Such shifts may not result in any short-term change in the overall population, but in the long-term, changes may occur when terrestrial predators inevitably discover that they have access to the relocated pupping areas.

Yet the NAS also admits (pg 38): “It would be challenging to design a study that could demonstrate whether or not short-term responses to disturbance have long-term population consequences for harbor seals, and no studies of this kind have yet been conducted anywhere.” By this standard the NAS claim that the NPS studies did not conclusively demonstrate population change is understandable, but not helpful in suggesting NPS management action. That concern is mitigated somewhat by the NAS noting that “a 1.5-km buffer exists around harbor seal haul-out sites in the Dutch Wadden Sea to exclude recreational disturbance (Brasseur and Fedak, 2003) and where a 500 m exclusion zone around breeding and molting haul-out sites has been included in the mariculture industry’s best practice guidelines in Shetland, United Kingdom.”

But it is not clear why NAS cites studies in Europe that inferred but did not prove population change, while ignoring not only studies in the Estero itself that inferred but did not prove population change, but also the eye-witness accounts (see photo on page 9). Nonetheless the NAS states (pg 38): “In the absence of additional research [albeit never yet accomplished anywhere], a precautionary approach to management would seek to reduce types of disturbance that affect behavior during the breeding season to avoid potential population effects that would only be evident with long term monitoring.” But that is exactly what NPS did, using its best available science.

The NAS Report conflicts with the MMPA definition of harassment as any alteration of behavior and thus its dismissal of site-specific impacts conflicts with the precautionary principle that has been the basis of the MMPA from its beginning as well with NPS management policy stating: “In cases of uncertainty as to the impacts of activities on park natural resources, the protection of natural resources will predominate.” The NPS study of site-specific impacts conforms to both NPS management policy and to the MMPA and provides at least an inference of potential impact that should not be dismissed as adequate support for precautionary management action.

Low or mitigated levels of oyster operation are inappropriately used to disqualify data supporting precautionary management action

The NAS concludes (pg 5 (emphasis ours) “that there is a lack of strong scientific evidence that shellfish farming has major adverse ecological effects on Drakes Estero at the current levels of production and under current operational practices.” However, the NAS Report fails to adequately clarify that Versions I and II of the NPS Sheltered Wilderness document (October „06 and Feb’ 07) noted (pg 13): “Disturbances to resting and breeding seals currently remain low because oyster activities are not occurring at existing haul out sites.” This situation changed prior to the start of the 2007 pupping season because the oyster operation expanded operations to new areas claimed as previously cultivated but which seals had re-colonized. Please see map on page 11 from August 2006 and compare to the CCC map on page 12 that shows the location of oyster beds the following year (2007). Please note that the number of active beds doubled from 2006 to 2007, including new beds 14, 15, 16, and 17 (at the bottom of the CCC map) within or near a Harbor Seal Protection Area.

Thus the NPS Sheltered Wilderness Report May „07 version that mentions site-specific impacts to seals was not, as NAS claims (pg 53) due to “hasty responses to local stakeholder concerns by NPS.” Instead the NPS Report prepared for the May „07 County Supervisor’s meeting was necessarily interim regarding site-specific impacts from very recent oyster expansions whose impacts on the full 2007 pupping season could not be analyzed until the season ended on June 30, 2007.

Furthermore, potential impacts were detected by NPS in 2007 and largely mitigated by the CCC Regulations by 2008, so the impacts were negligible again. However, NAS fails to acknowledge that DBOC did not agree to the “current operational practices, including compliance with restrictions to protect eelgrass, seals, waterbirds, and other natural resources” until November 2007 when it signed the CCC Cease and Desist Order. Prior to that date, DBOC claimed compliance only with the 1992 Agreement, which has been pointed out is not an equivalent to the CCC Regulations on operational practices. Additionally NAS failed to acknowledge that DBOC did not agree until November 2007 to any cap “at the current levels of production.” Thus, it is misleading for the NAS to claim in its press release that “CURRENT LEVEL OF OYSTER FARMING UNLIKELY TO HAVE SUBSTANTIAL IMPACT ON DRAKES ESTERO ECOSYSTEM” when the NPS concern was unabated expansion beyond current levels of production and lack of adequate restrictions on then-current operational practices.

Summary

We believe that NAS harbor seal conclusions conflict with the precautionary principle that has been the basis of the MMPA from its beginning as well as NPS management policy that states "In cases of uncertainty as to the impacts of activities on park natural resources, the protection of natural resources will predominate." The NAS Report thus creates confusion regarding the Marine Mammal Protection Act (MMPA) and National Park Service (NPS) policy and law. Unless clarified, the NAS Report could inadvertently lead to more permissive, but unjustified, management policies that could increase harassment of marine mammals. Thank you for considering our concerns about the NAS Report. We encourage you to request clarification of concerns that your agencies may also have.

Sincerely,



Gordon Bennett, Sierra Club Marin Group Coastal Chair and
2003 National Marine Sanctuary Foundation Volunteer of the Year and
15-year Volunteer for Gulf of the Farallones National Marine Sanctuary

Attachments: Harassment Photo pg 9, Oyster/Seal Maps pg 10, 11, 12

**EYEWITNESS ACCOUNT AND PHOTO (BEST SEEN IN ELECTRONIC FORM)
OF SEAL DISTURBANCE BY OYSTER BOAT**

Caption: Nov 9, 2007: "white outbd motor boat just behind site UEN...Seals - 47 - gave head alerts and flush water....during oystermen's presence..." (photo credit withheld at the request of the photographer).

It is unfortunate that the NAS Report singled out NPS volunteer seal monitors as possible sources of data error when confronted with denials of that data by those with an economic interest in the conclusions drawn. Increasingly, many research projects in our parks and elsewhere depend on volunteers to gather information that would be otherwise uneconomical and thus impossible to collect. Studies show that well-trained volunteers can collect data of equal quality compared to paid professionals. It benefits nothing, and least of all progress in science, to denigrate the efforts of such citizen scientists.

The NAS Report attempts to dismiss eyewitness accounts by local citizen scientists of seal disturbance by oyster boats (see above) as merely inferring potential cause and effect rather than demonstrating direct cause and effect. It is theoretically possible that every single time a NPS volunteer believed that they saw the oyster boat disturbing seals, the disturbance was actually caused by a simultaneous and proximate event unrelated to the oyster boat. But it is unlikely beyond a reasonable doubt. The tortured logic of the NAS Report leaves NPS volunteers in limbo as to whether they can believe their own eyes.

NOTE MAPS ON PAGES 10, 11 AND 12 SENT SEPARATELY