

From the aquarium to the ocean: an example of science made in captivity for the conservation of beluga whales in the Arctic

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Modern aquaria worldwide have a greater role than ever to play in advancing and promoting global conservation of aquatic ecosystems. Their goals should sustain, encourage and support initiatives for species and habitat conservation and promote increased public awareness of environmental issues of concern. Aquaria offer invaluable access to species in a controlled environment and should be encouraged to support and perform conservation research at their facilities. An example of such research is the beluga whale (*Delphinapterus leucas*) bioacoustics project conducted on captive belugas by the L'Oceanogràfic of the City of the Arts and Sciences of Valencia, Spain. Beluga whale populations are declining. Their survival is directly linked to their ecosystem balance that is being affected by global warming and increased pollution. Their seasonal patterns and habitat use are key features for conservation and population management plans but are difficult to obtain. Remote monitoring through acoustic detection has proved to be very effective for these purposes in other cetaceans, but has never been attempted with beluga whales. In order to evaluate the viability of remote acoustic monitoring of wild belugas, echolocation signals of L'Oceanogràfic beluga whales were analyzed and the performance of acoustic loggers (T-POD, Chelonia Ltd.) was tested in their facilities. Successful results from the controlled experiments were confirmed with field tests of acoustic monitoring in the Arctic environment including regions in Alaska (Disenchantment bay and Cook Inlet). Field work results proved the ability to positively detect echolocation of wild belugas and revealed unknown features of their habitat use, such as temporal distribution correlations with tide levels, feeding behaviors and circadian rhythms. This project demonstrates that research performed in captivity can provide powerful new insights on beluga biology and is important to the conservation of beluga whales in the Arctic.

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