New Study Links Saxitoxin to Deaths of Laaqudan, Northern Fur Seals, in the Southeast Bering Sea

St. Paul Island, AK; May 29, 2025 – New research published in the journal *Marine Mammal Science* establishes for the first time a link between the neurotoxin saxitoxin, accumulated during harmful algal blooms, and deaths of laaqudan (in Unangam Tunuu, the first language of Unangaŝ or the Aleut Peoples), or northern fur seals (*Callorhinus ursisnus*), in the southeast Bering Sea.

In the study, researchers collected and analyzed data related to the discovery of 10 dead northern fur seals and hundreds of dead, mostly benthic, fish that washed ashore on a popular beachcombing beach on St. Paul Island, Alaska, in August 2024. A tribal member from the Aleut Community of St. Paul Island first discovered the animals, and tribal environmental conservation staff collected and froze six northern fur seal carcasses for later analysis by a certified veterinarian team to determine the cause of death.

The study was led by Tribal, agency, and academic scientists from the Aleut Community of St. Paul Island, the National Oceanic and Atmospheric Administration (NOAA), the Northwest Fisheries Science Center (NWFSC), the University of Alaska Fairbanks College of Fisheries and Ocean Sciences, the Woods Hole Oceanographic Institution (WHOI), and the Alaska Ocean Observing System.

Harmful algal blooms occur when microscopic algal cells that naturally produce potent neurotoxins thrive and grow to high cell densities in marine ecosystems. Saxitoxins, a family of neurotoxins produced by the toxic algae *Alexandrium catenella*, accumulates in filter-feeding organisms (like clams, other invertebrates, and fish) during blooms. Consumption of saxitoxin-contaminated seafood causes paralytic shellfish poisoning in humans and threatens the health of wildlife, including marine mammals.

The team conducted a thorough investigation of possible causes of death including necropsies of the six frozen northern fur seals and all available fish. Results from necropsies of dead fish and northern fur seal body tissues, as well as analyses of seawater, sediments, and food web samples that were independently collected by research cruises around the same time in surrounding waters, provided compelling evidence that saxitoxin exposure via the food web was the main cause of death in this northern fur seal mortality event.

Samples taken in the southeast Bering Sea ecosystem at the same time and location as the seal deaths revealed bloom densities of *Alexandrium catenella*, large *A. catenella* cyst beds (resting stages of the algae), and high prevalences of saxitoxin in fish, zooplankton, clams, and worms in the northern fur seal foraging area. High concentrations of saxitoxin were also found in fish, clams, worms, and seal urine.

“As the Arctic Ocean ecosystem gets warmer, harmful algal blooms are becoming more frequent, getting stronger, and spreading further,” said Dr. Kathi Lefebvre, a research biologist at NOAA’s Northwest Fisheries Science Center and lead author of the study. “The findings of this study deepen our understanding of the changing ecosystem and give us new insights about the growing risks of toxin exposure to marine wildlife and coastal communities that rely on the ocean for food. Crucially, this new data also strengthens our ability to monitor and manage harmful algal blooms to mitigate those risks.”

“St. Paul is experiencing a rapidly transforming marine ecosystem with significant impacts on our community,” said Dr. Lauren Divine, Director of the Ecosystem Conservation Office for the Aleut Community of St. Paul Island. “The culture, economy, health, and food security of our people are closely tied to ocean health, and northern fur seals are vital to Unangaŝ cultural identity and wellbeing. This research is an important contribution to our knowledge of the harmful effects of the changing climate on

marine wildlife and will help guide our continued efforts to rebuild the northern fur seal stock on St. Paul."

The full study, "Saxitoxin Linked to Deaths of Northern Fur Seals in the Southeast Bering Sea," can be found in *Marine Mammal Science*.

Support for this research was provided by the NOAA Alaska Native Co-Management Funding Program, NOAA's Center for Coastal Ocean Studies ECOHAB Grant to the Northwest Fisheries Science Center and WHOI, NOAA Fisheries Prescott Program, NSF Office of Polar Programs, North Pacific Research Board, Cooperative Institute for the North Atlantic Region, Cooperative Institute for Climate, Ocean, & Ecosystem Studies, National Natural Science Foundation of China, National Key R&D Program of China, Pacific Marine Environmental Laboratory, and NOAA's Ecosystem Fisheries Oceanography Coordinated Investigations.

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