Sitka Tribe of Alaska Environmental Research Lab
Sitka Tribe of Alaska

In coastal Alaskan Native communities, harvesting subsistence foods at low tide is a way of life, and shellfish are one of the most important intertidal food sources. Climate change increasingly threatens the availability of these resources. With no other governmental agency monitoring ocean conditions affecting subsistence foods in the state, the Sitka Tribe of Alaska established a laboratory to serve Sitka tribal citizens and all citizens of coastal Alaska. The Tribe's Environmental Research Lab provides timely sample testing to evaluate marine harvest safety.

A SHELLFISH TOXIN

The Sitka Tribe of Alaska has a population of over 4,000 citizens who are primarily of Tlingit, Haida, Aleut, and Tsimshian heritage. Located on the coast of Baranof Island in Southeast Alaska, the community is only accessible by air or water. Tribal citizens have a long history of depending on the ocean for food. Beyond the region's famed salmon, families harvest halibut, herring, seals, seaweed, and numerous types of shellfish.

In recent years, climate change has caused new patterns in ocean temperatures along the Alaskan coast, threatening shellfish. Warming waters increase the frequency and duration of harmful algal blooms. These events produce biotoxins that make marine resources unsafe for human consumption. Eating even a small amount of tainted food can lead to paralytic shellfish poisoning, a debilitating illness that can lead to death. Contaminated shellfish are impossible to distinguish from unaffected shellfish and the toxin cannot be eliminated by freezing or cooking. The illness is particularly dangerous in remote Alaskan communities since village medical facilities have limited equipment, putting patients at higher risk of a fatal outcome.

As part of the National Shellfish Contamination Program, the state of Alaska maintains a lab in Anchorage that routinely tests commercial samples to verify that they meet safety standards. Unlike other coastal states, however, Alaska does not certify beaches as safe for recreational or subsistence harvesting. Instead, the state issues a blanket recommendation that shellfish should only be eaten if purchased from commercial harvesters, grocery stores, or restaurants. Subsistence harvesters are not included in the state monitoring system.

Traditional ecological knowledge held that harvesting shellfish was safe during the winter months, but rapidly changing ocean conditions made these long-standing guidelines unreliable. Seeking to protect its harvesters and those depending upon marine resources, the Sitka Tribe of Alaska proposed sending tribal shellfish to the state lab in Anchorage. But lengthy shipping times and the low priority placed on testing non-commercial samples meant that up to two months could pass before results became available, far too much time for subsistence living. The Tribe's Environmental Program Manager observed that fear caused many tribal citizens to stop harvesting, while others were forced to play "toxic roulette" in order to feed their families.

TRIBAL SAMPLE TESTING

In 2013, the Sitka Tribe of Alaska reached out to other tribes in the region to form a partnership dedicated to preserving the future of marine subsistence resources. The result was SEATOR, the Southeast Alaska Tribal Oceans Research Network, which brings together 16 tribes to collect baseline environmental data to monitor water quality. Each partner tribe has identified important community subsistence harvesting sites for protection.

A few years after the formation of SEATOR, the Sitka Tribe of Alaska launched its Environmental Research Lab with the specific intent of providing regional capacity to test shellfish for toxins. SEATOR communities send biweekly samples to the Lab, which tests them using the receptor binding assay method developed by the National Center for Coastal Ocean Science and generates results within one to two business days. If toxins are identified, the results are immediately communicated to all partners by email, and an advisory is posted on the SEATOR website.

The Sitka Tribe of Alaska Environmental Research Lab is the only facility in Alaska that routinely tests shellfish for subsistence and recreational harvesting. The lab provides training to SEATOR partner communities on water quality assessment, proper sample collection techniques, and data management. Staff also mentor student interns and provide science education to tribal youth through cultural camps. The lab is managed by the Sitka Tribe of Alaska's Resource Protection Department as part of its mandate to protect citizens' access to subsistence resources from land and sea.

Since 2014, the Sitka Tribe of Alaska has secured over $3 million to build and operate the lab from a mix of federal agencies including the Bureau of Indian Affairs, the National Institutes of Health, the Environmental Protection Agency, the Department of Health and Human Services Administration for Native Americans, and the National Oceanic and Atmospheric Administration.

Although to date, operations have depended almost entirely on grant funding, the Tribe's future plans include generating revenue for the lab through commercial harvest testing and by offering services to the general public.

The lab processes almost 1,000 samples annually and flags hundreds of shellfish that are over the biotoxin regulatory limit. In its first five years of operation, 11 more tribes joined the SEATOR partnership (one additional Southeast Alaska tribe and ten tribes from the Kodiak area) so that they, too, could better monitor food safety and collaborate on environmental surveillance. The Lab now routinely monitors over fifty coastal sites for 27 tribes. Based on the success of its shellfish program, the Lab has expanded into additional services, such as analyzing water samples for ocean acidification, testing for mercury in subsistence foods, and monitoring for two novel shellfish toxins. Through its regular operations, the Lab has identified several harmful algal blooms with lethal toxin levels, but there has not been a single case of paralytic shellfish poisoning from harvested resources in any of the 52 partner sites.

SOVEREIGNTY THROUGH SCIENCE

The state of Alaska has exclusive jurisdiction over coastal resources under the Alaska Native Claims Settlement Act, leaving Alaskan tribes without any regulatory authority over tidal subsistence foods. SEATOR tribes cannot shut down harvesting during harmful algal blooms, but tribal officials can use the Environmental Research Lab's timely and accurate results to warn harvesters about risks by posting advisory notices on local beaches. The lab provides tribal citizens with the information they need to decide whether to harvest at a given location on a specific day—thereby re-establishing tribal resource management within the context of existing state rules. Alicia Gassman, the General Manager of the Sitka Tribe of Alaska, notes that the lab is "increasing sovereignty through science." In effect, the Tribe is stepping into a vacuum left by the state of Alaska with regard to subsistence foods. When concerns about food availability emerged during the Covid-19 pandemic, the benefits of this authority were especially clear: subsistence harvesting became more widespread, and the Sitka Tribe of Alaska quickly responded to citizens' needs by changing lab policies and accepting samples collected outside the regularly monitored beach sites.

The Environmental Research Lab plays a central role in supporting inter-tribal collaboration by providing testing capacity and outreach for SEATOR. The partners, who meet annually to share information and discuss tribal priorities, guide lab activities. Each tribe designates locally significant areas to collect water quality and shellfish samples, ensuring that the data is relevant

to community harvesters. The National Atmospheric and Oceanic Administration has singled out the relationship between the Lab and the SEATOR inter-tribal initiative as a particularly effective example of "citizen science," recognizing that the general public is contributing to scientific knowledge that otherwise would be difficult to obtain. The Lab trains community members and local environmental coordinators, which enables the partnership to monitor conditions over a huge regional area with consistently high standards. The lab also offers scientific education to tribes outside the SEATOR partnership since climate change and biotoxin contamination affect all coastal areas. One example is a series of webinars on environmental monitoring that lab employees hosted through the Alaska Forum on the Environment and that attracted more than one hundred tribal participants. In sum, the Sitka Tribe's ability to monitor the ocean and ocean resources makes it possible for many tribes in the region to work better together, plan for new realities, and raise public awareness about the effects of climate change.

The Sitka Tribe of Alaska Environmental Research Lab also has developed close working relationships with various non-tribal partners through its broad geographic reach and technical excellence. Staff participate in workshops with relevant state and federal agencies, developing personal connections through shared goals for climate change mitigation, environmental management, and public health. In 2019, for example, the lab's testing revealed an unprecedentedly harmful algal bloom with large numbers of samples exceeding the regulatory limit. The Tribe worked with the state of Alaska to draft and disseminate a statewide public service announcement warning about the dangers of paralytic shellfish poisoning. Rather than passively receiving results from outside agencies, tribal scientists now work alongside their governmental and academic counterparts. The lab uses well-regarded testing methods to ensure that its results are transferable and recognized by other scientific organizations. As a marine sample collection and testing leader in Alaska, the lab is eligible to participate in large-scale research initiatives. Recently, the Sitka Tribe of Alaska received funding to collect and analyze data over multiple years for projects with the National Atmospheric and Oceanic Administration and the National Institutes of Health. The lab is now pursuing federal Food and Drug Administration certification, which will allow staff to test commercial harvesting samples. This network of partners helps fund the lab's activities and expands scientific understanding of the health of the coastal Alaska ecosystem.

Subsistence harvesting of marine resources is a way of life in Alaska's coastal communities. The Sitka Tribe of Alaska Environmental Research Lab provides testing so that tribes can monitor the safety of traditional foods. By developing scientific capacity and working with partner

communities, the Sitka Tribe of Alaska is exercising sovereignty over coastal resources and helping harvesters adapt to the effects of climate change on tidal beaches.

LESSONS

1. Tribal management of ecological resources expands tribal sovereignty.

2. Communities that rely on subsistence farming are best protected from the harmful impacts of climate change when inter-tribal collaboration and building community engagement are prioritized.

3. Sovereignty through science is driven by partnering with credible external entities and directly engaging tribal authority.