

Focus Puget Sound

Fidalgo & Padilla Bays

A PUGET SOUND INITIATIVE site - Reaching the goal of a healthy, sustainable Puget Sound now and forever



WASHINGTON STATE
Department of Ecology

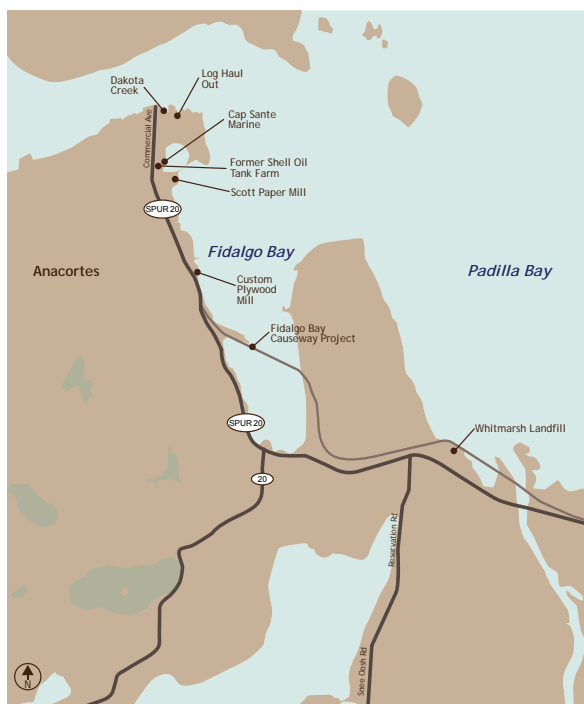
Department of Ecology Investigates Sediment Quality in Fidalgo Bay

Background

Puget Sound, a regional and national treasure, is in trouble – threatened by stormwater runoff, toxics, development, industrial pollution, and many other factors, and struggling under the impact of increasing human population. Recognizing its unique role as an ecosystem and its contribution to our state's economic and human well being, the state established the Puget Sound Initiative – a historic effort under way to restore and recover the Sound by the year 2020. In response to this new directive and armed with state funding, the Department of Ecology's Toxics Cleanup Program is focusing cleanup and restoration efforts on priority in-water and upland sites within one-half mile of Puget Sound. Seven bays have been identified as priority areas for Puget Sound waterfront site cleanup.

Ecology has launched sediment investigations at many of the priority bays. The City of Anacortes overlooking Fidalgo Bay in north Puget Sound has historically supported waterfront industries, recreation, fishing, and

remarkably productive fish and wildlife habitat. As part of the Puget Sound Initiative, Ecology is focusing on Fidalgo Bay for priority cleanup. Several waterfront cleanup sites have been identified, and cleanup and restoration efforts in these areas have begun. Additional cleanup sites or baywide cleanup needs may be identified as Ecology learns more about overall sediment quality and the extent of baywide contamination.



Fidalgo and Padilla Bays - Current Cleanup Sites

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Toxics Cleanup Program Web Site

http://www.ecy.wa.gov/programs/tcp/sites/psi/overview/psi_baywide.html

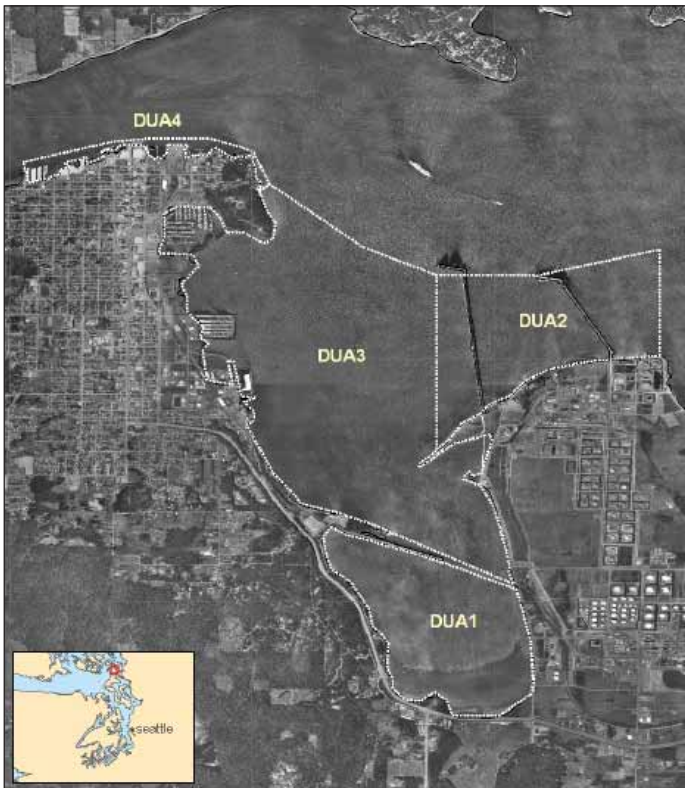
Special accommodations:

If you need this publication in an alternate format, call the Toxics Cleanup Program at (360) 407-7170. Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.

Scope of Baywide Sediment Study

The baywide study included areas of Fidalgo Bay that had not been sampled previously, and a short section of the Anacortes waterfront along Guemes Channel.

The Bay was divided for study into four areas: Southern Fidalgo Bay, south of the Tommy Thompson Trail causeway; March Point, near the refinery piers; Northwestern Fidalgo Bay; and the area from the east side of Cap Sante Marine west to the Guemes Island ferry landing.



Four DUAs (Decision Unit Areas) for sediment investigation

What We Did to Sample Fidalgo Bay

On the floor of the Bay, we sampled sediments down to 10 centimeters, which is the most biologically active layer. We analyzed for the presence of common sediment contaminants and biological toxicity. We also sampled much deeper, to about 13 feet, to understand the sedimentation rate. We also took tissue samples from bottom fish and shellfish throughout the Bay.

We were then able to analyze the chemicals present in sediments, and will be looking more closely at fish and shellfish tissue. Using a type of underwater camera, we looked broadly at the sediment surface to determine what types of plant and animal species are present.



Field team removes sediment samples

What Did We Learn?

The analyses focused on finding chemicals that exceeded the state's Sediment Management Standards. These standards identify chemical contaminants that commonly occur at contaminated sites, and are typically screened for the evaluation of sediment health. What we found included chemicals exceeding those standards for mercury, phthalates, and Polycyclic Aromatic Hydrocarbons (PAHs). Dioxins/furans were also detected in some areas in the Bay. Chemical exceedances tended to be in the northwestern part of the Bay, and in Guemes Channel. Southern Fidalgo Bay and the March Point area showed little chemical contamination.

Several locations throughout the Bay failed biological toxicity tests. Biological toxicity tests determine if sediment-dwelling organisms are impacted by the chemical contaminants. Some of these locations also have elevated chemical contaminants while others do not. Areas without obvious chemical contaminants appear to be affected in part by large volumes of decaying wood waste. This wood waste tends to increase overall biological toxicity to the sediment-dwelling



organisms and degrade habitat quality for eel-grass beds and natural resources. This, in turn, can impact fish that use these resources for habitat and food.

The northwestern area along the western shore historically supported industrial and other uses including a paper mill, lumber mill, and marina. It is then no surprise that this is an area where Ecology is already overseeing several cleanups in response to previous sampling (see cleanup sites on map). The new baywide information confirms the importance of working hard to clean up those areas of the waterfront that have a history of industrial use.

The extent of contaminants in Guemes Channel will take some more work to understand. It is possible that additional cleanup sites could be identified, but more analysis is needed to be sure.

What Are the Next Steps?

We are now conducting fish and shellfish tissue analysis to better understand contaminant concentrations that may impact human health. The results also confirm the importance of moving forward aggressively on the cleanup sites that are under way. For example, some of the highest dioxin concentrations were located in areas already designated for cleanup – near the former Scott mill site and the former Custom Plywood mill site. Those cleanups are already moving ahead, and should reduce the potential risk from any contaminants. Ecology may conduct further evaluation, especially in the Guemes Channel area where contaminated samples were found.

Frequently Asked Questions

Q *What kinds of contaminants were found, and at what levels?*

A There were some fairly low levels of mercury contamination found, as well as some petroleum products. Phthalates, which result from use of plastics and other sources, were found in several locations. Dioxins and furans were present in all four areas of the Bay, with more found in the northwestern area.

Q *What are phthalates, and what is their significance in the sediments?*

A Phthalates are plasticizers used in PVC products throughout urban commercial and residential neighborhoods in materials such as vinyl flooring and shower curtains. Generally, phthalates reach sediments when plasticized PVC products off-gas. Phthalates stick to fine particles in the air, which are then deposited on soils and surfaces

throughout the watershed. When it rains, the particles wash off surfaces - particularly impervious surfaces like pavement, roofs, and cars - and into storm drains. Some types of phthalates tend to accumulate in sediments at the end of urban stormwater outfalls. Over time, since phthalates don't readily dissolve in water, they tend to build up in sediments. This is especially true in quiet, slow-moving waters. Although phthalates in sediments are toxic to benthic organisms, sediment concentrations pose a minimal risk to larger animals and human health.

Q *What is the risk of mercury and petroleum products to Fidalgo Bay?*

A Both mercury and petroleum were found at levels exceeding state standards. It appears that neither mercury nor petroleum are widespread. We are currently focusing cleanup in most areas where these elevated levels were found. Additional investigation



will occur in the other areas where these levels were found. At high enough concentrations, mercury and petroleum can impact animals that live in the sediments. Mercury can impact human health if it is widespread as a contaminant. Some petroleum contamination can also affect human health.

Q *Where do dioxins come from?*

A Dioxins and dioxin-like compounds represent a family of chemical compounds. They are by products of human and natural activities, such as combustion and incineration, forest fires, chlorine bleaching of pulp and paper, automobile operation (from leaded fuels), certain types of chemical manufacturing and processing, and other industrial processes. Typically released in very small amounts, dioxins tend to build up in the environment because they break down very slowly. They are found everywhere – in air, soil, and water. Sometimes they are broadly scattered over an area; sometimes a “hot spot” exists where a particular operation took place. Wherever they are, dioxins strongly bind to soil and sediments.

Q *Do dioxins pose a risk to human health?*

A Most of what is known about the health effects of dioxins comes from studies of workers exposed to relatively high dioxin levels. These studies and research with animals indicate that dioxins at high levels are likely to cause cancer in humans and can also cause developmental and reproductive effects.

However, the levels that people are normally exposed to are generally much lower. The possibility of adverse effects from low levels of exposure to dioxins in the general public remains debatable and controversial. This is because we are exposed to different mixtures of dioxins over time and it is difficult to know how toxic the various mixtures are. The health effects associated with dioxins depend on a variety of factors including the level of exposure, when someone was exposed, and how long and how often they

were exposed to dioxins. It is also a challenge to measure or observe the effects, if any, from exposures to the general public at these low background levels.

Dioxins exist throughout the environment and almost every living creature including humans has been exposed to dioxins. Because dioxins are so widespread, we all have some level of dioxins in our bodies. In general most human exposure to dioxins comes from the fat in our food, mostly meat and dairy products. In the case of Fidalgo Bay, it is unlikely that exposure would increase significantly from occasional recreational activities.

Q *How can we learn more about dioxin risk?*

A More data is needed to better understand the risks to our health from low levels of exposure to dioxins. As more tissue analyses from this sediment study are completed, we will consult with state and county health officials to determine whether any fish and shellfish consumption limits should be established.

Q *What is the source of the contaminants in Fidalgo Bay?*

A A number of contaminants were found in Fidalgo Bay. They originated from a number of different sources. Ecology does not yet know all of the sources of the contaminants found in the recent sediment study. Dioxins were detected throughout the bay. Historic industrial use of the waterfront is a likely source. Dioxins come from activities including combustion and incineration, forest fires, chlorine bleaching of pulp and paper, certain types of chemical manufacturing and processing, and other industrial processes. Phthalates occur almost everywhere from road runoff, tires, brakepads, plastic products, and municipal wastewater treatment plants. Petroleum is associated with marinas and road runoff. Many metals are associated with shipyard operations. We have not identified any known source of mercury in Fidalgo Bay. Mercury may be from natural sources.



Q *How might I be exposed to the contaminants?*

A Exposure takes place, basically, through three routes: eating, breathing, and skin contact. For example, eating bottom fish and shellfish can result in dioxin, mercury, and carcinogenic PAH exposure. Skin contact with highly contaminated sediments can result in exposure to contaminants as well. For dioxin particularly, the primary pathway for exposure is diet, especially meat and dairy products.

Q *When will we know more? When will the study be completed?*

A Ecology is analyzing bottom fish and shellfish samples to provide better information about the health of the bay and potential human health risk. We plan to have those results by the end of July 2008. Once the results are available we will work with local and state health agencies to identify and communicate potential health risks to Fidalgo Bay communities. We will be back later this spring to talk with the community about the overall study results and what they mean for residents.

References for more detailed information on contaminants:

- Washington State Sediment Management Standards: http://www.ecy.wa.gov/programs/tcp/smu/sed_chem.htm
- Puget Sound Initiative priority bays link: http://www.ecy.wa.gov/puget_sound/index.html
- MTCA Cleanup link: <http://www.ecy.wa.gov/programs/tcp/cleanup.html>
- Dioxin link: <http://www.ecy.wa.gov/pubs/0104010.pdf>
- Phthalates link: http://www.ecy.wa.gov/programs/tcp/smu/phthalates/phthalates_hp.htm