Evaluation of Contaminants in Sediment, Fish, Shellfish, and Plant Tissue from Port Gardner and the Lower Snohomish Estuary

Washington State Department of Health
DOH 334-268 June 2011

The Washington State Department of Health completed a health consultation that looked at contaminants found in Port Gardner sediment, fish, shellfish, and plants to see if they could potentially harm people's health.

Overview

The Port Gardner site is located in Puget Sound's Whidbey Basin and is bordered on the east by the City of Everett. The site has a variety of commercial and industrial uses and a history of contamination. Several sediment investigations throughout Port Gardner have shown elevated contaminant levels in some places. The Department of Ecology and the Tulalip Tribe asked the Department of Health to evaluate sediment, fish, shellfish, and plant data from the site to see if contaminants are a health hazard.

Port Gardner and Lower Snohomish River Estuary

Health assessment

The Department of Health looked at a variety of information to determine if there are potential health effects from contaminants in Port Gardner sediment, fish, shellfish, and plants. This included:

- **Type** of contaminants (such as arsenic, dioxin, mercury).
- **How long** a person may be exposed to the contaminant.
- **The amount** of exposure a person may have to the contaminant.
- **Ways a person might be exposed** to the contaminant (breathing in, eating, or touching/skin contact).
- **Site conditions** where the contaminant is found and how people use that site (example: surface sediments that people may be in contact with).
- **How materials or food sources may be used** by the general public or local tribes.

What we found

Sediments: We looked at all the chemicals found in the surface sediment and, in general, the levels of contaminants were low. We were able to narrow our evaluation to arsenic and carcinogenic polycyclic aromatic hydrocarbons (cPAHs). We looked at potential health effects for workers and recreational users from direct contact with contaminated sediments. The health assessment concluded:

- Touching, breathing, or accidentally eating soil containing arsenic and cPAHs at Port Gardner is not expected to harm people's health.

Fish and shellfish: We looked at all contaminants detected in bottom fish and shellfish taken from the Port Gardner site and were able to narrow our evaluation to total arsenic, mercury, and total dioxins. People are exposed to contaminants when they eat fish and shellfish. To look at the potential health risks, we considered the amount of fish and shellfish people eat to see if they're exposed to harmful amounts of the chemicals. The health assessment concluded:

- **General population** — Eating bottom fish or shellfish from Port Gardner is not expected to harm the health of the general population.
- **Subsistence fishers** — Eating bottom fish or shellfish from Port Gardner at a subsistence rate could harm people's health.

Puget Sound crab advice: *The Department of Health recommends* (http://www.doh.wa.gov/ehp/oehas/fish/crab.htm) *that people consume Dungeness and red rock crab from non-urban areas and not eat the crab butter. If you cook crab in boiling water do not use the water for soup stock, broth, or gravy.*

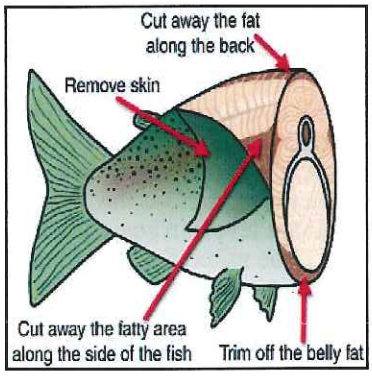
Plants: We looked at concentrations of metals, PCBs, and pesticides in plants from the Port Gardner site; however, plant ingestion rates were not available for us to evaluate potential exposures. Therefore, we cannot conclude whether eating or breathing in plant tissue will harm people's health.

General advice for eating fish

In accordance with the American Heart Association (AHA) recommendations the Department of Health encourages people to eat at least two fish meals per week as part of a heart healthy diet. People may eat fish more than two times weekly; taking a few simple steps will help reduce exposure to contaminants in the fish that they eat.

- Eat a variety of fish (www.doh.wa.gov/fish) that are low in contaminants according to guidance provided on the Department of Health's website.
- Follow fish advisories (www.doh.wa.gov/ehp/oehas/fish/fishadvisories) provided by the Department of Health and local health agencies for water bodies where you fish.
- Young children and small adults should eat smaller meal sizes in proportion to their body weight.
- Grill, bake, or broil fish so the fat drips off while cooking to reduce the amount of contaminants that collect in the fatty parts of fish.
- Eat fillets without the skin.

Mercury and other metals are stored in the fillet or bones of the fish and are not reduced by preparing fish in the ways recommended for reducing contaminants.



Reduce potential exposures from Port Gardner plant resources

- Avoid vegetation that appears to be stressed (wilting, brown or burnt leaves, premature coloration, or leaf drop). If plants do not look healthy, avoid harvesting plant materials for use as food or for medicinal purposes.
- As a rule, the higher off the ground the fruit, vegetable, or portion of the plant to be harvested, the less likely it will be affected by contamination from the soil.
- Always wash fruits and vegetables and any portion of the plant that will be eaten. This is by far the best way to prevent exposure to contaminants that are in the soil or sediments, either by soil adhering to root crops or from soil spray that results in contaminant deposition onto above ground portion of plants.
- Peel away the skin or top surface layer of the fruit or vegetable.

Information about contaminants

Arsenic is a naturally occurring element in the earth's crust. Arsenic can also be released into the environment through human activities, such as mining or smelting ores containing arsenic. It is also used in some commercial wood preservatives and agricultural chemicals. Exposure to arsenic may cause health effects in people including impacts to the cardiovascular system, kidneys, skin, nervous system, and various forms of cancer.

Dioxins are a group of chemicals that can occur naturally in the environment at low levels, and can also be made by people during industrial processes, like burning, bleached kraft pulp mill processes, or chemical manufacturing. Exposure to high levels of dioxin can cause health effects in people, such as chloracne, a skin disease with acne like lesions. Other effects may include immune and reproductive system problems, and possibly mild liver damage. Exposure to high levels of dioxin may also increase the risk of certain cancers.

Mercury is a naturally occurring metal and useful chemical in some products. Eating mercury contaminated fish and shellfish is a main way people are exposed. Exposure to mercury can impact fetuses, infants, and children having an effect on their growing brain and nervous system. Advice for women and children regarding fish can be found on the Department of Health's website (www.doh.wa.gov/fish).

PAHs are created by the incomplete burning of organic material, including oil, wood, and coal. A main source of exposure to PAHs is through the food we eat - smoked or barbecued meats and fish contain relatively high levels of PAHs. Some PAHs have been classified as possibly causing cancer. These are known as carcinogenic PAHs or cPAHs.

Contact information

Washington State Department of Health: Toll Free 1-877-485-7316.
Health consultations are posted on the Department of Health website (http://www.doh.wa.gov/ehp/oehas/consults.htm).

Washington State Department of Ecology: 1-360-407-7536

For persons with disabilities, this document is available in other formats. To make a request, call 1-800-525-0127 or 1-800-833-6388 (TTY/TDD).