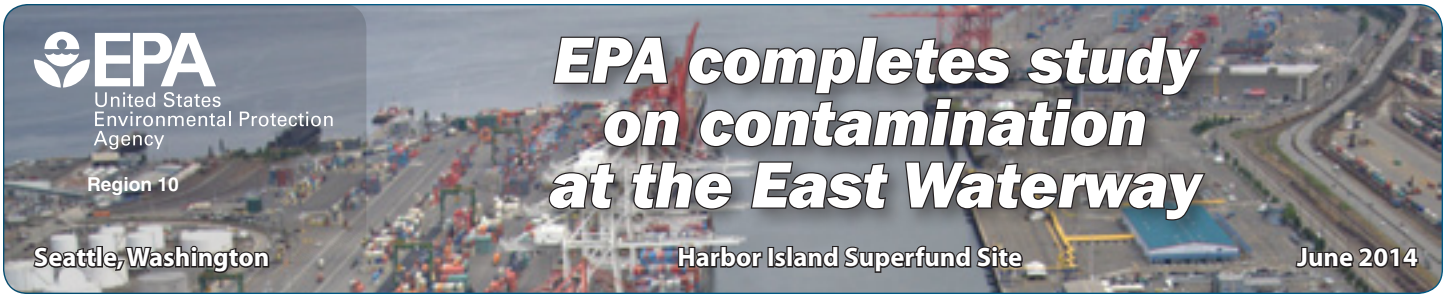


This fact sheet gives information about the recent study to define contamination at the East Waterway around the Harbor Island Superfund Site. The waterway is in Seattle, Washington, and extends along the east side of Harbor Island and is connected to the Lower Duwamish Waterway Superfund site.

Harbor Island was placed on EPA's National Priorities (Superfund) List in 1983 due to contamination from a lead smelter as well as releases of hazardous substances from other industrial activities on Harbor Island. For management purposes, EPA breaks up complicated sites into OUs (operable units). The East Waterway is one of seven OUs of the Harbor Island Superfund site. Under Superfund, a Remedial Investigation must be conducted for each OU.

Study Defines Contaminants

Under the oversight of EPA, the East Waterway Remedial Investigation was conducted by the East Waterway Group. The Group consists of the Port of Seattle, the City of Seattle, and King County. The Port led the work under a legal agreement with EPA. The City of Seattle and King County are supporting the Port's efforts and are conducting source control measures under EPA oversight. The purpose of the study was to learn about the contaminated mud (sediment), including the following:

- Chemicals of concern in the sediment
- Extent of the chemical contamination
- How — and where — contamination enters the East Waterway
- Harmful effects or risks that chemicals in sediment may pose to people and organisms that encounter them.

The data from the Remedial Investigation will support the analyses to be conducted in an upcoming Feasibility Study. The Study will evaluate a range of options for cleaning up the contamination.

What are the most harmful contaminants in the East Waterway?

There are many chemical contaminants in the waterway's sediment, fish, and shellfish. Most of the human health and environmental risk comes from these chemicals:

PCBs ***(polychlorinated biphenyls)*** are man-made chemicals that were banned in 1979. They stay in the environment for a long time and can build up in fish and shellfish. PCBs are known to impact the immune system and may cause cancer in people who have been exposed over a long time. PCBs can also affect learning abilities in children.

Arsenic is naturally present at low levels in Puget Sound area rock and soil. Industrial activities have spread additional arsenic over much of the Puget Sound region. Long-term exposure to toxic forms of arsenic may cause skin, bladder, and other cancers.

PAHs ***(carcinogenic polycyclic aromatic hydrocarbons)*** are formed during the burning of substances such as coal, oil, gas, wood, garbage and tobacco and during the charbroiling of meat. Long periods of breathing, eating, or having skin contact with high levels of some PAHs may increase a person's risk of cancer.

Dioxins and furans are by-products of burning (either in natural or industrial settings), chemical manufacturing and metal processing. Dioxins last a long time in the environment and, like PCBs, can build up in fish and fatty foods. Specific toxic effects related to dioxins include reproductive problems, problems in fetal development or in early childhood, immune system damage, and cancer.

TBT ***(tributyltin)*** is a chemical that is used in boat paints to prevent and slow the growth of algae and other organisms that attach to the hulls of boats. It is extremely toxic to aquatic life and is a hormone-disrupting chemical that causes severe reproductive effects in marine organisms.

Key Study Findings

Human Health

Health risks for people were evaluated for:

- Various seafood consumption scenarios
- Touching the sediment through various activities such as netfishing and clamming, and
- Coming into contact with the surface water through swimming or other activities.

The scenarios evaluated in this assessment have been selected in an attempt to not underestimate risks and to be protective of human health. Most of the human health risks are associated with PCBs, arsenic, PAHs, and dioxins and furans. (*See "What are the most harmful contaminants in the East Waterway?" on Page 1, describing the toxicity of these chemicals.)*

Lower risks are associated with activities that involve touching sediment, such as clamming and net fishing.

Human health risks in the East Waterway were higher for the seafood consumption scenarios. Over 95% of the total excess cancer risk was associated with arsenic, PAHs, PCBs, and dioxins/furans.

Elevated risk estimates associated with inorganic arsenic and PAHs are largely attributed to consumption of clams. For PCBs, risks are primarily attributable to fish fillet of perch and rockfish. For dioxins and dioxin-like compounds, risks are primarily attributable to clams, crab, and rockfish.

Sediment

Throughout the waterway, sediment contaminant concentrations are greater than standards allow. Contamination is generally greater in areas that have not been recently dredged. These areas of the waterway include the shallow main body, the perimeter of the deep main body, and the slips.

Contaminated sediments in the waterway pose a concern to worms and other creatures that live in the mud. Potential sources of contaminants were identified as being both historical and ongoing. Elevated levels of PCBs, TBT and mercury are among the 30 chemicals that are of concern to bottom-dwelling animals. The locations with the highest concentrations of the contaminants were varied.

Do you eat fish from the East Waterway?

The main way people are exposed to the chemicals in the East Waterway is by eating the seafood that live in the river year round. Don't eat resident fish (like the rockfish shown in the picture), shellfish or crab from the waterway.

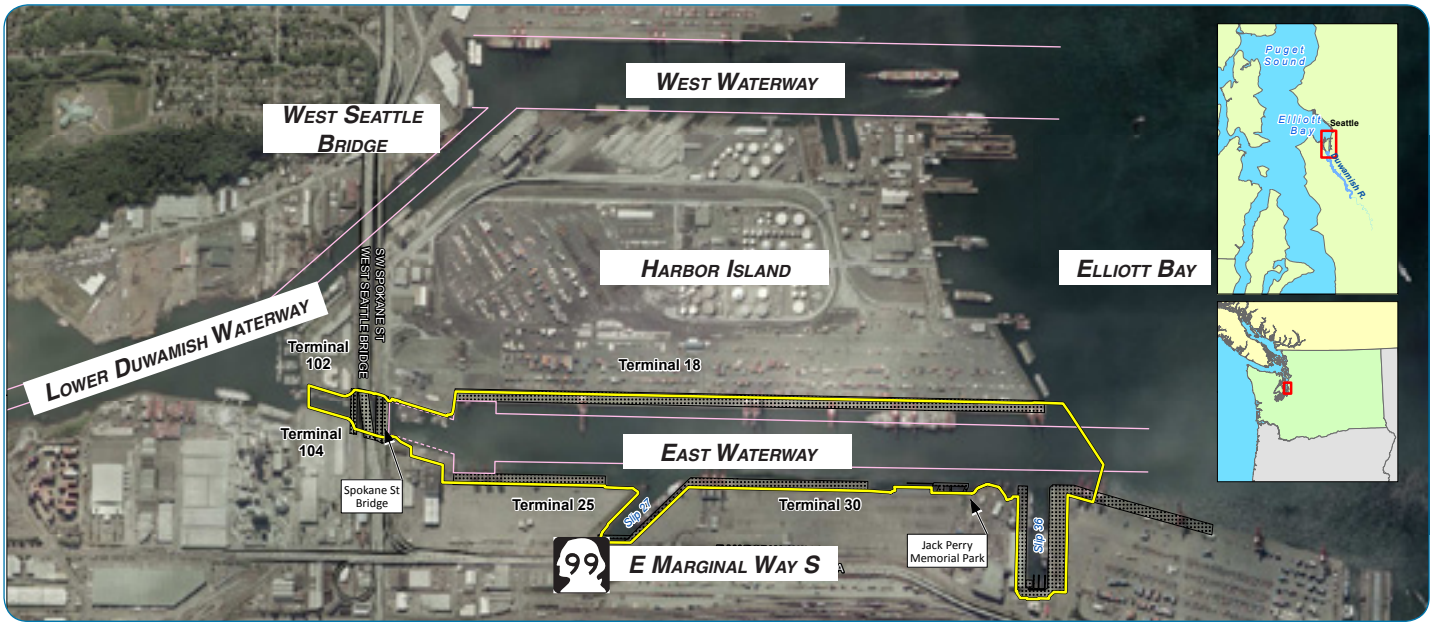
Salmon are a healthier choice because they migrate up and down the river. They spend most of their lives in the ocean. Everyone can safely eat 2 to 3 meals a week of coho, chum, pink, and sockeye salmon. LIMIT Chinook salmon to 1 meal a week and resident Blackmouth Chinook salmon (caught in the winter) to 2 meals a month.

Learn more at http://www.doh.wa.gov/fish

Fish and Wildlife

Despite habitat changes and the presence of contaminants the East Waterway is home to many aquatic species, including top predators. Risks to most wildlife generally did not exceed harmful levels based on their exposure within the waterway.

Based on their exposure within the waterway, unacceptable risks are not expected for aquatic-dependent wildlife like river otters, harbor seals, pigeon guillemot and osprey. For juvenile Chinook salmon, a species on the endangered species list, cadmium was a concern. Cadmium, copper and zinc were of concern for crabs. Total PCBs, cadmium, copper, TBT and vanadium were identified as contaminant risks for English sole and brown rockfish.



Site Background

The East Waterway is located about a mile southwest of downtown Seattle in King County, Washington. It is part of the greater Duwamish estuary, which extends as far as 10 miles upstream. At the southern end of Harbor Island the river splits into the East and West Waterway.

From there the two waterways extend to Elliott Bay at the north end of Harbor Island. The waterway runs along the entire eastern shore of Harbor Island. The Lower Duwamish Waterway Superfund Site is located immediately upstream of the East Waterway.

The waterway is about 1.4 miles long and for most of its length is 750 feet wide with a north to south orientation. The northern portion of the waterway has been dredged to depth currently needed for container ship navigation. Four bridges cross over the waterway along the Spokane Street corridor, including the lower Spokane Street Bridge (which includes the fishing pier bridge along the north side).

Over the past 100 years the waterway has been highly modified to support urban and industrial development. Some of the changes to the waterway include control of water flow, channel deepening, shoreline modifications, loss of intertidal habitat, and installation of riprap, pier aprons and sheet pile walls.

Commercial facilities line the shoreline. The waterway is currently used by ships to transport goods and other maritime purposes. The Port of Seattle periodically removes sediment, for operating purposes. A large portion of the dredged sediments are sent to landfills rather than open-water disposal.

Tribal members harvest seafood from the waterway, a right guaranteed by treaty with the U.S. government. However, a fish consumption advisory warning individuals not to consume contaminated resident seafood caught in the waterway is in place. (*See "Do you eat fish from the East Waterway?" Page 2)*

Next Steps

Information gathered during this investigation will help the EPA determine the best and most efficient ways to address the threats to human health and the environment. The EPA is evaluating several cleanup options, including removal of contaminants by dredging, capping over contaminants, adding thin layers of sand and monitoring for contaminant changes over time. These cleanup options will be detailed in a document called a Feasibility Study. The study will be available to the public in 2015 or early 2016. The public will also have a chance to review the proposed cleanup decision. The final cleanup decision will be documented in a ROD or Record of Decision.

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EPA completes study on contamination at the East Waterway

Read inside for details

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Visit the East Waterway Superfund Site on the web:

http://go.usa.gov/kFtH
View the OU1 Remedial Investigation Report, technical information, community involvement documents, photos, and more.

Information repositories:

EPA Superfund Records Center: 1200 Sixth Avenue, Seattle, WA 98101
Toll-free: 800-424-4372, ext. 4494. *Please call for an appointment.*

The EPA provides reasonable accommodation to people with disabilities on a case-by-case basis. If you need a reasonable accommodation (such as information in Braille format or large print or interpretation services), please notify Julie Congdon at 206-553-2752 or email congdon.julie@epa.gov

***TDD or TTY** users, please call 1-800-877-8339 and give the operator Julie's phone number.*

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