

Industrial Noise and the Gray Whales of Sakhalin: A Multi-Year Exercise in Estimation, Monitoring and Mitigation of Exposure

Roberto Racca

Jasco Applied Sciences, Victoria, BC, Canada

Since the start in the 1990's of subsea oil exploration and development off north-eastern Sakhalin Island in the Russian Far East, there has been an ongoing endeavour to avoid harmful impact of industrial activities on a small population of gray whales that every year return to forage and to rear calves during the short ice-free summer. A long-term monitoring program including visual observation of the whales from shore and vessels and measurement of underwater acoustic levels from natural events and human activities has increased our understanding of the influence of sound on these animals. At the same time much effort has been spent minimizing the possibility of negative effects from noise on the individuals and population through mitigation programs that have pushed the envelope of cautionary practices and forged standards regarded as exemplary worldwide. In this lecture we shall journey through the evolution of acoustic exposure estimation, monitoring and mitigation methods through a series of major industrial events including the laying of an offshore pipeline, the installation of large oil platforms and the recurrent geophysical surveying of the seabed. Along the way we shall visit strikingly beautiful wilderness, meet some iconic animals both in the sea and on shore, and learn how two gray whales named Flex and Varvara overturned our frame of reference about the migratory lifecycle of this species.



Roberto Racca is one of the principals and the Chief Communications Officer of JASCO Applied Sciences, a global company that specializes in the study of underwater sound, its effect on marine life, and ways to reduce the environmental impact of human-made aquatic noise. His career has been focused primarily on acoustics for the past twenty-five years or so, but he has worked previously and maintains an interest in other subjects of research including medical physics (development of improved cardiac valve prostheses), machine vision (tracking of waterborne targets from particle tracers to fish), multispectral imaging of fugitive greenhouse gases, and application of electro-optics in ultrahigh speed imaging and holography (for which he received the Hubert Schardin Medal of the German

Physical Institute). In his underwater acoustics studies Dr. Racca has travelled widely to remote regions from the arctic to the Brahmaputra, but no settings have captivated his interest (and his time) like Sakhalin Island and the population of Gray Whales that return there every summer; he has spent the last nearly 15 years working with industry and environmentalists on the protection of these whales from excessive exposure to underwater noise from hydrocarbon development.