

# Port Gamble Bay – Evaluation of Exposures to Chemicals in Shellfish and Sediment

## Fact Sheet

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The Port Gamble S’Klallam Tribe (PGST) petitioned the Agency for Toxic Substances and Disease Registry (ATSDR) with health concerns about exposure to chemicals in Port Gamble Bay. The concern is that people could be exposed to chemicals in the bay by eating shellfish or touching beach sediments. The Department of Ecology (Ecology), which is overseeing the cleanup of the bay, also requested an assessment. The Department of Health completed the Port Gamble Bay Public Health Assessment under a cooperative agreement with ATSDR. The assessment covers the needs of the Tribe and Ecology.

### Overview

Port Gamble Bay is located in Puget Sound on the north end of the Kitsap Peninsula. The former Pope and Talbot millsite operated on the bay from 1853 to 1995. A variety of activities occurred on the western shore, including saw and chip milling, log rafting, log rafting for transfer and sorting, and landfill operations. These activities, along with past fuel and oil spills and nautical debris, may have resulted in the release of chemicals. Sampling found some chemicals in sediments from parts of the bay. Shellfish in the area may pick up these contaminants; they are eaten by tribal members, local residents, or visitors, and are also commercially harvested. Before this health consultation, the Department of Health closed the western shore to harvest as a precaution because of concerns about potential contamination in shellfish.

PGST is on the eastern shore of the bay. Tribal members use the bay for commercial, ceremonial, and subsistence shellfish harvesting. It is part of the “usual and accustomed” shellfish harvesting grounds for several Puget Sound tribes.

### Sampling

Several sediment and shellfish samples were collected from the bay. Fish were not collected, so they’re not included in this assessment.

**Sediment**—samples were collected from the intertidal zone of the Port Gamble Bay shoreline. This included samples from the former mill, landfill sites, and the log rafting areas on the western shore. It included Point Julia on the PGST reservation on the eastern shore.

**Shellfish**—samples of shellfish were collected from the tribal harvest areas. Samples include oyster, intertidal clams (littleneck, manila, cockle, butter, and horse clams), geoduck, and crab. The information for geoduck and crab was limited at the time of the assessment, so there’s some uncertainty for these species.

### Health Assessment

Sampling results were evaluated along with a variety of information to determine if there are potential health impacts from exposures. This assessment considered several factors:

**Type of chemicals, amount detected**—several chemicals require more evaluation: arsenic, cadmium, chromium, copper, dioxin/furan compounds, polychlorinated biphenyls (PCBs), and carcinogenic polycyclic aromatic hydrocarbons (cPAHs). The amount of each chemical measured in sediments or shellfish tissue was used to evaluate people’s potential exposures.

**Ways a person might be exposed to chemicals**—we considered two ways people could be exposed: 1) eating shellfish (tribal members and the general population), and 2) touching or accidentally eating sediments from beaches during recreation or shellfish harvest activities.

**Number of hours, days, and years a person may be exposed to chemicals**—this assessment assumed that all of the shellfish that people eat were collected from Port Gamble Bay and is based on a lifetime exposure of 78 years. The tribe specifically asked us to look at these scenarios:

- Tribal members (adults and children) that eat shellfish as a major source of protein (subsistence). The tribes estimate this subsistence consumption to be a little more than one pound of shellfish meat a day.
- Tribal children playing in the beach sediments at Point Julia during summer break.

We also evaluated these scenarios:

- Tribal members that eat approximately one-half pound of shellfish meat every day.
- People in the general population, including bay residents, eating approximately one tenth of a pound of shellfish meat per day (1–2 meals per week).

## Conclusions

Eating shellfish from Port Gamble Bay at the **high tribe—estimated subsistence rate of a little more than one pound of meat every day** for an entire lifetime could be harmful to health.

Eating shellfish from Port Gamble Bay at a **low tribe—estimated subsistence rate of one-half a pound of meat every day** could be harmful to health, but to a lesser extent than at the high subsistence rate.

Eating shellfish from Port Gamble Bay at a general population rate of **1-2 meals per week** is not expected to harm people's health.

**Touching or accidentally eating beach sediment** during recreational activities in the summer months (or during shellfish harvesting) is not expected to harm children's health.

## Department of Health Recommendations

After reviewing all available information, we recommend:

- Department of Health open the former mill area and western shoreline for commercial shellfish harvest.
- Ecology continue its sediment cleanup work.
- Ecology recommend people not to harvest shellfish where cleanup construction activities are taking place.
- Additional sampling and analysis occur including:
  - Collect tissue samples after cleanup is complete to confirm chemical levels are safe for shellfish harvesting.
  - More geoduck and crab samples be analyzed for metals, dioxins, and PAHs.
  - Collect samples of non-migratory fish and analyze for metals, dioxins, and PAHs.
- Ecology oversee long-term cleanup monitoring, including shellfish, in Port Gamble Bay.



*The Tribe has collected more samples of geoduck, crab, and resident finfish, which will be evaluated in the future.*

Shellfish are filter feeders that absorb algae and other particles that are in the water. this may include bacteria, viruses, and biological toxins. People eating shellfish, especially at high consumption rates, should follow these recommendations:

- Collect and eat shellfish from a variety of locations.
- Consider eating an average serving size (8 oz of uncooked meat).
- Eat a variety of fish and shellfish.
- Young children should eat proportionally smaller meal sizes.
- Before cooking, let the clams “spit,” or soak the shellfish in saltwater for 4 – 24 hours, or overnight, to expel sand and silt stored inside their shells.
- Eat larger clams, like horse clams and geoduck, with the skin and gutball removed.
- Follow the [state crab advisory](#): DOH recommends not eating “crab butter” (Hepatopancreas)  
([www.doh.wa.gov/CommunityandEnvironment/Food/Fish/Advisories.aspx#PugetSound](http://www.doh.wa.gov/CommunityandEnvironment/Food/Fish/Advisories.aspx#PugetSound))
- Follow the [Department of Health’s shellfish advisories](#)  
([www.doh.wa.gov/CommunityandEnvironment/Shellfish/BeachClosures.aspx](http://www.doh.wa.gov/CommunityandEnvironment/Shellfish/BeachClosures.aspx)).

## Next Steps

The state Department of Health will review new data from additional shellfish and fish samples as it becomes available and adjust recommendations as needed.

The agency will also review shellfish monitoring results during and following the cleanup. The health department may reopen the harvest area if the data show shellfish are okay to eat.

## Health Benefits of Shellfish

Shellfish is a nutritious source of protein, low in calories and saturated fats. Shellfish contribute to a healthy diet. Shellfish are also a good source of omega-3 fatty acids and essential nutrients like iron, zinc, copper, and vitamin B-12. According to the U.S. Food and Drug Administration, a well-balanced diet that includes a variety of fish and shellfish can contribute to heart health and children’s proper growth and development. All Washingtonians and tribal members should eat at least two seafood meals a week as part of a heart-healthy diet in accordance with American Heart Association (AHA) recommendations. People who eat fish or shellfish more than two times weekly should follow the recommendations listed to reduce exposure to contaminants in the fish and shellfish they eat.

**For more information, contact the Department of Health: 1-877-485-7316**

[Health consultation reports](#) are available on the Department of Health website ([doh.wa.gov/consults](http://doh.wa.gov/consults)).