MARINE MAMMAL COMMISSION
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Dear Chairman Watkins:

Following my 22 February 2002 presentation to the U.S. Ocean Policy Commission you sent me a number of questions regarding the management of living marine resources. I apologize for the delay in responding. I hope that my responses will be helpful to you and the Commission as you prepare recommendations for a national ocean policy. Your questions and my responses are as follows.

1a. How important are "baseline data" in the management of living marine resources?

Baseline data are fundamental to the management of living marine resources. One of management's major goals is to prevent unacceptable levels of human-related degradation or change of marine ecosystems and the living resources they contain. Baseline data are essential to our efforts to characterize marine ecosystems in their natural state (i.e., to characterize that which management seeks to conserve), thereby providing the necessary reference information for assessment of change or degradation. Without essential baseline information, management often cannot determine the extent of human-related ecosystem change that may have occurred or the relative influence of natural versus human-related factors contributing to such change.

One member of the Marine Mammal Commission (P.K. Dayton) has co-authored two recent scientific papers[1] that discuss the importance of baseline data. Those papers point out that in many, if not most, cases scientists and managers have failed to develop or collect the data necessary to understand baseline conditions. As a result, they lack the standard or reference point needed to measure or appreciate the nature and extent of changes that have occurred in marine ecosystems.

1b. Has the presence or absence of baseline data available made a difference in the management of marine mammals? Why or why not?

Both the presence and the absence of essential baseline data have been important determinants of management success. In 1994 the eastern Pacific stock of gray whales was removed from the endangered species list because counts indicated that the population had recovered to a level consistent with its historical abundance. In this case,

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comparisons to historical baseline data provided the essential evidence that the population had recovered to a size near that which might be expected under natural conditions and was no longer in need of the special protections of the Endangered Species Act.

Conversely, the debate over the effects of groundfish fisheries on the Steller sea lion and Alaska marine ecosystems has been severely confounded by the absence of essential baseline information on the nature of those ecosystems, including abundance, variability, and trends of their living marine resources. The absence of essential baseline data effectively prevents managers from distinguishing the relative effects of the groundfish fisheries versus environmental regime shifts and natural predation. Potential effects related to fisheries also are a significant concern with respect to coastal bottlenose dolphins along the eastern and southeastern coasts of the United States. In this case, the lack of baseline data on dolphin stock structure, abundance, and incidental mortality in gillnet and other fisheries has been a significant impediment to the development of management measures to reduce fishery effects on dolphin stocks and facilitate their recovery without unnecessary constraints on the fisheries. The lack of baseline information may put living marine resources at excessive risk if the effects of the fisheries are underestimated, or could lead to unnecessary regulation of fisheries if their effects are overestimated.

The lack of baseline information for marine mammals is evident on a broad scale in stock assessment reports prepared by the National Marine Fisheries Service. Abundance data - perhaps the most important baseline information - are not available for 11 of 32 stocks of marine mammals identified in Alaska waters. If not remedied, this lack of baseline data will be a significant impediment to the conservation and management of these species, particularly in view of the potentially profound effects of global warming on Arctic ecosystems and the marine mammals that exist only within those ecosystems.

Similarly, the lack of essential baseline information on fish stocks targeted or taken incidentally in marine fisheries is a significant impediment to assessment of the health of those stocks and marine ecosystems generally. The current fishery management regime is founded on maximum sustainable yield theory which, in practice, is based on either presumed stock-recruitment relations or proxy's of such because real stock-recruitment relations are unknown for the majority of target stocks. To make matters worse, baseline information on the ecological effects of fishing is also largely unknown. As the affected fish stocks are often important prey for marine mammals, the lack of information on fishery effects leads to uncertainty with respect to indirect effects of fisheries on marine mammals.

Baseline data are also important with respect to other human impacts in the marine environment, such as pollution and noise. In recent years, for example, managers have become more concerned about the potentially significant but poorly understood effects of human-generated noise. Hearing, rather than vision, may be the most important sensory function in the marine environment, and excessive noise may adversely affect marine mammals in ways that scientists are just beginning to investigate and understand. Anthropogenic sound or noise may be introduced into the marine environment by a range of human activities including, but not limited to, commercial shipping and recreational boating; coastal development; oil and gas exploration and drilling; construction, demolition, and blasting; and deployment of sonar systems in fisheries and for military purposes. Studies have been initiated to investigate the effects of noise on marine mammals, but baseline data on noise levels, hearing sensitivity, and the effects of noise introduced into the marine environment are still lacking for the nearly all species.

2a. Do the Marine Mammal Protection Act and the National Environmental Policy Act provide sufficient authority to protect manatees from changes in power plant operations?

The National Environmental Policy Act (NEPA) does not require specific levels of protection for marine mammal or other species. This Act simply requires that the environmental effects of proposed major federal actions be analyzed with respect to their effects on the human environment (including manatees) and that alternatives be considered when potential effects are deemed significant. It is not clear that changes in power plant operations would constitute a "major federal action" triggering an analysis under NEPA.

The Marine Mammal Protection Act does not include provisions specific to the effects of power plant operations on manatees. Contrary to the more common situation where human activities have a potentially detrimental effect on marine mammals, thermal effluent of these power plants has created additional winter habitat for manatees and the cessation of power plant operation would eliminate the associated beneficial effects.

The issue is confounded by two important considerations. First, much of the natural winter habitat of manatees located to the south of the power plants has been lost due to other human activities, and therefore alternative habitat may not be available in sufficient amounts to support either the existing population or a recovered population. Second, the manatees themselves appear to have adapted to the winter refuges created by power plant thermal discharge and may be at grave risk of cold-related mortality if such effluent is no longer available. For those reasons, additional steps appear necessary to ensure that manatee populations are not put at additional risk by further loss of their natural habitat or the potential loss of the

artificial warm-water upon which they have come to depend. Thus, the issue in question is not the imposition of detrimental effects from an activity, but rather the withdrawal or cessation of beneficial effects that may be essential to the recovery of manatees.

In the context of the Marine Mammal Protection Act, the crucial question is whether changes in power plant operations would constitute a "taking" of manatees even if some animals died or were injured as a result. It is not clear that the elimination of thermal effluent, particularly if it occurred during a time of the year when manatees were not dependent on such warm water sources, would be considered to be a taking. If a federal action is involved in authorizing the changes, the Endangered Species Act would likely provide the best means of ensuring that manatees are not jeopardized or their critical habitat adversely modified.

2b. What step should the Commission on Ocean Policy take to prevent or mitigate this potential problem?

The key management steps at this point are to complete a full assessment of manatee habitat and to provide the protection necessary to ensure that further habitat loss does not occur. Once these steps have been accomplished, managers will have to determine whether 1) to maintain the warm-water habitat created by the power plants as a substitute for lost natural habitat, 2) to attempt to wean manatees from these warm-water refuges, or 3) to find or create alternative thermal sources.

Although this problem and the need for resolution have been clear to management authorities for a decade or more, progress has been inordinately slow and management's approach is not yet clear. In a 2000 report to Florida Power and Light[2], I attempted to provide a basis for moving forward. My review of the warm-water issue summarized the physiological vulnerability of manatees to cold water, described the consequences of past incidents when warm-water sources were diminished and additional threats to manatees if more warm-water sites are eliminated, mapped the distribution of manatees, and finally proposed the creation of warm-water refugia independent of power plant operations and sufficient to sustain a recovered population of manatees in the future. In view of the already extensive loss of natural manatee habitat and the continued threats to remaining habitat, such refugia appear necessary to ensure the long-term conservation of a healthy, recovered population of manatees in Florida.

3. How would you "harmonize" marine mammal policy (i.e., how would you coordinate marine mammal management tasks spread across agencies)?

Management responsibilities pertaining to marine mammals are defined by the laws governing such management, including the Marine Mammal

Protection Act. First and foremost, careful adherence to the mandates of these laws by all responsible agencies is essential to provide for consistency in management of marine mammals.

Second, the agencies with primary responsibility for marine mammal management (i.e., the National Marine Fisheries Service and the Fish and Wildlife Service) meet these obligations by adopting numerous policies, some of which are reflected in implementing regulations. Collaboration and consistency in the development and implementation of such policies and regulations provide another opportunity to harmonize marine mammal management practices.

Third, the agencies with primary management responsibility for marine mammal management often are also responsible for other activities that may conflict with their marine mammal policies. Mechanisms for independent oversight are necessary to avoid situations in which these potentially conflicting responsibilities may be resolved in a way that undermines successful marine mammal management. Such oversight provides an opportunity for objective, independent review of the actions and policies within each agency involved in marine mammal management, and for comparison of the policies and actions among the multiple agencies which share these responsibilities.

Another mechanism that could be used to harmonize the management of marine mammals would be to place all management authority in a single agency. Such consolidation of authority may provide the most certain mechanism to ensure consistency in the management of marine mammals. This alternative would require both legislation to transfer authority and strong leadership to ensure the success of the transfer.

4. How do you convince the public that the "precautionary principle" is a useful tool?

The precautionary principle is used in the management of living marine resources in essentially the same manner as it is used in our daily lives. In our daily lives we identify those things that are of greatest value to us and, whenever those values are at risk, we take the precautionary steps needed to ensure that they are protected. Parents, for example, expend extensive resources to ensure that their children have food, clothing, shelter, insurance, health care, education, and the opportunity to lead happy and productive lives. Whenever the future availability of those resources is in doubt, parents take the extra precautionary steps to ensure that the resources will be available to their children in the future.

As a society we have placed great value in the quality of our marine environment and the living resources therein. Such value is expressed in our nation's laws, such as the Marine Mammal Protection Act, which implement the precautionary principle to ensure protection of the environment for the use and enjoyment of future generations. To

facilitate the public's awareness of and appreciation for the precautionary principle, it is essential that managers and scientists provide to the public realistic, accurate assessments of the status of our marine living resources, the nature and extent of the threats to those resources and the marine environment in general, and the short- and long-term costs associated with their loss. If well informed about the status of marine resources, the known and potential threats to them, and the costs associated with their loss, the public is likely to both understand and support a precautionary approach to marine resource management.

5. What recommendations would you make regarding Marine Protected Areas if you were a member of the Commission?

Marine Protected Areas provide a range of potential benefits. They help to ensure that our nation's natural marine ecosystems are not destroyed or adversely modified to the extent that they can no longer provide the advantages (products and services) of healthy marine ecosystems. The following are necessary to ensure that Marine Protected Areas are used effectively. Marine Protected areas should be established and managed

- with clearly established goals, objectives, and oversight to ensure accountability and success of management;
- to perpetuate reserve areas with natural ecosystem composition and function. Such areas are important to provide, among other things, a reference for understanding natural marine processes and a completely protected resource base for otherwise unprotected areas;
- in accordance with the precautionary principle; that is, they should be established pro-actively to provide the necessary level of protection before activities are allowed to destroy or diminish the long-term value of their resources;
- in areas where they will provide the greatest overall benefit; i.e., those areas where important resources are located and are vulnerable to destruction or unacceptable adverse modification;
- on a scale large enough to ensure the protection of the all the resources and habitat types of concern, and to ensure that those resources and habitats are self-sustaining;
- in a manner that is not under the direct control of the agencies and organizations that would benefit from the utilization of the resources being protected, but with the participation of stakeholders;
- with allowance for suitable levels of research and education;

- with effective monitoring and enforcement; and
- with adequate resources (budget) to achieve the stated goals and objectives.

6. What is the federal investment in marine mammal research, including the magnitude of state versus federal investment and the contribution of the various agencies?

In fiscal year 1999 the Federal government funded about $35M dollars for marine mammal research. For fiscal years 1995 through 1999, funding patterns were as indicated in the following table (in thousands of dollars).

Department/Agency	FY95	FY96	FY97	FY98	FY99
Commerce					
Natl. Marine Fisheries Service	16,582	12,973	12,351	17,448	17,422
Natl. Ocean Service				25	173
Natl. Sea Grant Program	387	158	136	152	25
Ocean and Coastal Resource Mgmt.	2	76	170	215	
Defense					
Advanced Research Projects Agency	842	1,144	250		
Air Force	127	89	135	100	
Army	282	282			
Navy	5,439	4,862	6,364	11,258	6,625
Strategic Environmental Research	852	2,684	2,120	1,908	370
Health and Human Services	788	361	?	?	?
Interior					
Fish and Wildlife Service	182	161	214	578	433
Geological Survey			2,151	1,795	2,306
Minerals Management Service	648	1027	1,150	1,349	1,690
Interior, cont.					
Natl. Biological Service	2,432	2,119			
Natl. Park Service	6	31	444	186	378
State	1,162	1,012	993	1,113	608
Transportation	80	80	80	140	285
Environmental Protection Agency	85	1378		35	
Marine Mammal Commission	46	13	44	15	131
Natl. Aeronautics and Space Admin.	30	26	24	31	33
Natl. Science Foundation	1,292	1,054	1,025	275	4,165
Smithsonian Institution	239	269	155	171	172
Totals (thousands)	31,503	29,799	27,806	36,794	34,816

The above data on federal spending levels are from:

Waring, G.H. 2001. Survey of Federally-Funded Marine Mammal Research and Studies, FY74-FY99. Final Report to the U.S. Marine Mammal Commission in Fulfillment of Contract T74464724. Available from the Marine Mammal Commission, 4340 East-West Highway, Room 905, Bethesda, Maryland 20814.

The table is currently being updated to include more recent funding levels. The amount spent in 2001 and 2002 is known to have increased markedly due to Congressional appropriations for research on Steller sea lions and their interactions with the Alaska groundfish fisheries. From 2000 to 2001, funding for research on this issue increased from $4.85M to $43.15M, an increase of $38.30M, which is more than the estimated total allocated to marine mammal research in fiscal year 1999.

The Marine Mammal Commission does not have information available on state spending on marine mammals.

Again, I hope that the above information will be of use to you and the U.S. Commission on Ocean Policy in preparing your recommendations for a national ocean policy. If you have questions about my responses or would like me to provide additional information, please don't hesitate to contact me.

Sincerely,

John E. Reynolds, Ph.D.
Chairman

Citations

1. Dayton, P.K., M.J. Tegner, P.B. Edwards, and K.L. Riser. 1998. Sliding baselines, ghosts, and reduced expectations in kelp forest communities. Ecological Applications 8:309-322.

Dayton, P.K., E. Sala, M.J. Tegner, and S. Thrush. 2000. Marine Reserves: Parks, baselines, and fishery enhancement. Bulletin of Marine Science 66:617-634.

2. Reynolds, J.E. 2000. Possible locations for long-term, warm-water refugia for manatees in Florida: Alternatives to power plants. Report prepared for Environmental Services, Florida Power & Light Company, P.O. Box 14000, Juno Beach, FL 33408.