

**Process Assessment Report
for a
Dialogue on Impacts of Anthropogenic
Noise on Marine Mammals**

Prepared for the
Marine Mammal Commission
By the independent facilitation team of

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Anthropogenic Noise on Marine Mammals**

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Process Assessment for Dialogue on Impacts of Anthropogenic Noise on Marine Mammals

I. Introduction

A. Background

The U.S. Congress has directed the Marine Mammal Commission (via the Omnibus Appropriations Act of 2003) to organize a series of meetings to consider the impacts of anthropogenic sound on marine mammals, specifically “to share findings, survey acoustic threats to marine mammals, and develop means of reducing those threats while maintaining the oceans as a global highway of international commerce.” The Marine Mammal Commission (the Commission) has responded by exploring the potential for a multi-stakeholder dialogue focused on consideration of current understanding and available information regarding this complex topic, prioritizing outstanding research needs, and developing proposals for appropriate management actions while research is proceeding. The Commission, in cooperation with the U.S. Institute for Environmental Conflict Resolution, has contracted with a team of professional facilitators to assist them in assessing the most promising approach to this effort and conducting a meaningful and productive dialogue.

B. Purpose and goals of the assessment

A critical first step in considering and planning for a multi-stakeholder collaborative dialogue is to conduct a thorough and neutral assessment of the circumstances, issues and concerns - historical, current and evolving - that have brought the specific topic to the attention of decision makers. The purpose of the assessment is to inform the decision regarding whether to proceed with a collaborative dialogue process, and if so, what form it might take to optimize its success. To accomplish this, the specific goals of the assessment process include the identification of:

- the range of interested and affected parties;
- key issues and concerns that parties believe should be addressed by a dialogue for it to be meaningful;
- areas of controversy;
- areas of agreement or potential agreement;
- information and expertise needed for a well-informed dialogue;
- the level of interest in and support for a dialogue on the topic; and
- any external factors that could affect the success of a dialogue.

This information is then used to consider the feasibility of convening a productive dialogue, the potential representation of interests and membership in the dialogue group, the scope and focus of issues to be addressed, and the development of design options for the process.

C. Description of the assessment process.

Working from an initial list compiled by the Marine Mammal Commission, and subsequently augmented by suggestions from interviewees themselves, the facilitation team interviewed eighty individuals, using an interview protocol that was designed to solicit the information described above.¹ Interviews were conducted by telephone and in person over a period of nine weeks from September 10 to November 14, 2003. Concurrently, a Federal Register Notice was issued announcing the potential for the formation of a Federal Advisory Committee and soliciting comment, including nominations for participants and issues for discussion.² Comments received in response to this notice are considered part of the assessment process, and individuals nominated through this process were interviewed.

The range of individuals interviewed reflected the range of interests and perspectives on this topic. They included:

- producers and/or users of sound in the marine environment that has the potential to impact marine mammals (particularly oil and gas exploration and production, military sonar, scientific research, shipping, etc.);
- non-governmental environmental and animal welfare groups (national, international and regional);
- governmental authorities with responsibility for management of marine mammals and/or regulation or oversight of activities with potential impacts on marine mammals (federal and state);
- Scientific experts in the fields of study relevant to the assessment of potential impacts of anthropogenic sound on marine mammals;

It is worth noting that overall, those interviewed were responsive, interested and supportive of an effort to bring people together to address this topic, and of the role of the Marine Mammal Commission in convening such a process. Without exception, interviewees were generous with their time and thoughtful in their responses to the interview questions. The facilitation team believes that this bodes well for the prospects of a productive dialogue.

The information and insights collected through this assessment are summarized in this report. Issues identified as important by various interviewees are outlined in some detail. Recommendations regarding the structure of a Federal Advisory Committee process are also described in detail.

II. Assessment of Feasibility of Productive Collaboration and Dialogue

A. Potential for Success

The interview results support the creation of a multi-stakeholder group to discuss and collaborate on marine mammal and sound issues. Because the Commission has stated its intention to seek advice from the range of interest groups about its report to Congress, the stakeholder group should be structured as a Federal Advisory Committee. The interviews did not identify any significant barriers

¹ The list of individuals interviewed is included as Appendix A; a copy of the interview protocol is attached as Appendix B).

² Federal Register /Vol 68, No. 203 /Tuesday, October 21, 2003/Notices/60120

to an Advisory Committee approach, and thus the facilitation team focused much of the interview process on how the discussions could be structured to be most productive, rather on whether they should occur.

The process assessment for a policy dialogue/Federal Advisory Committee on Anthropogenic Sound and Marine Mammals has generated considerable interest and engagement from the affected interest groups. The issues that such a Committee can address are highly dynamic and controversial, in part because both the science and policy are emerging arenas, and the problems are broad in scope and not well understood. The facilitation team, after conducting over eighty interviews, is impressed with the high level of knowledge and commitment to these issues from all involved. There was very little questioning about whether an Advisory Committee would be useful, and many, many of the interviewees made excellent suggestions for structuring the process, and indicated their desire to participate and make progress on the topic. The issues are complex and challenging to discuss in a cross-disciplinary fashion, but that is what is needed at this time, given the desire to address implementation of the NRC reports, and avoid litigation.

B. Areas Most Amenable to Discussion and Possible Agreement

The interviews identified several issue areas that appear to be amenable to discussion and, possibly, agreement in an Advisory Committee process. Among the areas most frequently mentioned as potentially productive in the interviews are the following:

- There is a need to stabilize and make more predictable what at times is a very dynamic process of developing the science and applying it to management actions. The proposed Advisory Committee could help in that effort by crafting recommendations for a comprehensive, implementable, coordinated approach to moving forward on the science and the policy issues over the next ten-to-fifteen years. Some referred to this approach as a “road map,” or an implementation plan for the previous NRC reports.
- As part of the “road map” the most important research questions for the near and far term should be discussed and prioritized. Agreement on research priorities will benefit from the involvement of all stakeholders, though it may be important to note that introducers of sound are likely to develop information outside of the priorities to support their future activities and regulatory affairs.
- There are barriers to moving forward with the scientific and regulatory efforts that may be addressed successfully through collaboration. Options suggested for addressing these barriers include establishing independent administration of research funding that may help produce information that is credible with multiple stakeholders, pooling funding to improve research capabilities and designs, coordinating monitoring and data management efforts to build a more available and reliable information base for all involved, and integrating U.S. scientific efforts, policies and approaches with those in other countries.
- The management questions that will arise as the science moves forward have created many of the legal and policy controversies to date. Some of these may be addressed by an Advisory Committee through discussion and development of recommendations to the

Marine Mammal Commission and Congress. Fruitful areas for discussion that could improve understanding and develop approaches to reduce the management-related controversies include:

- ~ what constitutes a quality risk assessment;
- ~ when do you have enough information to determine the effects of sound producing activities;
- ~ whether and/or how to mitigate for some impacts; and
- ~ whether and/or how to conduct research activities that may produce some marine mammal impacts but benefit the mammals in the long run.

C. Factors Affecting Success

Experience with past voluntary collaborative efforts has shown that certain factors can affect success of these processes. The assessment team reviewed the interview results to determine whether and how certain prerequisites for success are met. The assessment process established that the proposed Advisory Committee has the potential to succeed because it meets some key criteria for success, as outlined below.

- The process will be product focused, given the need for a report from the Commission to Congress, and the desire of the Commission to identify useful and implementable ideas to include in that report. This focus will provide direction and incentives for participants to tackle the tough issues inherent in this topic.
- Representatives of all affected interest groups are willing to participate. Affected interest groups are defined as including those who may be involved in implementing the proposed Committee's product, those with resources to apply to solutions, those with information essential to creating a high quality product, and those who can block implementation of the product. For this process, there may be some hesitation to participation from groups who are not currently engaged in the debate, such as the shipping industry, but even there some representation of those interests is achievable.
- Expertise is available to inform the discussions and the outcome. Scientists interviewed expressed willingness to work with the Commission and the proposed Advisory Committee to evaluate the existing science and develop an understanding of the most important future directions for scientific inquiry and documentation. Many interviewees pointed out that the National Research Council (NRC) has already produced recommendations for improving the science, and the future directions for scientific exploration. They suggested that the proposed Advisory Committee build on those efforts, and rather than duplicate what the NRC efforts.
- Necessary time and resources are available to conduct the collaborative effort, and there is a deadline that provides a backstop and endpoint to the effort.
- Most parties feel they have something to gain from the process. Potential gains most often mentioned were: preventing further gridlock on policy questions, engaging in a forum for

meaningful discussion of some of the uncertainties and plans for addressing them, and helping to shape the approaches that will be developed for future management activities.

III. Issues of Concern

The summary of issues that follows represents an effort to reflect accurately, in some detail, and without judgment or bias, the input received from the interviews conducted. This section focuses primarily on responses to four of the questions in the interview protocol:

- A. What do you believe are the critical questions/issues that need to be addressed to take this issue to the next level?
- B. What are your/your organizations goals with respect to this issue?
- C. What do you think are the major challenges or barriers that will need to be addressed in order to make meaningful progress on this topic?
- D. What do you think would be the appropriate relative emphasis on science versus management and policy in a new discussion?

The responses to these four questions were used extensively to guide the recommendations about how to structure the proposed Advisory Committee process. Issues and concerns raised in interviews fell into several categories: science and research, research process, policy and management and other issues raised.

A. Science and Research Questions and Concerns

Interviewees emphasized that the magnitude of what we still do not understand about marine mammals and the impacts of anthropogenic noise creates an atmosphere of considerable uncertainty and, often, controversy. The scientific process of addressing these issues is unfolding slowly and faces many challenges, many of them a function of the difficulty of studying these widely dispersed, difficult to observe, ocean-dwelling animals.

From the points of view of the interviewees, the scientific questions most in need of being addressed are those related to understanding the nature and extent of the problem in order to characterize and quantify the threat. This is necessary in order to understand the extent and types of management or mitigation that are needed and/or would be effective to minimize or eliminate the threats.

Interviewees noted the following specific areas where scientific inquiry is needed:

1. **Understanding the sources of sound and their characteristics** (frequency, duration, loudness, location, chronic, acute/episodic, cumulative, etc.)
2. **Understanding the characteristics of marine mammals as the receivers of sound.** That is, how does sound affect marine mammals. We need a much better understanding of

- marine mammal hearing;
 - the use of sound by marine mammals – including the characteristics of the sound they produce and use themselves (both communication and echo-location);
 - Pathways of impacts: auditory and non-auditory mechanisms, and relationship between behavioral impacts and injury;
 - the implications of chronic noise (e.g. from shipping);
 - the role and significance of masking;
 - validation and improved understanding of temporary threshold shift (TTS), its significance and its short and long-term implications for both behavioral changes and injury. The same questions apply to permanent threshold shift (PTS).
 - thresholds of noise that cause significant behavioral changes and/or lead to injury – for different types of sound and different species and under what conditions;
 - differences and similarities in all of the above among various species or groupings of species.
3. **Baseline natural history, biology and ecology of marine mammals.** With limited information on normal behaviors, populations and distribution, it is difficult to assess changes that may be the result of the introduction of noise. Specific areas suggested for exploration include:
 - habitat needs and identification of sensitive areas/seasons;
 - status of populations and distribution;
 - patterns of movements;
 - role of sound and hearing in maintaining behaviors necessary to healthy populations.
 4. Careful consideration of **the usefulness and validity of extrapolation of data** – between marine mammal species, between terrestrial (including human) and marine species, and from very small numbers of individual animals to larger numbers.
 5. **Systematic collection and evaluation of correlational data.** Data on strandings and on noise generation exist that could provide potentially valuable insights. Interviewees on all sides of the debate noted the need for these and other data to be centralized and made widely accessible.
 6. Assessment of **the effectiveness of different mitigation strategies** (e.g. ramp-up).

B. Research Process Issues

Interviewees identified a number of challenges that are hampering the ability to increase and/or improve research on marine mammals and sound.

1. Greater mutual understanding and **agreement on research priorities** could help bring more cooperation to this issue. Interest groups do not agree on where research energies should be focused.
2. An often lengthy, and sometimes unpredictable **permitting process** causes delays and diversion of resources that are needed for the research itself. Much marine mammal research is seasonally dependent, and delays can be costly, and in some cases, create barriers to conducting research..

3. There is **controversy over the use of sound in research to determine its effects**. It is troubling to some that in order to determine the effects of different kinds and levels of sound it may be necessary to intentionally expose animals to potentially harmful sound. Some interests accept that it may be necessary to cause harm to a limited number of individual in the short term in order to gain greater certainty regarding the effects of sound. Others do not.
4. **The assumption on the part of some that there is a bias in some science and research based on its funding source** has and continues to cause controversy among groups and individuals, making collaboration and joint problem solving extremely difficult. While some feel strongly that this is a false assumption, it is generally acknowledged that even the perception is problematic. Many interviewees suggested the need to explore the potential for an independently administered, credible (peer reviewed) and transparent process for funding scientific research on marine mammals and sound.
5. Some interviewees expressed **the desire for greater openness and transparency with respect to data analysis related to specific incidents** (e.g. where there is a question of a link between anthropogenic noise and strandings; necropsies on animals, etc.).
6. The **research needs are huge, and the resources available to conduct the research are limited**, both in terms of funding and in the number of scientists qualified and available to accomplish research goals and needs. Many scientists pointed out that there is a relatively small community of scientists working on the relevant topics, which limits the existing research capacity.
7. There is a need for focus on **improving data gathering tools and methodologies**. Interviewees noted the difficulty of studying marine mammal, particularly cetaceans, due to the fact that they live in the ocean, are often wide ranging and deep diving, and are long-lived. Observations are often unpredictable, localized, and involve small numbers that may or may not be representative. Normal behaviors are difficult to observe in the wild, and for most species, cannot be observed in captivity. New technologies are needed, as is greater access to (and resources for) existing and emerging new research technologies, not only for studying marine mammals, but also for preventing undesirable impacts during sound producing activities, like oil and gas exploration, submarine location, etc.

C. Policy and Management Issues

Interviewees acknowledged the enormous difficulty for policy development and regulatory decision making that is the result of the high level of scientific uncertainty regarding impacts of anthropogenic sound on marine mammals. There is general agreement that the science needed to inform policy is not yet developed to the point of providing strong support for regulatory actions. . Even if the science was available to the degree desired by the policy makers, it might not solve the problem of determining what consequences are acceptable or not as a matter of public policy. When there is great uncertainty about the science, the consequences of policy decisions are more open to debate and criticism, and legal challenge.

The following issues and questions related to policy, regulation and impact management were identified by interviewees as critical to the discussion of this topic:

1. **How precautionary should policies be in view of the high level of uncertainty?** Not surprisingly, some interviewees believe we should seriously curtail noise-producing activities until we have better information, and others believe that without clear evidence of a problem, activities should be allowed to proceed until science can identify specific harmful impacts. Related to this are questions such as:
 - What is the acceptable level of risk to marine mammals, and how can we even assess the risk in the absence of better scientific understanding?
 - What is a biologically significant impact from sound on marine mammals, from a regulatory standpoint?
 - How do we define “take” or “harassment”? Can we use the information we already have to develop a useful, science-based system to determine take, harassment, and negligible impact?
 - Should national security issues play a role in marine mammal risk assessment, if yes, when and how?

2. Policy decisions are being made even in the absence of greater clarity of scientific understanding, even if they are short-term. The regulated community seeks **predictability and transparency in the regulation** of their activities.

3. A full **range of management options, including mitigation, to minimize potential impacts** should be explored, and mechanisms for evaluating their effectiveness are needed. Among the mitigation options mentioned by interviewees are:
 - non-intrusive methods and technologies for avoiding acoustic impacts on marine mammals
 - geographic and/or seasonal exclusion zones;
 - more effective monitoring methods and observation tools;
 - quieting technologies for ships;
 - ramp-up strategies;
 - distance from shore;
 - elimination or minimization of unnecessary noise production (e.g., non-constant operation of sonar by ships)

D. Other Issues of Concern

1. Many noted the **need to improve public understanding of the issues** related to marine mammals and anthropogenic sound. Attempts to simplify the issue have sometimes lead to inaccurate understanding. The public policy debate needs to be elevated to a level that will take into account the complexity and uncertainty inherent in this topic as it seeks solutions. Scientists, government, environmental groups and the regulated community all have an important role to play in ensuring that the public debate addresses the real problems, and neither sweeps important dimensions under the rug nor mis-characterize an issue for political purposes.

2. **Dialogue on this issue needs to be international in scope**, from the standpoint of both science and policy. Marine mammals and propagation of sound in the ocean do not respect political boundaries, and solutions will ultimately require international attention and collaboration. International treaties and laws, and international bodies such as the European Union and NATO as well as individual national governments, multi-national corporations, and international NGOs

and scientists will have roles to play. Some international entities are already actively considering this issue and those activities should be brought to the attention of the policy dialogue being contemplated here.

3. The interviews revealed that one factor in the controversy over this topic is what might be described as **fundamental value differences among parties regarding marine mammal protection** and the appropriate relationship between them and humans, including the extent to which marine mammals are deserving of a level of respect equivalent to that afforded to humans. While most of those interviewed indicated an awareness of these value differences and their roles in the polarized debates, many also indicated a willingness to look for solutions that realistically reflect the range of interests and perspectives on this issue.

E. Interviewee and Organizational Goals Regarding Marine Mammal and Sound

Responses to the question regarding the goals of the interviewees and their organization with regard to the topic of marine mammals and noise fell into several categories: policy and management goals; science and research goals, process-related goals and overall goals. These categories, and the order in which they appear, are not meant to imply any prioritization, nor are they intended to constrain the scope of discussion of any particular goal described. The interviewee responses listed below identify goals of individual organizations, and do not reflect any general consensus.

1. Process goals

- Clarify among parties what battles we really need to fight and not create unnecessary and unproductive ones. Getting agreement on what we know with confidence would be a first step, as it will help us to understand the things we really need to be worried about.
- Improve relations among parties. This is a small community of actively interested parties, who need each other in order to make progress on this topic.
- Improve sharing of information that has been collected, including data regarding strandings and noise producing activities.
- Educate and engage noise producers for whom noise is a by-product and look for ways to eliminate or minimize “needless” noise.

2. Policy and management goals

- Policies that balance environmental concerns with other uses of the marine environment including resource exploration and extraction, national security, and commerce.
- Policies that respect and protect marine mammal welfare and incorporate management and mitigation actions in the near term even while we are awaiting more and “better” science. These might include, at a minimum, keeping noise away from sensitive areas for cetaceans.
- Policies that reflect the assumption that it is unlikely that there is no cost to cetaceans from the introduction of sound in the marine environment.
- Greater clarity and predictability and consistency in regulatory process.
- Use of peer-reviewed scientific research in regulatory decision making.
- Accountability in international and regional waters particular for the navies of the world, perhaps in the form of an international treaty addressing noise in the oceans.

- Revisions to Marine Mammal Protection Act thresholds and criteria for harassment.
- Ceasing the use/deployment of sound sources in question at least until we have a better understanding of their potential harm to marine mammals (e.g. LFA, hull-mounted sonar, invasive research).

3. Science and research goals

- Revise the research permitting process so that it is not a barrier to obtaining the scientific understanding needed to ensure protection of marine mammals.
- Identify what information we most need to know to protect marine mammals from noise and target research to address those questions.
- Establish a mechanism for independent funding of research with peer review process.
- Clarify where there are disagreements over the science.

4. Overall goals

- Common support for a way forward that will put an end to what has been a “reeling” from crisis to crisis with finger pointing and costly battles.
- Joint development of, and buy-in to, a plan for the next 10-15 years that includes:
 - ~ a constructive role for all parties that addresses how to get the needed information through credible research,
 - ~ guidance for how to manage, mitigate, and permit relevant activities, and
 - ~ an increase in the quality of the level of public understanding and debate on the issue.

F. Challenges for a Dialogue Process

Interviewees related a number of challenges and barriers that will need to be acknowledged and addressed, if not overcome, in order to make meaningful progress on the issues regarding marine mammals and anthropogenic noise. These included:

- The scientific understanding is not where the policy making process needs or would like it to be in order to provide clear guidance. The problem is exacerbated by the fact that there are widely differing views on the implications of uncertainty for the policy making process. This tends to play itself out in debates over where the burden of proof lies, and how much precaution should be applied.
- The scientific complexity of the topic makes it difficult for all stakeholders to engage effectively. Expertise in highly specialized scientific disciplines such as acoustic physics, marine mammal hearing, behavior and biology, physical oceanography, and others, is critical to understanding this topic. It has been and continues to be an enormous challenge to communicate and share this information accurately and productively between disciplines and among stakeholders with differing levels of scientific expertise. The public decisions that address the complexity need to be understood by all constituent groups, so efforts need to be made to summarize and synthesize to explain the reasoning behind those decisions.

- Interviewees expressed the view that incentives for meaningful and productive participation in the dialogue by key parties may be difficult to establish, particularly with regard to the U.S. Navy and the commercial shipping industry. The Navy has sought relief from the issue through exemptions from environmental laws, which could remove some of their incentives to engage in voluntary collaboration. The shipping industry, and others for whom the generation of sound is incidental, are not convinced at this time that the sound they are producing is causing any significant problem, and the likelihood of their being regulated on this issue is perceived as remote, while other issues rise to higher priority for their attention.
- Interactions among scientists, environmental groups, regulators and producers/users of sound have become strained and in some cases personalized, resulting in lack of trust and credibility. This negative dynamic is hampering the constructive, multi-disciplinary collaboration that progress on this complex issues requires. Most interviewees acknowledged this and expressed a desire to put it behind them.
- The scientific research community has a dual role with regard to this topic. They can not be viewed exclusively as a resource for scientific expertise, because they are also members of the regulated community, due to the fact that they may be required to obtain research permits for studies requiring the use of sound in the marine environment.

G. Relative Emphasis on Science and Research versus Policy and Management

Virtually everyone indicated that the science and policy dimensions are linked and that both need to be addressed. The majority indicated that the relative emphasis in the dialogue process should be about 50/50 or greater emphasis on the policy and management side. The following points were made in support of this approach:

- Discussion of the state of the scientific knowledge and identification of science gaps and needs has received a great deal of quality attention already, for example, in the three NRC reports. While it is important to capture the essence of what science can and can not tell us, a meaningful policy discussion has been lacking to date and this is an opportunity for a forum to address management and mitigation strategies given the science we have in hand.
- We cannot postpone consideration of mitigation options until we have all of the conclusive science we would like to have, since this is not likely to be forthcoming in the next decade. Policies managing human activities that generate potentially harmful sound in the marine environment are needed now.
- It would be very easy, and not desirable, to get engrossed in the numerous scientific questions related to this topic and never get to the policy and management decisions that are the essence of the dissonance that we are currently experiencing.
- This effort will require a mutual understanding of the complexity and uncertainty of the science, and should also weigh-in on research priorities, as this will inform the discussion of policy issues and the critical goal of rational management.

- Begin with science discussion to establish 1) mutual understanding and agreement on what we can say we know now with some level of scientific confidence, 2) to acknowledge where there is disagreement on what the science tells us, and 3) agreement on research priorities to address disagreement, uncertainty, and critical gaps in our understanding. Then, the group should move on to a discussion of our policy goals, and how best to apply the available science to management and mitigation.
- In the end it will be the policy and regulatory authorities that will define what happens and this represents an opportunity for the full range of stakeholders to participate in the process of defining how it will look.

A handful of those interviewed indicated a preference for greater emphasis on science (60 – 75%) than on policy, emphasizing that the fundamental debate is over the characteristics of sound and its impacts on marine mammals, and the need for science to be the foundation for the policy.

IV. Procedural Issues and Recommendations

The proposed Advisory Committee will be asked to review the recommendations in this assessment report for the structure, workplan, and other procedural elements at its initial meeting, making changes as can be agreed upon in the discussion. The following recommendations and process suggestions incorporate the ideas elicited in the interviews, and hopefully can create a starting point for the proposed Advisory Committee as it begins to direct its own efforts.

A. Purpose, Goal and Scope for Proposed Advisory Committee

Congress requested that the Marine Mammal Commission “hold a series of meetings to share findings, survey acoustic threats to marine mammals, and develop means of reducing those threats while maintaining the oceans as a global highway of international commerce.” The Commission will report on their efforts to Congress in mid-2005, and has determined that it will work with the Advisory Committee to produce a report. The report will go from the proposed Advisory Committee to the Marine Mammal Commissioners and the Commission’s Science Advisors and then the Commission will submit its report to Congress.

Therefore, the **stated purpose of the proposed Advisory Committee is to produce a report of its findings and recommendations to the Marine Mammal Commission for inclusion in the Commission’s report to Congress. Based on the interviews, an appropriate specific goal for the proposed Advisory Committee would be to work toward agreement on a comprehensive, coordinated, and implementable plan, or approach, to guide scientific and policy efforts on marine mammals and sound over the next ten or fifteen years.** To be constructive and effective, the plan, outlined in the report, should include:

1. a current assessment of the extent of knowledge about the threats,
2. recommendations for focusing the research on the issues most important to resolving regulatory and policy controversies and most amenable to study with current research capabilities, and

3. suggestions for management and mitigation methods with recommendations about how they should be applied.

The scope of the proposed Committee's work should be broad enough to fulfill the Congressional request. It should assess all threats to marine mammals from the full range of anthropogenic sound sources to the extent feasible, taking into account the fact that impacts from certain sources may be more urgent or significant. Its discussions should extend to international institutions, resources, and management approaches

B. Product

The proposed Advisory Committee on Anthropogenic Sound and Marine Mammals will be charged by the Marine Mammal Commission to develop, with the Commission, as much consensus as is achievable on the topics discussed. The discussions and any consensus achieved will be documented in a report that will be reviewed and adopted by the Committee.

During the proposed Committee's 12-18 months of operation, interim products may be developed, including balanced summaries of each meeting and any draft recommendations that may be proposed and/or agreed upon as the Committee addresses each meeting's specific topic.

C. Committee Structure

1) Plenary Group: As noted earlier, the Advisory Committee should be chartered under the Federal Advisory Committee Act because it will provide advice to the Marine Mammal Commission, a federal agency, regarding the Commission's report to Congress on Marine Mammal and Anthropogenic Sound issues. The Advisory Committee should have a plenary group of approximately 25 members who would become educated about the issues within the scope of the Committee's inquiry and analysis, and who would be responsible for endorsing the final report, including any recommendations that the Committee may wish to include in that report. The plenary Committee will have access to scientific resources and can form subcommittees, all of which will work at the direction of the plenary Committee. Further, the Committee and all subcommittees need to include a balance of views among the regulated community, public interest groups and governmental entities with authority or interests in the outcome.

2) Subcommittees: The full Advisory Committee may establish subcommittees to assist it in developing draft products or proposals for consideration at specific plenary sessions. All subcommittees should work at the direction of and report to the plenary Committee. The proposed Advisory Committee will need to develop a brief scope of work for each subcommittee it creates, outlining the desired expertise, schedule, and desired product.

3) Technical Resource Panel: The Commission will identify a group of technical resource panelists who will be available to assist the Committee or subcommittees as they prepare documents for plenary consideration. Examples of products that would be developed by technical resource panelists and subcommittees are (1) a review of the scientific information to date on the topic of anthropogenic sound impacts on marine mammals, and (2) a description of management and mitigation methods and

options currently available or under development, with a summary of available scientific information about their effectiveness and/or impacts.

The need to have the best and most useful scientific information available to the Committee was mentioned in most interviews. Because specific scientists have specific areas of expertise, the process would benefit from having respected and relevant scientists available on an as needed basis for assistance to the Advisory Committee. A Technical Resource Panel should be identified by the Commission and should be available as needed to engage in Committee discussions at the Committee's request, provide scientific expertise to the Committee or subcommittee(s), prepare background documents as requested, and otherwise assist the Committee in achieving its goals.

D. Workplan

Table 1 provides an overview of the proposed schedule and topics for each plenary meeting. Additional information about the schedule and sequence of activities is provided here. It will be refined, along with the schedule, as the Advisory Committee plans together during its meetings.

The proposed Advisory Committee is funded to meet five times beginning in February, 2004. It will meet approximately quarterly, although the first two meetings will occur within a six or eight week interval, to allow time for start-up of the process and team building among the Committee members. The meetings should occur roughly in February, March, summer, and November in 2004, and February, 2005.

The major substantive topics that need to be discussed involve 1) assessing the state of knowledge to date, 2) understanding what the most important substantive questions are, 3) prioritizing and planning for how those questions will be addressed in the future, and 4) discussing the policy implications for anthropogenic sound activities given the state of the knowledge and the extent of the threat. The sequence of topics should reflect this progression of tasks: defining the problem, determining the information base available for addressing it, and focusing on the policy implications of the characteristics of the problem and the information available. Not surprisingly, some interviewees (NGOs and regulated entities) place a higher priority on discussing the management and policy questions and others (scientists and research funders) place a higher priority on discussing the scientific questions. The placement of issues in the sequence of meetings does not imply any greater urgency or priority on the issues discussed in the early phases, but is meant to build the information base before tackling the policy and management questions

Advisory Committee on Anthropogenic Sound and Marine Mammals

TABLE 1: Draft Facilitators' Recommendations for Plenary Meetings

PLENARY MEETING 1	PLENARY MEETING 2	WORKSHOP 1	PLENARY MEETING 3	WORKSHOP 2	PLENARY MEETING 4	PLENARY MEETING 5
February 3,4,5, 2004 (2.5 days)	March, 2004 (3 days)	April 13-16	Summer, 2004 (3-4 days)	Fall, 2004	November, 2004 (3-4 days)	February, 2005 (3 days)
Introduction to Issues and Process	Risk Assessment Issues	Beaked Whale Issues	Scientific Issues: • Status of knowledge • Barriers • Priorities	International Regulatory & Scientific Efforts	Management and Mitigation Issues	Final Report
<p>Presentations</p> <ul style="list-style-type: none"> Basics of Sound, esp. in water Sound sources of interest or concern (presentations by sound producers and sound overview) Characteristics of these sounds Cetacean uses of sound (Balcomb) Impacts of sound on marine mammals (incl. Ketten on hearing, non-auditory, Tyack on behavior, others) Overview of relevant U.S. regulatory authorities 	<ul style="list-style-type: none"> What is a good risk assessment for marine mammals? (Panel) Challenges in risk assessment process, especially uncertainties Presentations NOAA Fisheries Guidelines Science Panel Conclusions Purpose of Guidelines Overview of matrix Discussion of issues raised, assumptions, extrapolation, if not this, what Other risk assessment approaches FWS, NGO? 		<ul style="list-style-type: none"> Presentation from Subcommittee on research synthesis Relevant highlights from Workshop 1 Develop list of what is agreed upon Develop list of research needs and priorities Discuss barriers to addressing priorities, e.g. Availability of researchers Need for independence of funding source Permit regulations Other 		<p>Presentations from Subcommittee on management options re:</p> <ul style="list-style-type: none"> Existing Mitigation & Mgt tools/approaches (include international) Range of options for short and longer term What is needed to get improved mitigation options in the future, including technology and risk management advances Relevant highlights from Workshop 2 <p>Other issues that arise in previous meetings</p>	<p>Discuss and agree on Language for final Report to MMC</p>
<p>Products:</p> <ul style="list-style-type: none"> Agreement on purpose and scope, operating procedures, Committee structure, and schedule Plan for information needed for future discussions, especially research synthesis for Meeting 3 	<p>Products:</p> <ul style="list-style-type: none"> Summary of discussion and suggestions and/or concerns Plan for information needed for discussion on management issues and options at Meeting 4 		<p>Products:</p> <ul style="list-style-type: none"> DRAFT summary of what is known and agreed upon DRAFT list of research priorities DRAFT recommendations for addressing barriers to research 		<p>Product:</p> <ul style="list-style-type: none"> Draft recommendations on management strategies 	<p>Product:</p> <ul style="list-style-type: none"> Final Report to MMC to include recommendations produced at previous meetings and others as needed

E. Integration with other forums

Another sequence issue for the process is how to integrate the Advisory Committee with the many other forums in which the overlapping issues are being raised and addressed. Among those mentioned in the interviews were the Beaked Whale Workshop sponsored by the Marine Mammal Commission, the effort at NOAA Fisheries to develop guidelines on acoustic impacts on marine mammals, the NRC Committee addressing the definition of harassment, MMPA reauthorization activities, and NOAA Fisheries workshops on shipping noise and on non-auditory impacts of sonar on marine mammals. In addition, many scientific meetings, including international conferences, include some focus on these issues. ~~including international conferences~~. It is important that the Advisory Committee on Anthropogenic Sound and Marine Mammals coordinate with these and other efforts yet to be developed in order to avoid duplication of effort, and to ensure that the Committee's product is complete.

In order to achieve the desired integration, it will be important to provide time in the Committee's process to receive and review reports from the other forums, to have overlapping membership with those forums to assist in coordination and information exchange, to have the option for Committee members to observe other workshops and forums, and to have the option of recommending additional workshops as needed to bring an increased focus to a specific topic. The interviews produced one suggestion for an additional workshop, on international science and policy efforts, and a proposal was made to have this workshop at the NATO SACLANT facility in LoSpetia, Italy. This workshop could be open to Committee members who desired to attend, and would require significant lead time to arrange, so its scheduling should probably fall between the Committee's fourth and fifth meetings, in the fall of 2004.

One additional factor in the integration of the Committee with other scientific and policy efforts is the fact that NOAA Fisheries will be conducting a public review of its proposed Guidelines for Acoustic Impacts during the spring of 2004. NOAA Fisheries and the Commission have noted that the Guidelines will be of interest to the proposed Advisory Committee members and relevant to the Committee's discussions. NOAA Fisheries further noted that they would benefit from a thorough discussion of the Guidelines with the Advisory Committee as part of the scoping process for an EIS that NOAA Fisheries will conduct for the Guidelines. Thus, the second Advisory Committee meeting, tentatively scheduled for March-April, 2004, will include a presentation and thorough discussion of the proposed Guidelines.

F. Participation

1. Criteria for Participation

In order for the Advisory Committee Process to be credible and effective, the participation needs to reflect the full range of views on the issues that will be discussed. There is a further need to have a manageable group size to allow debate and discussion in some depth. When these two criteria are combined, we find that the optimal size for a group with such a substantive task is 25 or fewer members. Thus, choices need to be made regarding whom to involve directly in the Advisory Committee.

In selecting members, the following criteria should be used:

- ability and willingness to represent others with similar views (i.e. the individual can represent a constituency);
- constituency is likely to be affected by the recommendations or other outcome;
- knowledge and expertise about the issues that will be discussed;
- is viewed by others as providing constructive leadership on the issues.

A further criterion is achieving balance among the affected interests. This balance is required by the Federal Advisory Committee Act and also helps create products that are useful and will not be blocked by strong constituencies who are not involved. In this committee representation should include the regulated community, public interest groups and NGOs who participate in the regulation process, and government authorities

2. Recommended list of participating organizations

The following list of participants was developed based on the input received by the facilitation team in the interviews and on the need to have balance among the interests at the table. Many of the suggested groups were recommended repeatedly, and often by groups outside of their interest group, as useful dialogue participants. These are the entities that would comprise the plenary group of the proposed Advisory Committee, and which will be responsible for producing and endorsing the Committee's product.

Governmental Authorities (6)

NOAA Fisheries, Office of Protected Species
NOAA Fisheries, Regional Office
Minerals Management Service, Office of Offshore Minerals Management
Minerals Management Service, Regional Office
U.S. Fish and Wildlife Service
CA Coastal Commission

Regulated Community (12)

U.S. Navy, Office of Environment, Naval Operations
U.S. Navy, Fleet Operations
Academic Researchers (3)
Oil and Gas Exploration and Production
International Association of Geophysical Contractors
Chamber of Shipping of America
Consortium for Oceanographic Research and Education
Wood Hole Oceanographic Institute
Scripps Institute of Oceanography
Lamont-Doherty Earth Observatory

Non-Governmental Organizations (7)

Natural Resources Defense Counsel
Humane Society of the United States
International Fund for Animal Welfare
The Ocean Conservancy
The Ocean Mammal Institute
Environmental Defense
The Whale and Dolphin Conservation Society

3. Marine Mammal Commission Role

The Marine Mammal Commission should be represented by two individuals, who will participate in all discussions, and bring the Commission's views to the table. The Commission also will be the entity receiving the report and recommendations from the Advisory Committee. The Commission has stated its desire to have a report that can be implemented, to the extent it is possible to anticipate implementation challenges. Therefore, it is important for the Commission to participate in the discussions and be open about its views, especially about what it is prepared to communicate to Congress on these issues. That will prevent a problem that sometimes arises when an Advisory Committee completes its work, that is, the recommendations are unacceptable to the agency charged with implementing or moving forward with the recommendations, and the product is abandoned. The Commission has indicated its willingness to take forward to Congress all the consensus items on which it and the Committee are able to agree, and, for any items on which they do not agree, the disagreement will be noted and the Commission will decide what to recommend on that issue, if anything.

G. Procedures

Draft Operating Procedures for the Advisory Committee will be circulated in advance of the first meeting for Committee review. They will be discussed, revised, and finalized with the full Committee at its first meeting.

Key issues for the operating procedures are outlined below to help the Committee in its review prior to the discussion at the first meeting.

Definition of Consensus: When any group strives to develop some level of consensus, it is important to define what the group will consider to be a consensus in advance of the decision making efforts. The definition of consensus that the facilitation team would recommend is the following: Consensus is defined as all Committee members can live with (and not actively oppose) the recommendation or decision. If the Advisory Committee cannot reach consensus on an issue that it feels should be included in its report, it may choose to outline the disagreement in the report. As noted previously, the Commission intends to use any recommendations on which there is a consensus that includes the Commission, in its report to Congress. On issues where the Committee does not or cannot reach consensus, the Commission may develop, if it so chooses, its own recommendations to Congress on those issues.

Responsibilities of Members: Committee members are responsible for:

- Representing the views of other members in their constituency and/or groups with similar interests, and for communicating with others in their interest group to fulfill that responsibility.
- Clearly and fully articulating the issues and concerns that are significant to their organizations and constituents.
- Attending each meeting or coordinating with an alternate to attend and participate.
- Bringing the endorsement of their organizations to the eventual product.
- Sharing all relevant information that will assist the Committee in achieving its goals.
- Resolving process issues within the Committee structure.
- Refraining from speaking for the Committee in public forums, unless the Committee has specifically asked them to do so.
- Ensure that the views and opinions they express in the Committee are consistent with the views they express in other forums.

Maintaining Credibility and Balance for the Advisory Committee: The Advisory Committee will meet quarterly for the most part, and issues regarding the management of the Committee's process may arise and need input from the various interest groups in between meetings. The Advisory Committee may need to consider the option of appointing a small (5-6) member Steering Committee to work with the Commission and the facilitators to provide guidance on the procedural issues that may arise. If the Committee does establish a Steering Committee, its membership should be balanced to reflect the plenary membership.

H. Background information

Several interviewees made suggestions for background information that should be provided to the Committee in advance of the first meeting. Among the most commonly suggested items are:

- Copies of the previous NRC reports.
- An overview of the current regulatory process
- A chronology of the incidents that have caused concern (i.e. strandings, lawsuits to stop projects, ship shock incidents, etc.)
- The first chapter or two from the Richardson, et al book, *Marine Mammals and Noise*.³

The first meeting will focus on presentations from various Committee members on sources and characteristics of sound, and marine mammal interaction with sound sources. Any presentations and materials developed for those presentations should be made widely available.

³ Richardson, John W., Charles R. Greene, Jr., Charles I. Malme, and Denis H. Johnson. Marine Mammals and Noise. Academic Press, New York 1995.

I. Public Involvement and Targeted Outreach

Most of those interviewed indicated that they would like to follow the proposed Advisory Committee efforts in some detail, if they were not appointed to the Committee. All meetings will be announced in the Federal Register. The meetings will be open to observers and the public, and some time should be allocated at each meeting for public comment. The project web site should be designed to become the resource for all information about the Committee, including background documents, presentations, meeting summaries and advance agendas, etc. The Commission should also develop a method of providing ongoing information directly to those who request it, in either electronic or hard copy format. This targeted outreach will inform the public comment that is made available at the meetings.

V. Conclusion

The view from the assessment process has produced a promising prognosis for the usefulness of convening and supporting a Federal Advisory Committee on Anthropogenic Sound and Marine Mammals. Key participants expressed a willingness to participate, and in many cases, a desire for a constructive forum on these issues. The proposed Advisory Committee has a good chance of moving the issues forward, and it has the potential to achieve agreement on a course of action for the next decade that reflects existing knowledge, acknowledgement of the evolving nature of scientific understanding on this topic and appropriate regulations and management strategies.

Appendices

- A. List of individuals interviewed**
- B. Interview Protocol**

APPENDIX A

Proposed Dialogue on Anthropogenic Sound and Marine Mammals

Interview List

(as of November 21, 2003)

1. Jean Adams, Port Canaveral Port Authority
- ~~1.2.~~ Dan Allen, Chevron/Texaco
- ~~2.3.~~ Joe Angelo, U.S. Coast Guard
- ~~3.4.~~ Ken Balcomb, Center for Whale Research, Inc.
- ~~4.5.~~ Jay Barlow, NOAA Fisheries – SW Fisheries Science Center
- ~~5.6.~~ Linda Bauch, American Petroleum Institute
- ~~6.7.~~ Josh Bauer, U.S. Coast Guard
8. Jon Berkson, U.S. Coast Guard
- ~~7.9.~~ Diane Bowen, U.S. Dept. of Interior, Fish & Wildlife Service
- ~~8.10.~~ Todd Burrows, Maine State Planning Office
- ~~9.11.~~ Jack Caldwell, Reservoir Services
- ~~10.12.~~ Chris Clark, Cornell University Laboratory of Ornithology (*interview pending*)
13. Tara Cox, Marine Mammal Commission
- ~~11.14.~~ Penny Dalton, Consortium for Oceanographic Research and Education
- ~~12.15.~~ Mark Delaplaine, California Coastal Commission
- ~~13.16.~~ John S. Devens, Prince William Sound Regional Citizen's Advisory Council
- ~~14.17.~~ Sarah Dolman, Whale and Dolphin Conservation Society
- ~~15.18.~~ Richard du Moulin, Intrepid Shipping (formerly of Intertanko)
- ~~16.19.~~ Raymond Fisher, Noise Control Engineers
- ~~17.20.~~ Phil Fontana, American Petroleum Institute
- ~~18.21.~~ Rod Fujita, Environmental Defense
- ~~19.22.~~ Roger Gentry, NOAA Fisheries, Office of Protected Resources
- ~~20.23.~~ Chip Gill, International Assn. Of Geophysical Contractors
- ~~21.24.~~ Bob Gisiner, Office of Naval Research , U.S. Navy
- ~~22.25.~~ Mike Gosliner, Marine Mammal Commission
- ~~23.26.~~ Marsha Green, Ocean Mammal Institute
- ~~24.27.~~ Marti Hastings, Office of Naval Research
- ~~25.28.~~ Erin Heskett, International Fund for Animals
- ~~26.29.~~ John Hildebrand, Scripps Institute of Oceanography (Marine Mammal Commission)
- ~~27.30.~~ Charlotte Hudson, Oceana
- ~~28.31.~~ Michael Jasny, Natural Resources Defense Council
- ~~29.32.~~ Paul Jepson, Zoological Society of London
- ~~30.33.~~ Lindy Johnson, NOAA Office of International Environmental Law
34. Robert Kanter, The Long Beach Port Authority
- ~~31.35.~~ Rajiv Khandpur, U.S. Coast Guard
- ~~32.36.~~ Zvi Karni, John J. McMullen Associates
- ~~33.37.~~ Charles Kennel, Scripps Institution of Oceanography
- ~~34.38.~~ Darlene Ketten, Woods Hole Oceanographic Institute
- ~~35.39.~~ Marty Kodis, Fish & Wildlife Service
- ~~36.40.~~ Karen Kohanowich, U.S. Navy, Secretariat

~~37:41.~~ David Laist, Marine Mammal Commission
~~38:42.~~ Bill Lang, U.S. Dept. of Interior, Minerals Management Service, SE Regional Office

~~39:43.~~ Gerald Leape, National Environmental Trust
~~40:44.~~ CDR Daniel MacLeod, U.S. Coast Guard
~~41:45.~~ Rodger Melton, Exxon-Mobil
~~42:46.~~ Jennifer Merrill, National Research Council – Ocean Studies Board
~~43:47.~~ Kathy Metcalf, American Chamber of Shipping
~~44:48.~~ Paul Nachtigall, Hawaii Institute of Marine Biology
~~45:49.~~ John Orcutt, Scripps Institution of Oceanography
~~46:50.~~ Mark Palmer, Earth Island Institute
~~47:51.~~ Katy Penland, American Cetacean Society
~~48:52.~~ RADM Richard Pittenger, Woods Hole Oceanographic Institute
~~49:53.~~ Mike Purdy, Lamont-Doherty Earth Observatory
~~50:54.~~ Tim Regan, Marine Mammal Commission
~~51:55.~~ Jim Ray, Shell Global Solutions, U.S.
~~52:56.~~ Tom Readinger, U.S. Dept. of Interior, Minerals Management Service
~~53:57.~~ Joel Reynolds, Natural Resources Defense Council
~~54:58.~~ John Richardson, LGL Limited
~~55:59.~~ Naomi Rose, Human Society of the United States
~~56:60.~~ Bill Rossiter, Cetacean Society International
~~57:61.~~ Bruce Russell, JS&A Environmental Services, Inc.
~~58:62.~~ Sandy (Alexander) Shor, National Science Foundation
~~59:63.~~ Mark Simmonds, Whale & Dolphin Conservation Society
~~60:64.~~ Lanny Sinkin, Rainbow Friends Animal Sanctuary
~~61:65.~~ Frank Stone, U.S. Navy - Operations
~~62:66.~~ Brandon Southall, NOAA Fisheries, Office of Protected Resources
~~63:67.~~ Jeanette Thomas, Laboratory of Sensory Biology, Eastern Illinois Univ.

Regional Ctr.

~~64:68.~~ Peter Tyack, Woods Hole Oceanographic Institute
~~65:69.~~ Courtney Vail, Whale & Dolphin Conservation Society
~~66:70.~~ Sara Wan, California Coastal Commission
~~67:71.~~ Doug Wartzok, Florida International University
~~68:72.~~ Peter Weiss, Merchant Marine Academy
~~69:73.~~ Admiral Richard West, Consortium for Ocean Research and Education
~~70:74.~~ Donna Wieting, NOAA Fisheries, Office of Protected Resources
~~71:75.~~ Lindy Weilgart,
~~72:76.~~ Ben White, Animal Welfare Institute
~~73:77.~~ Judy Wilson, U.S. Dept. of Interior, Minerals Management Service
~~74:78.~~ Peter Worcester, Scripps Institution of Oceanography
~~75:79.~~ Russell Wray, Citizens Opposed to Active Sonar
~~76:80.~~ Nina Young, The Ocean Conservancy

APPENDIX B

Proposed Dialogue on Anthropogenic Sound and Marine Mammals

INTERVIEW QUESTIONS

1. Introduction
 - who we are
 - description/background of proposed project – who, what, why & objectives
 - purpose of interviews – how part of process
 - our role
2. What is your/your organization's interest and role with regard to the issue of the impacts of anthropogenic sound on marine mammals (currently and/or historically)?
3. What do you believe are the critical questions/issues that need to be addressed to take this issue to the next level? How would you prioritize them?
4. What are your/your organization's goals with respect to this issue?
5. What do you think are the major challenges or barriers that will need to be addressed in order to make meaningful progress on this topic (both substantive and procedural)?
6. What do you think would be the appropriate relative emphasis on science v. management/policy in a new discussion?
7. What do you think would be the most important information needed to inform this discussion and what are the best sources of that information?
8. What voices need to be at the table to have a full and productive dialogue on this topic (interest groups/individuals)?
9. Have you ever participated in a collaborative dialogue process focusing on a controversial topic (if so, describe the process, your role in it, and any insights or lessons you learned from the process that might inform a new process)?
10. What mechanisms or procedures does your organization have for keeping its constituents informed and seeking their feedback and/or support?
11. We will only be able to include a limited number of individuals at the table for this dialogue; if you (or your organization) are not chosen to be the representative of your perspective at the table, whom would you like to see at the table that could represent your interests and perspective?
12. Would you/your organization be interested, willing and available to participate in an 18-month collaborative dialogue process to address this topic, should you be invited?