

Negative Environmental Impacts on Marine Seismic Survey Activities

Authors : Katherine Del Carmen Camacho Zorogastua, Victor Hugo Gallo Ramos, Jhon Walter Gomez Lora

Abstract : Marine hydrocarbon exploration (oil and natural gas) activities are developed using 2D, 3D and 4D seismic prospecting techniques where sound waves are directed from a seismic vessel emitted every few seconds depending on the variety of air compressors, which cross the layers of rock at the bottom of the sea and are reflected to the surface of the water. Hydrophones receive and record the reflected energy signals for cross-sectional mapping of the lithological profile in order to identify possible areas where hydrocarbon deposits can be formed. However, they produce several significant negative environmental impacts on the marine ecosystem and in the social and economic sectors. Therefore, the objective of the research is to publicize the negative impacts and environmental measures that must be carried out during the development of these activities to prevent and mitigate water quality, the population involved (fishermen) and the marine biota (e.g., Cetaceans, fish) that are the most vulnerable. The research contains technical environmental aspects based on bibliographic sources of environmental studies approved by the Peruvian authority, research articles, undergraduate and postgraduate theses, books, guides, and manuals from Spain, Australia, Canada, Brazil, and Mexico. It describes the negative impacts on the environment and population (fishing sector), environmental prevention, mitigation, recovery and compensation measures that must be properly implemented and the cases of global sea species stranding, for which international experiences from Spain, Madagascar, Mexico, Ecuador, Uruguay, and Peru were referenced. Negative impacts on marine fauna, seawater quality, and the socioeconomic sector (fishermen) were identified. Omission or inadequate biological monitoring in mammals could alter their ability to communicate, feed, and displacement resulting in their stranding and death. In fish, they cause deadly damage to physical-physiological type and in their behavior. Inadequate wastewater treatment and waste management could increase the organic load and oily waste on seawater quality in violation of marine flora and fauna. The possible estrangement of marine resources (fish) affects the economic sector as they carry out their fishing activity for consumption or sale. Finally, it is concluded from the experiences gathered from Spain, Madagascar, Mexico, Ecuador, Uruguay, and Peru that there is a cause and effect relationship between the inadequate development of seismic exploration activities (cause) and marine species strandings (effect) since over the years, stranded or dead marine mammals have been detected on the shores of the sea in areas of seismic acquisition of hydrocarbons. In this regard, it is recommended to establish technical procedures, guidelines, and protocols for the monitoring of marine species in order to contribute to the conservation of hydrobiological resources.

Keywords : 3D seismic prospecting, cetaceans, significant environmental impacts, prevention, mitigation, recovery, environmental compensation

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