

## **Background**

Commercial shipping is one of the most widespread industrial activities in our oceans, transporting more than 90% of the world's goods and energy. By its very nature its routes are often highly concentrated within shipping lanes and near ports. Shipping vessel operations, both individually and in aggregate, have a range of potential impacts on marine species and ecosystems -- such as direct injury or mortality from ship strikes, and sub-lethal behavioral effects of underwater noise pollution (including interference with communication, foraging, and navigation of marine species). While these issues differ in a number of ways, the relative risk of each increases where higher spatial and temporal overlap occurs between shipping density and the presence of susceptible species engaged in biologically important activities occurs. In other words, the potential impacts from both are far greater when a high concentration of shipping activity intersects with the migratory pathways or critical feeding or reproductive habitat of vulnerable species.

Both ship-strike probability and ocean noise pollution can be monitored and impacts reduced by integrating widely available remote-sensing and tracking technologies with knowledge of animal presence and behavior and managing impacts accordingly. Noise quieting technologies may also effectively mitigate noise pollution at the source, leading to an overall reduction in levels of shipping noise.

There is considerable scientific, conservation, government, and industry interest in understanding and mitigating the impacts of ship-strikes and ocean noise pollution from commercial shipping and other marine traffic on marine life. This interest has resulted in some specific measures, including ship-routing and speed-control schemes and passive acoustic and ship-monitoring networks in several jurisdictions, and the development of vessel-quieting guidelines within the International Maritime Organization (IMO). However, additional and sustained international collaboration and partnerships, leading to specific actions, are needed to limit and reduce the impacts of vessel operations on marine life.

## **Recommendations**

The June 2017 UN Ocean Conference enables UN Member States to reverse the state of decline of our oceans and meet SDG14 targets by 2030. Given the global scale of shipping and the documented impacts of direct mortality and acoustic habitat loss on endangered and protected marine species, it is critical to incorporate these issues into the framework for delivery of the SDG14 targets. We recommend including the following specific measures in the Call for Action issued by the UN Ocean Conference:

- Recognize both acute (ship-strike mortality) and chronic (elevation of marine ambient noise at a global scale) impacts on marine species as inter-related threats that must be addressed for successful implementation of SDG14.
- Further develop and integrate national and international acoustic monitoring and ship-tracking programs.
- Use the results of integrated monitoring to evaluate risks from ship strikes and ocean noise pollution and then develop appropriate regulatory strategies.
- Use existing knowledge, technological advances, and public-private partnerships to develop and implement global best practices to address both ship-strike and ocean noise pollution issues (see supplementary document with additional considerations and references to recent related efforts).

- For ship-strikes, best practices should include the temporal and spatial separation of shipping lanes and large whale habitat, where possible, as well as encouraging slow steaming practices and consideration of speed reductions in high-risk areas.
- Ship-noise monitoring and mitigation efforts should involve shipping industry and government partnerships aimed at addressing these issues from strategically different perspectives, including:
  - reducing noise exposure within new or existing marine protected areas (Target 14.5) or Important Marine Mammal Areas, especially for those with resident or predictably-present acoustically sensitive and vocally-active species;
  - implementing quieting techniques in accordance with the IMO voluntary vessel-quieting guidelines to directly reduce shipping contributions to noise pollution (Target 14.1);
  - evaluating noise benefits of holistic “green ship” designs aimed at increased fuel efficiency and reduced emissions; and providing financial incentives to encourage the adoption of ship-quieting technology.

## **Ocean Noise: an abbreviated compilation of recommendations from recent work by IUCN<sup>1</sup>, IWC<sup>2</sup>, CMS<sup>3</sup> and NOAA<sup>4</sup> focused on impacts of anthropogenic noise on marine life**

This brief summary of suggestions and recommendations from recent publications on the topic of impacts of anthropogenic noise on marine life is meant to support discussions of international policy for reducing those impacts. The table below is only a subset of what was presented in each publication – selected here to reinforce particular goals and to emphasize points of agreement among many specialists in the field of ocean noise and its impacts. Numerous other reports and peer-reviewed publications on this topic exist, but those mentioned in the table provide an introductory window on the key issues.

Nowacek et al. 2015 (ref 1b) state, “a responsible path forward should focus on the creation of legally binding international commitments” to reduce the impacts of anthropogenic noise on marine life. They list five measures that provide an initial framework for a “new conversation” regarding ocean noise. Two options they suggest are that: (1) member states of the IMO pursue an annex to MARPOL 1973/1978 through the Marine Environmental Protection Committee or, because MARPOL applies solely to ships, (2) member states negotiate a new convention to regulate all non-military sources of underwater noise. Either of these approaches, or others, will require agreement among nations on overarching goals.

### **References**

<sup>1.a</sup> Nowacek, D.P. and B.L. Southall. 2016. Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys: a resource guide for managers. Gland, Switzerland: IUCN, 42 pp. ISBN: 978-2-8317-1805-7

<sup>1.b</sup> Nowacek, D.P. et al. 2015. Marine seismic surveys and ocean noise: time for coordinated and prudent planning. *Front Ecol Environ* 13(7): 378-386.

<sup>2</sup> IWC.2016. Report of the Workshop on Acoustic Masking and Whale Population Dynamics. SC/66b/Rep 10 (<https://iwc.int/workshop-reports>)

<sup>3</sup> Prideaux, G. et al. 2016. CMS Family Environmental Impact Assessment Guidelines for Marine Noise-generating Activities. Convention on Migratory Species (CMS) of Wild Animals, Bonn. ISBN: ?

<sup>4</sup> Gedamke, J. et al. 2016. NOAA Ocean Noise Strategy Roadmap (<http://cetsound.noaa.gov/road-map>)

**Table 1. Suggestions and recommendations from four recent workshops cross-referenced to the five measures listed in Nowacek et al. 2015 (1b).**

<b>Nowacek et al. 2015 - paraphrased</b>	<b>IUCN Planning Strategies<sup>1a</sup></b>	<b>IWC Masking Workshop<sup>2</sup></b>	<b>CMS Guidelines<sup>3</sup></b>	<b>NOAA ONS<sup>4</sup></b>
Empirically based restrictions on the duration and/or area of activities in known biologically important habitat		Section 11 – Site selection of Important Marine Mammal Areas for protection should integrate information on anthropogenic noise		Development of national guidance for acoustic impact thresholds and other management tools
Sustained monitoring of acoustic habitat indicators, with limitations and targets based on the cumulative noise contributions of human activities	Practice #3 – Implement mitigation and monitoring of operations	Section 11 – Increase research on and management consideration of acoustic habitat in cetacean conservation efforts	Section I.2 – Professional sound propagation modeling  Section I.3 – Cumulative sound exposure level (SELcum) as key metric	Improved management to protect acoustic habitat and achieve species- or habitat-focused goals through incorporation of place-based authorities
Preconditions for developing and implementing practices to reduce acoustic footprints of noise-generating activities	Practice #1 – Assess and evaluate the environment in the context of the proposed actions	Section 11 – Ships that contribute disproportionately to ocean noise levels should be a priority for replacement or application of ship-quieting technology	Section I.1 – Operational mitigation procedures  Sections I.4-I.11 – EIA guidelines for specific noise sources	Expansion of existing international partnerships with regulatory agencies and industries to promote use of quieter technologies
Creation of an intergovernmental science organization to coordinate and advance efforts to improve the environmental assessment of acoustic impacts		Section 11 – Member states should undertake management efforts to keep quiet areas quiet and make noisy areas quieter	Section G – Related intergovernmental decisions	Development of NOAA capacity for predictive sound field and sound exposure modeling
Requirements for preparation of EIAs and strategic or programmatic environmental assessments to include analysis of potential for cumulative effects	Practice #2 – Evaluate risk and develop plans accordingly  Practice #4 – Evaluate and improve	Section 11 – Integrate consideration of ocean noise into efforts under the United Nations Sustainable Development Goal 14 and the Convention on Biological Diversity (Aichi Targets 7 and 11)	Section H.2 – Basic principles of EIAs  Section I – Framework for EIA guidelines for marine noise-generating activities	Enacting monitoring requirements for compliance processes that reflect comprehensive science goals