

Summary of Public Comments on Draft NOAA Ocean Noise Strategy Roadmap

The public comment period led to 13,264 submissions received and included a petition with 72,750 signatures. Nearly all submissions supported the effort, including over 13,200 comments specifically calling for NOAA to progress swiftly to implementation planning, securing further funding, and broadening partnerships with other action agencies. The petition echoed this theme, leading to a total of ~86,000 responses of this nature.

More expansive comments from 46 authors and/or co-signing organizations (local and national-scale environmental NGOs and tribes) commended NOAA's approach to the effort, and called for the agency to support its goals by identifying and committing to concrete actions within its purview (implementation planning and associated budgetary decisions) by the end of 2016.

Received comments were compiled in a spreadsheet and categorized according to the type of suggestions made (e.g. specific text edit, overarching theme). Changes to address comments were made throughout the Roadmap and written responses describing how we address recurring or significant thematic or categorical comments appear below.

Written Responses to Recurring Themes in Public Comments on Ocean Noise Strategy

1. IMPLEMENTATION PLANNING

The majority of commenters (86,000+ individuals, 13 letters from the Marine Mammal Commission and environmental organizations) recommended solidifying a near-term implementation plan and dedicated resources for the strategy. Key programs within NOAA will develop implementation plans to identify actions to be taken over the next two years to advance the Strategy's goals. NOAA Fisheries is developing Policy and Procedural Directives to require such planning.

- Implementation plans developed by both science and management-oriented offices would determine directed methods for achieving goals articulated in the Roadmap.
- Implementation plans will identify key partnerships both with and external to NOAA that are necessary to achieve desired outcomes
- As appropriate, plans will include opportunities public comment.

2. RELATIONSHIP OF STRATEGY TO SPECIFIC CURRENT REGULATORY ACTIONS

Multiple commenters suggested that NMFS should delay final decisions on specific regulatory decisions (such as MMPA incidental harassment authorization (IHA) requests for companies planning seismic surveys off the Atlantic Coast) until implementation planning is complete or the specific recommendations in the Roadmap are implemented. IHA decisions will not be delayed until after implementation planning is complete or until IHAs can fulfill recommendations highlighted in the Roadmap. The Strategy is a long-term effort to improve a wide range of interdependent NOAA management and science decisions, including NOAA's legal responsibility to authorize take. Meanwhile,

however, NOAA is charged with making management decisions (including requests for IHAs) based on the best available science.

Multiple commenters recommended special consideration for Cook Inlet and the Salish Sea, either in the form of prioritizing those areas for early ONS implementation focus or in the form of delaying the authorization of further impacts from human activities until more work has been done in those areas. NOAA will consider the prioritization recommendation in the development of implementation plans, but as noted above, cannot delay management actions as long as the necessary findings may be reached under the applicable statutes, given the best available science. Recommendations for specific agency actions that could support the Strategy, but which are too detailed or otherwise not suited for inclusion in the Roadmap, are being compiled for consideration in the implementation planning stage.

3. EFFECTIVE USE OF CURRENT AUTHORITIES VS. EXPANDED AUTHORITY

In a few key places in the Roadmap, in response to comments we further clarified that the focus of this effort is on effective implementation of current mandates versus the expansion of current authorities. Exemplifying these comments, one submission recommended “that NOAA provide additional clarity on the ways that NOAA intends to expand their authorities to address ocean noise, and/or commit to formal rulemaking should they seek to expand or revise the way their existing management authorities to ensure proper input from the public and other federal agencies.” The relevance of noise impacts to NOAA’s standing authorities is discussed in the Roadmap. NOAA is not seeking to expand on those authorities, but rather to ensure that acoustics is incorporated within their assessments in a prioritized and consistent manner. Implementation planning will highlight opportunities for collaboration in program-specific actions.

- Contrary to one recommendation, the nexus to other specific NOAA priority initiatives, including Ecosystem Based Management and the National Ocean Policy, was not removed from the Roadmap. Here, focus remains on leveraging tools developed to support multiple agency objectives rather than additional statutory authority.
- An additional set of comments included the following: “We are aware of no examples of MMPA-authorized commercial and industrial activities where existing regulatory management proved inadequate to address ocean noise effects.” Although we agree that the historical focus on acute behavioral disturbance and injury specifically to marine mammals has been effective at reducing the incidence of these specific types of impacts on these populations, the science strongly suggests a need for an approach moving forward that will improve protection for marine mammals *and their habitats*, address chronic and cumulative as well as acute effects, and better address implications for other NOAA trust resources, including fish, turtles and marine invertebrates.

4. STANDARDS

The definitions of soundscape and acoustic habitat were modified somewhat to indicate that the ISO standard soundscape definition considers noise perception and not just the physical environmental condition (acoustic environment), developed with a focus on humans. Though ultimately understanding of the acoustic environment as perceived by wildlife is of interest, the physical and biological definition

of those environments (habitats) are more often the construct applicable to management, both functionally and relative to legislative authority. However, we have clarified that the term soundscape, under the ISO standard, can allow for this term to be used perceptually, whereas the soundscape terminology commonly used by ecologists continues to refer to all the sounds in a place.

Numerous additional comments identified that several efforts discussed in the Roadmap emphasized standardization (terminology, measurement and monitoring methodology etc.) and should reference any ongoing efforts within the International Standards Organization or the American Standards Association. NOAA has been participating in several such efforts, and the relevance of those processes is discussed in Chapter 1, 2 and 3. We did not believe it was necessary to modify the document to include a description or list of all such efforts.

5. NOISE REFERENCE STATIONS AND PASSIVE ACOUSTIC MONITORING

Multiple commenters stressed the importance of NOAA further developing and maintaining the Noise Reference Station Network and building a publicly accessible archive. NOAA is committed to doing so and continues to make progress in these efforts.

Monitoring capacities that would augment the NRS current capabilities were also called for. As discussed in Chapter 3, one of the key science based recommendations is the establishment of a standardized NOAA-led, long-term, passive acoustic monitoring capacity to monitor U.S. waters. NOAA recently successfully initiated the Ocean Noise Reference Station Network through a broad collaboration across NOAA offices. Of course, as with any set of instruments selected for a project, there are potential limitations depending on the areas of interest, and any system would not meet the needs of all interested parties. Comments included suggestions to increase the bandwidth of the recording instruments to capture higher frequencies, as well as measure particle motion which would be most relevant in considering noise impacts to fish. However, with our highest priority (initially) to monitor relatively low-frequency, far-traveling, noise over the vast scales of US EEZ waters and long time-frames, and considering the costs associated with the proposed augmented capacities, it is simply not feasible at this time to act on all of the recommendations from the commenters (e.g., increased bandwidth and particle motion). These considerations can, however, be considered in the development of implementation plans with a more regional, or particular species-based focus. We do, however, strongly agree with the suggestion to integrate interagency capacity and this is represented in the recommendations text of Chapter 3. As noted, we have been working on this topic with fellow federal agencies through the Subcommittee on Ocean Science and Technology's Interagency Task Force on Ocean Noise and Marine Life. The Task Force's March 2016 report detailing this effort and proposing an interagency passive acoustic monitoring network and archival capacity is pending clearance for public release.

6. RISK ASSESSMENT FOR MARINE MAMMAL POPULATIONS

NOAA is committed to seeking mechanisms to further prioritize management and science attention towards populations and places with high noise impact risks through the development of implementation plans, which will include further development of both internal and external partnerships. As noted previously, numerous commenters recommended prioritizing noise impact

management for some specific populations of marine mammals and/or in particular places, such as: the Salish Sea, Cook Inlet, and Cape Cod Bay. NOAA will consider these recommendations in the development of implementation plans.

NOAA is also committed to developing risk assessment tools that help better address chronic and cumulative effects for marine mammals and other taxa. The following are a few existing and in-process mechanisms that can help in both focusing effort and assessing risk:

- NMFS' Species in the Spotlight initiative supports the Cook Inlet recommendation by identifying Cook Inlet belugas as one of eight focal species (three marine mammals), but also highlights other taxa in critical need of attention, including fish and invertebrates.
- NOAA supported the Biologically Important Areas effort to identify areas that are specifically important for breeding, feeding, or migrating for marine mammals, or where there are small resident populations.
- NOAA has developed a first-order chronic and cumulative assessment tool that MAY be used to help evaluate accumulated noise from aggregate sources over ecologically relevant time periods.
- NMFS is in the process of establishing a publicly-accessible GIS website providing locations of all MMPA-authorized activities to support cumulative impact analyses.
- NMFS recently supported an interim Population Consequences of Disturbance (PCoD) effort, utilizing a combination of data and expert elicitation to help forecast how disturbance activities might impact the Cook Inlet beluga whale population (final workshop report due Fall 2016).

Most importantly, NOAA plans to continue engaging with external partners to help identify the most critical needs for risk assessment tools.

7. STATE OF THE SCIENCE AND RISK ASSESSMENT FOR FISHES AND INVERTEBRATES

Comments showcased general agreement regarding the state of the science associated with the impacts of noise on fish and marine invertebrates, with the exception of one set of comments that showcased a strongly divergent interpretation. Most commenters, ranging from environmental activists to fishery managers highlighted the need for a prioritized approach to addressing remaining uncertainty regarding noise impacts to fish and invertebrates, and to managed stocks in particular. Notably, comments submitted by experts in the field of fish acoustics stated: "This work [case study on Managing Noise Impacts on Spawning Areas Used by Acoustically Sensitive and Commercially Important Fish and Invertebrate Species] is important. There is an urgent need to assess the risk of noise exposure from transiting vessels, offshore energy exploration and development, and other sources upon spawning fish and invertebrates, and especially those that use sound extensively during their spawning activities". In contrast to these majority views, the one submission commented on a lack of concrete evidence and stated "acoustic effects have never been demonstrated or thought to have population-level impacts to any invertebrate population" and "there is little evidence enhanced acoustic risk assessment or noise management would meaningfully contribute to recovery of fish stocks that are overfished or to the health of invertebrate populations".

The Roadmap was not intended to provide the most comprehensive or up to date review of the available scientific literature regarding noise impacts to these species. In the past few years, several such reviews have been published by career specialists, and the Roadmap refers to these sources for more information. That said, serving as a guide for internal NOAA conversations, it was important to provide context for NOAA's assertion that significant research supports an approach that focuses more on addressing noise implications for some NOAA-managed fish and invertebrates. In the majority of cases, the status of such science suggests a need for targeted collection of baseline information. In a few cases, the knowledge base may support the design of mitigation approaches to address noise exposure risks. Such decisions, as well as the need to evaluate such actions relative to current NOAA capacities, are inherent to implementation planning.

Research regarding the effects of noise on fish and invertebrates is rapidly evolving and this section has been broadly revised. One set of comments noted a lack of citations to more recent research and provided some valuable suggestions. We have incorporated those that are relevant and within the context of the Roadmap's goals, where the information supports the discussions on specific physical or behavioral effects of sound on fishes (and invertebrates). We also emphasize the inherent difficulties assessing the severity of behavioral effects of human-made sound exposure on fishes given the unique challenges of trying to study fish behavior. Most research on fish behavior has been conducted in controlled, laboratory environments or with caged fish in situ, which inherently alters their behavior. Therefore trying to extrapolate that information to wild, unrestricted fishes is difficult. Although more research has been devoted to this subject in recent years, the comments received highlight how much we have yet to learn regarding the effects of human-made sound on fishes and invertebrates. An additional part of our effort in modifying the fish and invertebrate sections of the Roadmap included removing some material that previously went into excessive detail, given the Roadmap's intent to more broadly compile and summarize the relevant literature.

8. ROLE OF CASE STUDIES

The majority of commenters appreciated the case studies as place-specific examples of concepts discussed in the Roadmap. The fish-focused case study of the South Atlantic was particularly noted as showcasing important risk assessment considerations for non-marine mammal taxa. However, one commenter felt that the case studies showcased "a search for adverse acoustic effects and impacts not known to exist and not likely to be biologically significant." The case studies, as stated in the Roadmap, were chosen to represent data-rich and data-poor contexts for applying the risk assessment tools discussed in Chapter 4. Neither is meant to indicate prioritized NOAA activity in the chosen locations or directed at the chosen stocks. NOAA agrees with this commenter that the agency should "prioritize science directed at species or stocks that are exhibiting decline in abundance or other important measures of biological fitness for which ocean noise is a plausible significant factor." This statement in fact highlights several of the weighting factors discussed in the Case Studies.

9. INTERAGENCY AND OTHER EXTERNAL COLLABORATION AND PARTNERSHIP

A large number of commenters suggested focused engagement with stakeholders and other government agencies (Department of Transportation, Bureau of Ocean Energy Management, Navy) and

a smaller subset additionally suggested increased engagement with indigenous peoples. We consider the initial work of the Ocean Noise Strategy to include the CetSound effort (<http://cetsound.noaa.gov>), which was supported by four agencies and included expertise from a broad range of federal, academic and industry groups. The culmination of this phase, a large stakeholder meeting in 2012, resulted in the identification by NOAA of a need to bring together a diverse range of science and management capacities around common goals for addressing the impacts of ocean noise. This led to the development of the Roadmap as a description of that process. As stated in the Roadmap, implementation of these goals cannot be achieved by NOAA in isolation. Programs that are working effectively now do so in close collaboration with other agency and external partners, and addressing noise more comprehensively will necessitate parallel growth in those relationships. We see the clearer articulation of those opportunities to be a key element of implementation planning. Edits were made to the Roadmap to increase emphasis on this phased approach.

10. REFERENCE VALUES AND REGULATION

Two commenters noted concern that “the Strategy seeks to manage noise to ‘pre-industrial’ levels,” however this is not the intent behind the Strategy. Chapter 2 of the Roadmap includes mention of the use of such conditions as reference values for National Park Service (NPS) management of soundscapes. Edits were made to further highlight the Roadmap’s assertion that in general, reference conditions, such as those utilized by NPS, are not regulatory thresholds but instead are used to provide biologically-relevant benchmarks for local, stakeholder-inclusive, conversations about management goals for noise attributes at a site, and to assess progress quantitatively towards those goals. As one submission noted, using such a “reference condition means that all noise sources are treated equally, avoiding the artifacts of the historical sequence of exposure to different noise sources.”

11. SHIPPING NOISE

Many commenters referred to the need for new approaches to manage shipping noise, and had diverse suggestions regarding the role that NOAA could play in leading or nurturing the development of those approaches. The vast majority called for NOAA to “Engage other agencies and stakeholders in a coordinated approach to shipping noise management,” including working with MARAD to develop a program to provide guidance to ports, and facilitating a research group with other agencies to support key information gains to support vessel quieting implementation. Additional sets of comments similarly focused on possible use of NOAA’s capacities to nurture new approaches to shipping noise management and acknowledged that without such new approaches “significant unregulated noise sources will continue to operate with little management or incentive to analyze acoustic effects and to innovate operating solutions.” We concur that management can, and perhaps should, result in investment in quieter alternatives within an industry. Implementation plans developed by NOAA programs are likely to address a need for specific engagement and action to address shipping noise in contexts in which ships are known to be a dominant contributor to noise conditions. The Roadmap and several commenters acknowledge that NOAA’s work on this issue will not be in isolation, but will necessitate determining roles for leadership, technical support, and other roles, and will continue to benefit from close working relationships internationally.

12. POPULATION CONSEQUENCES OF DISTURBANCE (PCoD) Modeling

There was cross-sectoral attention to the current status and potential future application of Population Consequences of Disturbance modeling output to noise impact management. NOAA made several edits to the paragraphs addressing this modeling work to balance both the strengths of this methodology for specific applications and limitations for current and future management applications (edits to Chapter 1 and also addressed in Chapter 2).

Submissions demonstrated interest in future application of this work but noted associated limitations: “We agree with increasing emphasis on PCoD framework for linking exposure-effect-consequence. However, the reliability of the expert elicitation process in the marine mammal field is unknown”. Additionally, funders of the PCoD work showcased their opinions that applications were likely to be broad and not specific to management contexts: “Recommend clarifying that “interim PCOD” is likely not going to be a broadly-applied next step to any goal in the strategic roadmap for management decisions, but rather the overall PCoD framework (not interim) informs the roadmap.” Others had similar reservations regarding the data-hungry nature of these models and the likelihood of applying them to high risk fish and invertebrate populations, asserting: “For data-deficient animals, and for circumstances where there is limited knowledge of ecological interactions, an alternative qualitative risk assessment tool is needed.”

One submission indicated that reliance on models for consequences of noise impacts based on responses or physiological changes (such as PCoD) fail to recognize that under models based on evolutionary principles, animals’ sensory capabilities evolved because it gave those organisms fitness advantages over their competitors who had higher absolute hearing thresholds. They indicated: “Thus, the null hypothesis should be that noise is causing fitness consequences. PCoD, applied as the basis for assessing risk to populations from noise, is unlikely to be a precautionary approach to identifying and addressing fitness effects.”

NOAA is committed both to further exploration and support of the PCoD methods (interim as well as full energetic models), and other risk assessment tools, as well as appropriate caution in their management application.

13. ACOUSTIC GUIDANCE AND THRESHOLDS

Many commenters highlighted interests in the relationship between the Strategy’s Roadmap and NMFS’s expected release of the Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing, which is now final (August, 2016). The Technical Guidance is listed in the Roadmap (Chapter 1) as an example of the type of science-based, transparently developed, tool that will be helpful for noise impact assessment and decision-making. Several commenters commented on the importance of precautionary criteria based on the best available science, and noted their particular interest in future phases of this work, to address behavioral impact assessments for marine mammals and managed fish species or species complexes.

The Roadmap notes (Chapter 2) that thresholds should be viewed with caution. One submission further shared their views based on a long history of criteria development in collaboration with the Federal Aviation Administration, suggesting that “thresholds can offer a distorted impression of the action of

noise (no effect below, total effect above), and they create powerful incentives to bias results to assign exposures just below the management threshold. A dose-response approach, as mentioned [in the Roadmap], which assigns a non-decreasing probability of take with increasing noise exposure, removes both kinds of distortions.” NOAA appreciates these concerns and intends to consider them in the development of behavioral harassment guidance for marine mammals as well as the implementation of the new Acoustic Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing.