

Project #: 644

Title: Response and Intervention System for Climate Change Induced Paralytic Shellfish Poisoning in Aleut Communities

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Project Summary: This project will educate local residents about paralytic shellfish poisoning (PSP) and train them to use test kits to monitor for PSP toxin. The project activities will include workshops, development of a manual on how to set up a community-based surveillance system, and public outreach materials. The proposed communities extend the length of the Aleutian Islands where little baseline data is available on PSP toxin. Since 1973, over 150 outbreaks have been reported in Alaska, with three fatalities since 1994. In an effort to reduce the risk of PSP encounters, the Alaska Science and Technology Foundation funded research to develop a rapid test kit proposed by Jellett Biotech in Nova Scotia, Canada, which was developed in 1994 and, in 2004, was approved by the Food and Drug Administration, Interstate Shellfish Sanitation Program for screening shellfish, opening opportunities for communities to use a reliable, inexpensive method. The project PIs will investigate the increased risk of PSP as a result of climate change and the reliability of traditional knowledge used when harvesting clams and mussels. Methods developed to monitor occurrence and distribution of PSP toxins in connection with climate change observations will increase communities' capacities in responding to the threat of poisoning while developing the process of interlinking modern technology and traditional knowledge.

Progress Summary: Researchers have completed the sample collections from sites in coastal Alaska from Southeast Alaska throughout the Aleutian and Pribilof Islands and including the Commander Islands in Russia. Three labs and several technicians analyzed the samples. During the 14 months of collections the project collected 146 samples from 26 sites representing 8 bivalve species.

We saw consistent positive results for PSP throughout the year in King Cove, Sand Point and Unalaska. Sand Point had the highest level of PSP toxin determined by the DEC lab with a surf clam sample collected on June 23, 2006 at 329 µg/100 grams followed by the second highest reading from a butter clam sample collect in Unalaska on July 20, 2006 with a reading of 218 µg/100 grams.

An additional 15 samples from Adak, Akutan, Atka, False Pass, Port Fidalgo, Port Lions and Valdez will be analyzed in February.

The NOAA Marine Biotoxins Program analyzed samples provided by the PSP project and is leading the comparison study. The results from the NOAA Marine Biotoxins Program lab

show the toxin profile (quantify each type of toxin) as well as the STX equivalents (generated via HPLC analyses) and the quantifications from the receptor binding assay, presence/absence data from the Jellett strips and the mouse bioassay results. The NOAA Marine Biotoxins Program analyzed the 106 samples with the following tests:

- 1) HPLC (high pressure lipid chromatography) determination of the suite of toxins (toxin profile for the PSP toxins) and the associated STX equivalents in terms of toxicity.
- 2) Receptor binding assay quantification of PSP toxicity in terms of Saxitoxin equivalents (this is a receptor mediated assay that measures binding of STX to rat sodium channels by the displacement of radiolabeled STX).
- 3) Jellett tests using both extraction methods.

In early December, a Unalaska woman was suspected of having paralytic shellfish poisoning. The patient dug 4 razor clams at Summer's Bay near Unalaska on 12/7/07. The clams were steamed after removal of siphons and viscera and eaten with some butter. Over the next 3-4 hours the patient developed headache, nausea and vomiting followed by paresthesias of her mouth and tongue, dysarthria, mild ataxia and a floating sensation. Symptoms had mostly resolved by the time she was evaluated by the public health nurse the next day.

Thirty traditional knowledge surveys are completed and several more are expected by the end of February. The analysis of the survey will begin in February and will be completed in March.



Researcher, Natalia Tatarenkova, (left) conducts traditional knowledge survey with Vera Belobrova (center) and her daughter. Nikolskoye, Bering Island, Russia. Photo courtesy Tatarenkova