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Marine seismic surveys and ocean noise: mitigation, monitoring and a plan for international management

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Given the extent of seismic surveys and their potential negative environmental impacts, there is need for systematic planning and operational standards to minimize or eliminate impacts, especially in sensitive areas. Mitigating immediate potential impacts is important, but monitoring for short- as well as long-term impacts is essential. Risks from cumulative, synergistic, and synchronous effects, which may occur over large spatial and temporal scales, are rarely considered sufficiently in environmental assessments; regulatory requirements vary widely from one country/jurisdiction to another. We describe a series of basic elements for responsibly conducting marine seismic surveys or other major noise generating activity: obtaining consistent baseline ecological data; substantial advance planning, communication, transparency and critical review; integrated acoustic and visual monitoring during operations; and systematic analysis and sharing of results to inform future planning and mitigation. These programs need to be adaptive and not all elements are needed in every case. In addition to these elements, given the international and transboundary nature of ocean noise generally, we assert the urgent need for a consistent worldwide approach to address this issue. Such a framework could involve the creation of a new international instrument or, preferably, the extension of an existing one (e.g. International Convention on the Prevention of Pollution from Ships - MARPOL). The broad issue of ocean noise is being discussed and precedents for such international instruments exist within a range of intergovernmental organizations (e.g., CBD, IMO, CMS and IWC). In addition, the US requires consideration of noise in the preparation of environmental impact statements and the EU has recognized ocean noise as a pollutant and an indicator of environmental quality under its Marine Strategy Framework Directive. The time is ripe and the need is great to consolidate such initiatives to develop a consistent, effective, science-based international regulatory framework to address the issue of ocean noise.

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