

Mapping cumulative threats in endangered Cook Inlet beluga whale habitat

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The beluga whale population in Cook Inlet, Alaska is in danger of going extinct in the near future with fewer than 280 whales remaining in what was, until a few decades ago, considered a healthy population numbering over 1000. In 2008, the Cook Inlet beluga whale distinct population segment was listed as endangered under the Endangered Species Act; however, based on the most recent abundance estimate from 2018, the population declined at a rate of 2.3% annually during that 10-year period. At this rate of decline, there will be less than 200 Cook Inlet belugas by 2033; a threshold level that the National Marine Fisheries Service (NMFS) identified as being the point where small population dynamics, such as inbreeding depression or loss of genetic diversity, pose a significant risk to the population, likely exacerbating the rate of decline.

NMFS identified cumulative effects of multiple stressors as a threat of high concern to beluga recovery. Yet, both federal and state agencies continue to authorize the legal harassment of the whales and/or degradation of their habitat, without comprehensively understanding the extent of various threats these highly mobile whales are already encountering throughout Cook Inlet. Complicating matters are the varying regulatory definitions of cumulative effects/impacts/risk, most of which do not align with scientific or colloquial interpretations. Given the urgency for curbing the population decline, our goal for this project was to develop a visualization of the areas within Cook Inlet where belugas were exposed to threats. We started with a small number of threats that were easily mappable: shipping patterns using AIS data; NMFS permitted level B harassment zones for projects that could incidentally take Cook Inlet belugas; and mixing zones where pollution was allowed to exceed water quality standards, permitted by Alaska Department of Environmental Conservation and the Environmental Protection Agency. We overlaid these data with actual location points from belugas that were previously satellite-tagged by NMFS from 1999-2002. Mapping data from these limited sources is a powerful tool in helping to visualize and explain the extent of cumulative threats to these whales. Furthermore, this project highlights the need for regulators to meaningfully consider the multitude of stressors the few remaining Cook Inlet belugas encounter throughout their range prior to permitting more activities that harass them or affect their habitat.