

*Contributing to the
Recovery of an Inland Sea:*
The Remediation and Restoration
of Urban Rivers

Brenda Bachman, US Army Corps of Engineers

Special thanks to:

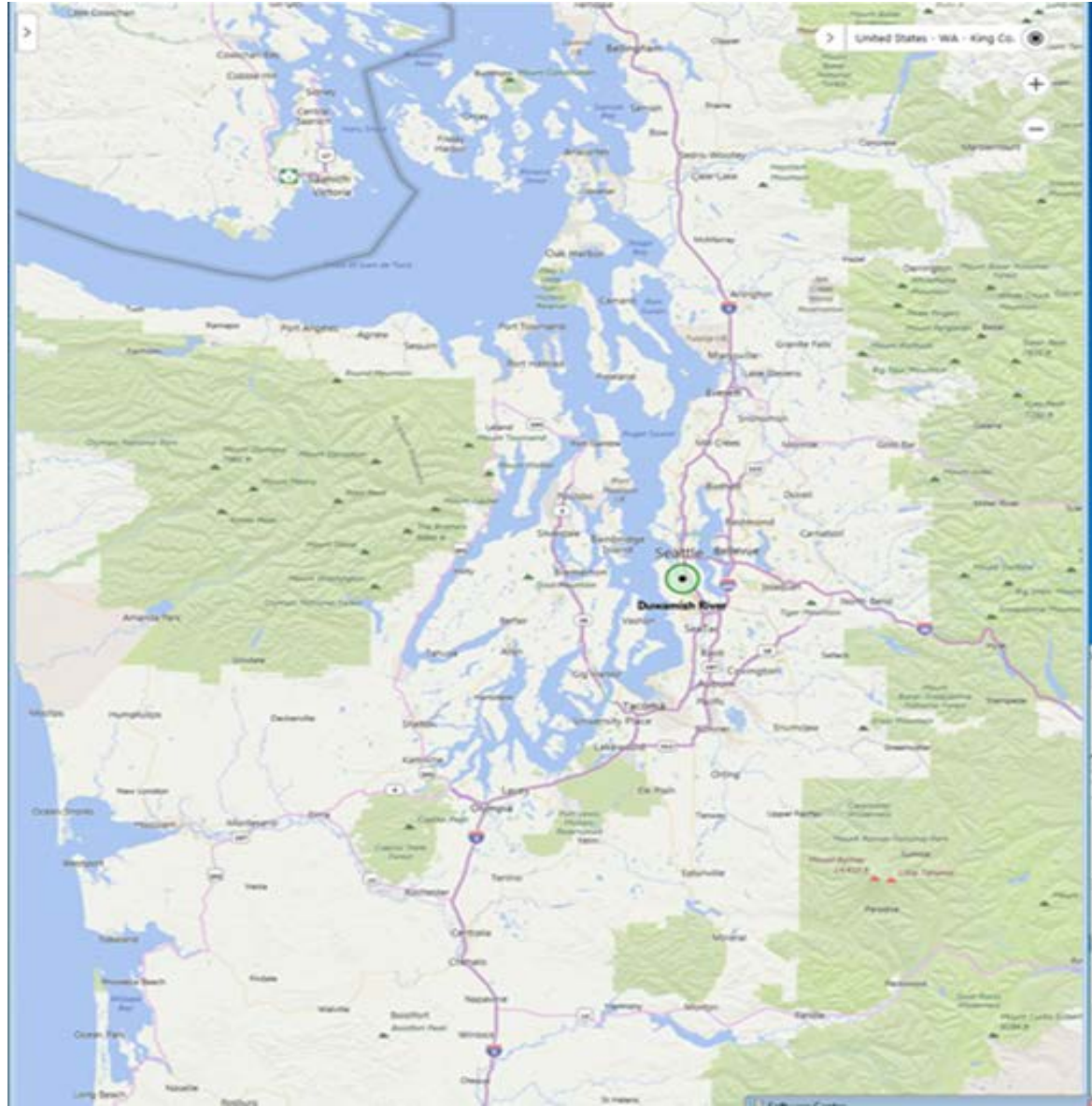
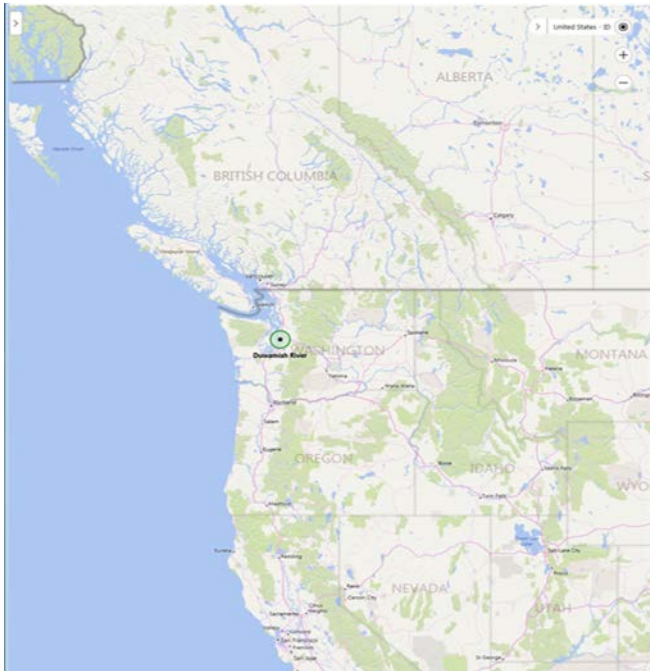
Jeff Krausman, USFWS

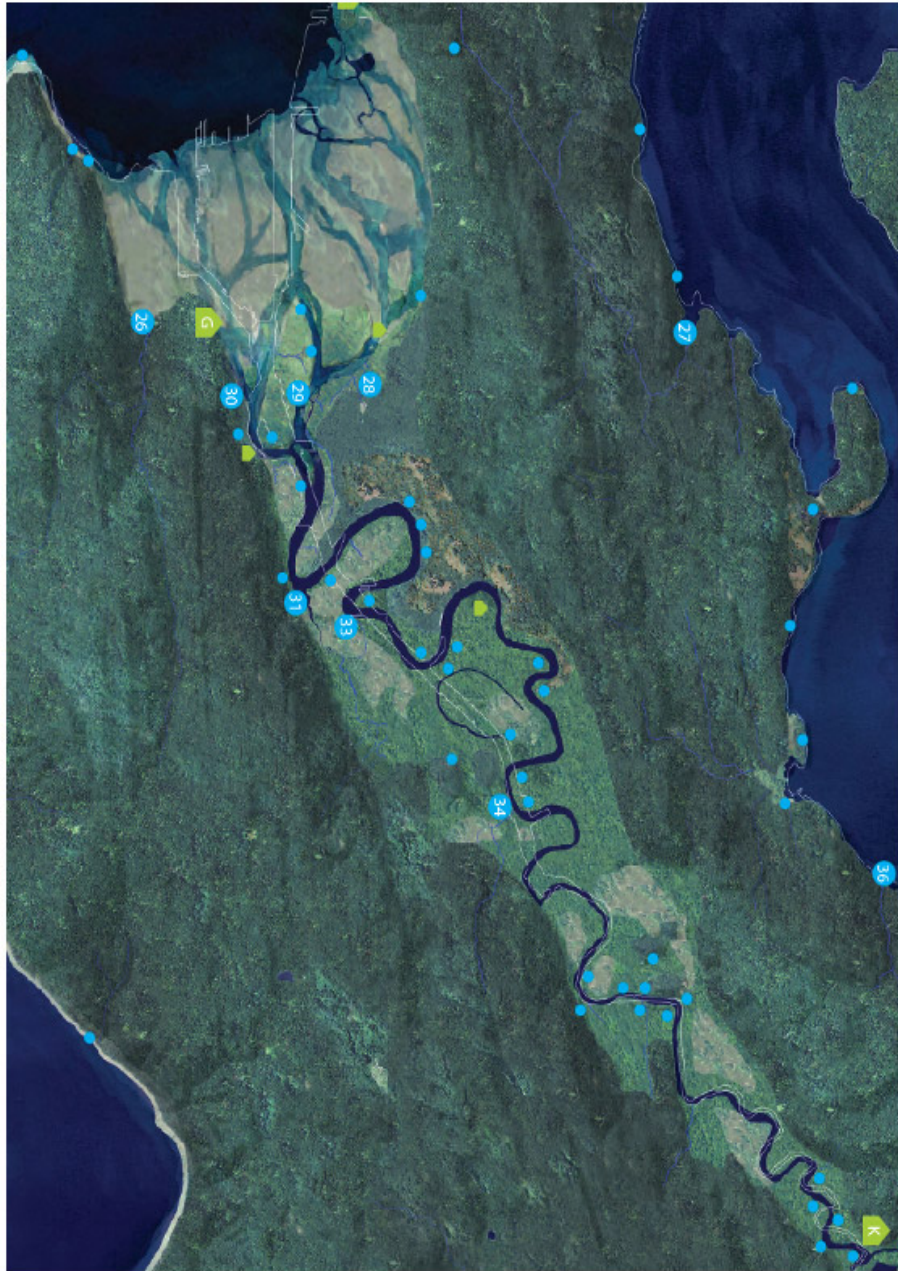
Mike Perfetti, City of Tukwila, WA

Heida Diefenderfer, PNNL MSL

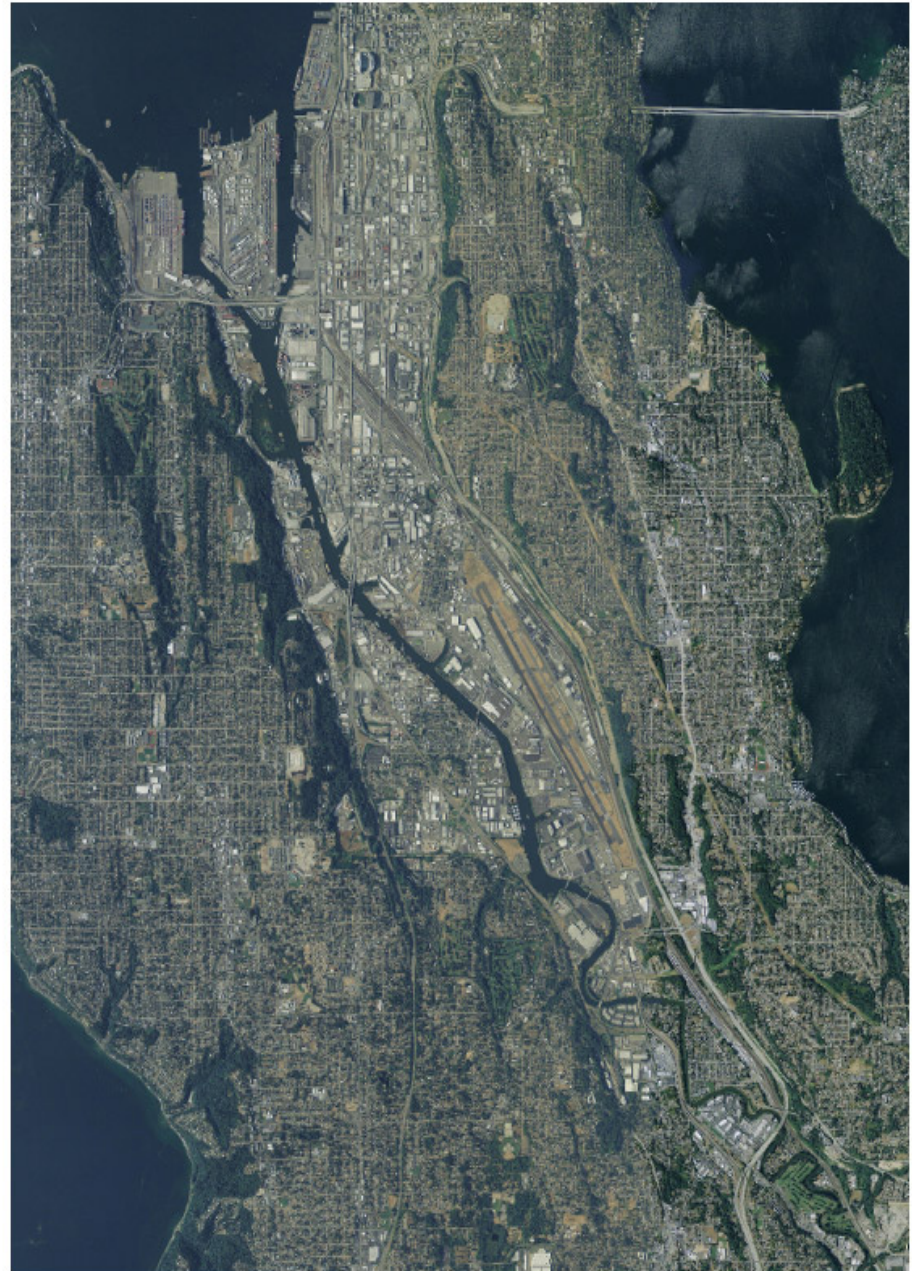
Duwamish River

Seattle, WA





Mid-1800s





Today

1 Miles



High Profile

Duwamish Alive Coalition

Follow Us!  



Volunteer

Home Sign Up! Meet the Duwamish River! Partners & Sponsors Sound of the Duwamish (Blog)

JOIN US Saturday, April 16th from 9:30 - 2:00
Restoring the Health of our River and its Watershed!

Join our partners as a volunteer to make a positive impact within our community while learning about our local environment. Volunteer opportunities vary widely from working on the river in boats, removing debris; planting native plants and removing invasive weeds in a variety of habitats which include a natural bog, sites along the river or in our urban forests.

There are still opportunities to help restore the Duwamish this Saturday with our coalition partners at the following sites:

- Pigeon Point Park (West Seattle)
 - Roxhill Bog (West Seattle)
 - Gateway North Park (Georgetown) includes Carleton Block Party
 - Duwamish Substation (South Park)
 - Herrings House Park (Seattle/ Duwamish)
 - Cecil Moses Park (Tukwila/South Park)
- Find your site and sign up here!

EARTH MONTH EVENT KICKS OFF IN WEST SEATTLE

Join us at 9:30 AM on April 16th, for our official Kick Off with 34th District Representative, Joe Fitzgibbon at Greg Davis Park in West Seattle. Representative, Fitzgibbon, named Legislator of the Year for his leadership in environmental issues in 2015, will speak on the importance of our urban natural areas and environmental stewardship. Come learn about Longfellow Creek and the efforts to restore it. Coffee and refreshments will be served.

This year *DuwamishAlive!* will focus watershed restoration efforts along Longfellow Creek in West Seattle from its headwaters at Roxhill Bog, to Brandon Street Natural Area through to Pigeon Point Park. Longfellow Creek is Seattle's second largest salmon-bearing creek flowing directly into the Duwamish River. Each year 60-100% of salmon in Longfellow Creek die before they get the chance to spawn due to pollution from heavy stormwater runoff and threatened habitat. Our goal is to improve the water quality within the Longfellow Creek watershed by establishing natural stormwater systems throughout critical areas and improving the native habitat.

Green-Duwamish River listed as one of America's most endangered

swim away and return upriver as fertile adults. Howard Hanson Dam lacks a fish passage, constraining the populations on both sides. A second dam, the Tacoma Headworks Diversion Dam, has been engineered to allow adult salmon and steelhead to pass through to the upriver area, but that's not enough help if juveniles can't get downstream, the report says.



It advocates a proposed U.S. Army Corps of Engineers project to put a juvenile fish passage on the Howard Hanson Dam to enable more fish to travel the circuitous routes their ancestors swam for centuries. The motive isn't simply being nice to the fish for the sake of it. Laws protecting the endangered Chinook salmon and steelhead trout populations in the river could be triggered if their numbers don't turn around. Doing that, Gerrity said, would put new restrictions on river water use.

"If they're not doing enough to restore threatened salmon," Gerrity said, "then it puts more pressure, potentially, to do more or to use less water out of the Green River."

The report contains a simple recommendation with a twist of real.

The partnership offers an opportunity to realize urban waterway and watershed revitalization goals that are larger than, and beyond the resources of any individual community, agency, or mission.

- Jo Ellen Dancy, Assistant Secretary of the Army for Civil Works, U.S. Army Corps of Engineers



Contact Us to ask a question, provide feedback, or report a problem.

About the Campaign



Help DRCC/TAG Restore the Flow by May 3, 2016! Due to budget shortfalls at the Washington State level, a key source of funding for our core work was just eliminated. Check out the latest on this funding cut.

We need your support to raise \$20,000 to begin closing this gap. Because of a generous \$20,000 match by anonymous donors, your donation will be matched one-for-one! Each donation level offers a way to connect with DRCC/TAG - click donate to see all the options.

Since our founding in 2001, DRCC/TAG's core work is to actively and meaningfully engage the diverse communities of South Park and Georgetown in the cleanup of the Duwamish River, ensuring their voice and vision is incorporated into a comprehensive and health-protective cleanup. Throughout our history, our aim has been to divert resources into these communities - rather than raising funds within them.

But now our critical work is under serious threat, including:



- \$10.00 Thank You!
- \$25.00 "I (the Duwamish River)" Sticker (Yellow/Green)
- \$36.00 Green Duwamish Watershed Map (Yellow/Green)
- \$75.00 "I (the Duwamish River)" T-Shirt (Yellow/Green)
- \$90.00 T-Shirt + Sticker
- \$100.00 One Ticket for a June + Best Beer with Beer and Wine led by Jason Kasmussen (on Available)
- \$140.00 Signed Copy of "Once and Future River" Book featuring Photography by Tom Breen
- \$200.00 One Ticket for a June + Best Beer and Signed Copy of Book
- \$501.00 South on the First Ponds for four people with Executive Director James Kasmussen
- \$750.00 Traditional Executive Dinner for six people with Community Engagement Manager Paulina Lopez

ENVIRONMENTAL

Duwamish Cleanup



The Lower Duwamish Waterway plays many essential roles, supporting commerce and employment, meeting commercial and tribal fishing needs, and providing for critical estuarine environments for salmon and wildlife. The Duwamish industrial area is a crucial jobs base for the region, employing more than 30,000 people. The Lower Duwamish Waterway plays an essential role in supporting commercial navigation, employment, and commerce that invigorates our economy.

Since 2000, the Port of Seattle has been a partner of the Lower Duwamish Waterway Group in working on the environmental cleanup of the Lower Duwamish Waterway Superfund Site. The partners include: City of Seattle, King County, and the Boeing Company.

The partners are working under a voluntary agreement with the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) to conduct a coordinated investigation to assess the risks from contaminated sediments in the Lower Duwamish Waterway, to summarize what is known about the sources of chemical contaminants, and to derive solutions to reduce exposure to these chemicals to meet remedial action objectives.

LDWG's goals are to protect public health, improve water quality, and restore vital areas of the river environment while making sure the Lower Duwamish Waterway remains a vibrant urban working waterway. To date, LDWG partners have invested over \$40 million dollars for this effort.

Currently, planning for cleanup of the overall river is proceeding in parallel with the early actions, including the cleanup of Terminal 117. EPA has just released the Proposed Plan for the site and the plan is out for public comment. When decisions are made on how to clean up the LDWG, the agencies will issue a Record of Decision to direct cleanup actions and long-term monitoring.

In addition to the cleanup, the port and its partners are planning for additional future habitat restoration, the Port Commission approved the Lower Duwamish Habitat Restoration Plan.

Lower Duwamish River Remedial Investigation / Feasibility Study

Objective: A study of the extent of contamination in the river and the risks to humans

Conducted by: Lower Duwamish Waterway Group - a partnership between City of Seattle, King County, the Port of Seattle, and the Boeing Company

Oversight: U.S. Environmental Protection Agency and Washington State Department of Ecology

This report provides the results of a nine-year investigation into the waterway's health. The investigation includes intensive studies on contaminant concentrations in sediments, water, fish and shellfish, and sediment movement. It also estimates the risk to humans and wildlife from the contaminants.

Data collected in the Remedial Investigation were used in the development of remedial alternatives. The Feasibility Study was finalized in 2012.

theStranger THINGS TO READ - THINGS TO DO -

SLOG

The Green-Duwamish River Makes U.S. Endangered Rivers List For 2016

by Anna Sofia Knaul - Apr 12, 2016 at 10:33 am



The lower Duwamish, which is now listed as an endangered waterway, flows into Elliott Bay, pictured above.

In case you needed further proof that the Duwamish River is in need of some serious help, the waterway, which is the lower end of the Green River, came in at #5 on this year's American Rivers' 10 most endangered rivers list. "The national conservation group says the issue it wants addressed is outdated dams that lack passage for endangered fish," KPLU reports.

Here's what American Rivers has to say about it: ADVERTISEMENT

The Green-Duwamish River flows from the Cascade Mountains north of Mt. Rainier, winding through farmland and the Seattle-Tacoma metropolitan area, before reaching Puget Sound. Decades of pollution, floodplain development and harmful dam operations have taken their toll on the river and its salmon and steelhead runs. Two key actions this

Active Public

DUWAMISH RIVER CLEANUP COALITION
Technical Advisory Group

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Community Health
Community Engagement
Environmental Health
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Public Involvement

The Final Cleanup Plan is here!

Upcoming Events
There are no upcoming events at this time.

Recent News

- A Community Testimony about Restoring the Flow
- Why is Restoring the Flow important to our Board Chair?
- Restore the Flow to DRCC/TAG!

Public Meetings
DRCC/TAG works with EPA and other agencies to develop multilingual, culturally-competent public meetings that provide necessary services for effective public participation, including food, child care, and language interpretation.

Community Workshops
DRCC/TAG hosts community workshops with technical experts to help residents understand and formulate their opinions about cleanup proposals. DRCC/TAG offers workshops to interested community organizations on all major cleanup proposals and plans - contact us at contact@duwamishcleanup.org or (206) 954-0284 to request a workshop or presentation for your group.

Donate



Environmental Justice Impacts
Cleaning up the Lower Duwamish Waterway Superfund Site

Seattle, Washington

April 2013

Over a century of industrial and urban use has contaminated the sediments (and on the river bottom), water, and marine life in the Lower Duwamish Waterway. Highways, railroads, King County airport, and a busy port exist alongside two of the most diverse and low income residential neighborhoods in Seattle: South Park and Georgetown. These neighborhoods bear the burden of air pollution and noise from nearby transportation sources and industry.

The U.S. Environmental Protection Agency and the Washington Department of Ecology are responsible for overseeing the cleanup of the contaminated sediment in the Lower Duwamish Waterway. These agencies recently published their recommendations for cleaning up the Duwamish. Community members asked the Environmental Protection Agency to conduct an environmental justice analysis of the cleanup options and their potential impacts on the nearby communities.

The Environmental Justice Analysis for the Lower Duwamish Waterway is the first such analysis written for a Superfund site. The Superfund program has already begun implementing some of the recommendations made in the Lower Duwamish Waterway Environmental Justice Analysis.

Public Comment Period Ends June 13, 2013

Find the Proposed Plan, Source Control Strategy, and Environmental Justice Analysis as well as



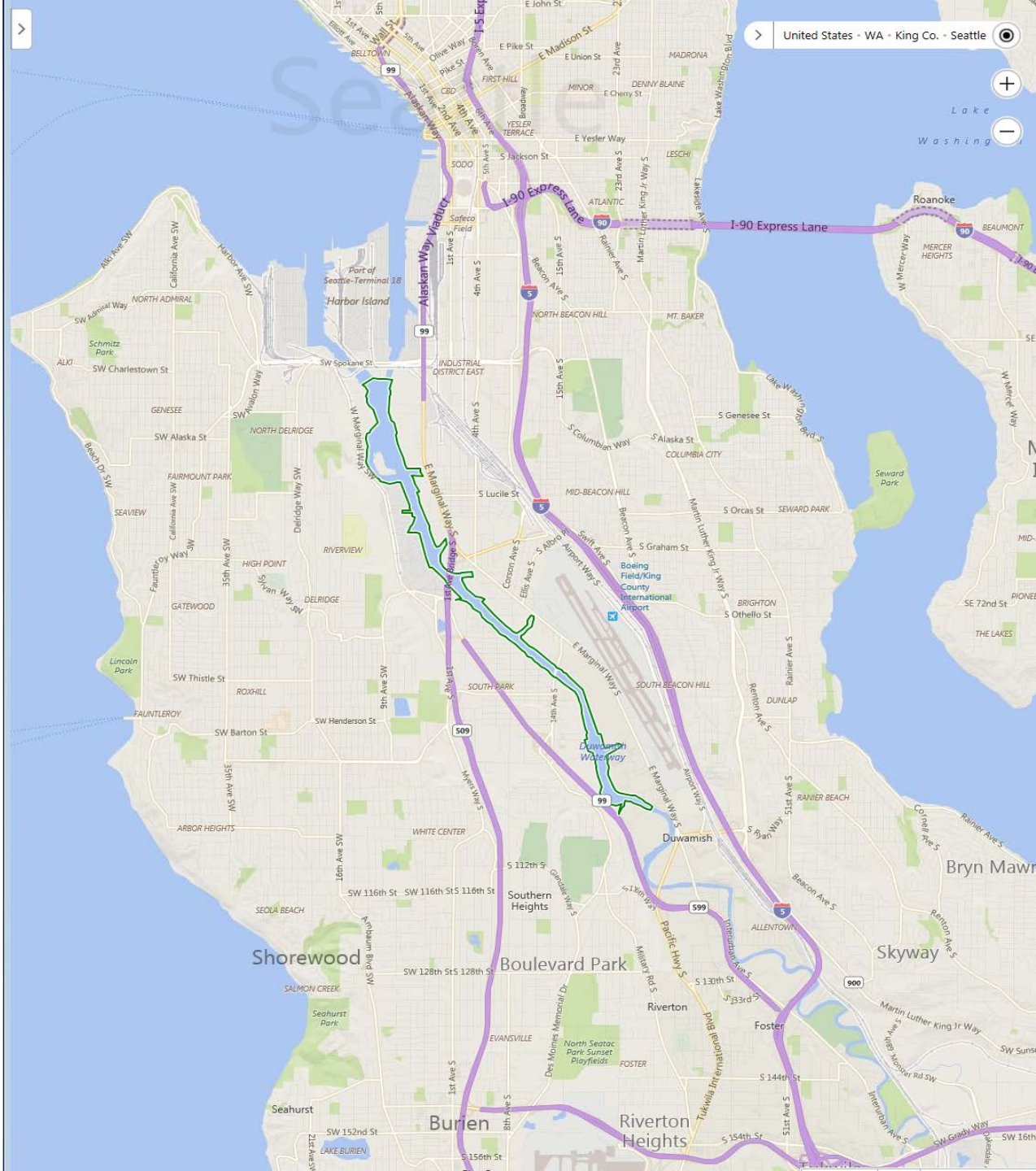
The Environmental Justice Analysis:

- Summarizes known environmental justice concerns in the community which could be affected by the cleanup.
- Examines the cleanup options to determine where disproportionate adverse impacts may occur.
- Provides guidance to the Superfund program regarding selection of the proposed cleanup plan.
- Provides recommendations for mitigating disproportionate adverse impacts.

The Proposed Plan for the cleanup, the Source Control Strategy (the plan for controlling source of pollution to the Duwamish) and the Environmental

Active Industrial History

- One of the first NRDA settlements in USA (1991)
- Multiple ongoing State and Federal Cleanups
 - Multiple contaminants and responsible parties (200+)
- Multiple trust resources:
 - 8 Salmon and Trout Species
- Multiple Trustees
- 20+ Restoration Actions

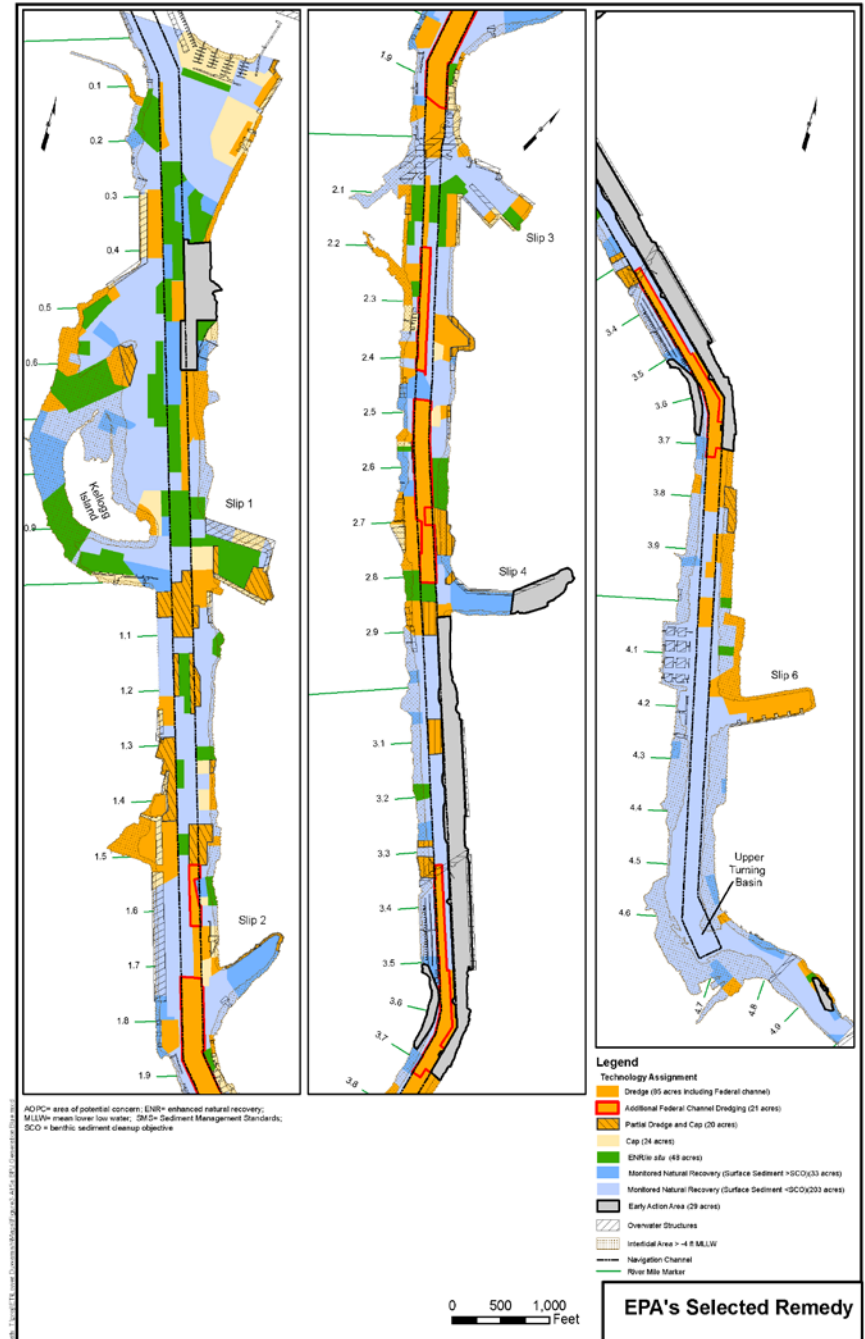


Cleanup Actions



- 3 Superfund Sites with 7 Early Action Areas
 - 3 EAA's completed, 4 underway
- Proposed Plan 2015
 - \$305 Million, 156 acres active remediation
 - 7 yr Remedial Actions plus 10 yr to reduce contaminant concentrations to lowest predicted levels through natural recovery.
 - Contaminant concentrations in the rest of the waterway will be reduced through cleanup of the EAAs (29 acres) or MNR (256 acres).

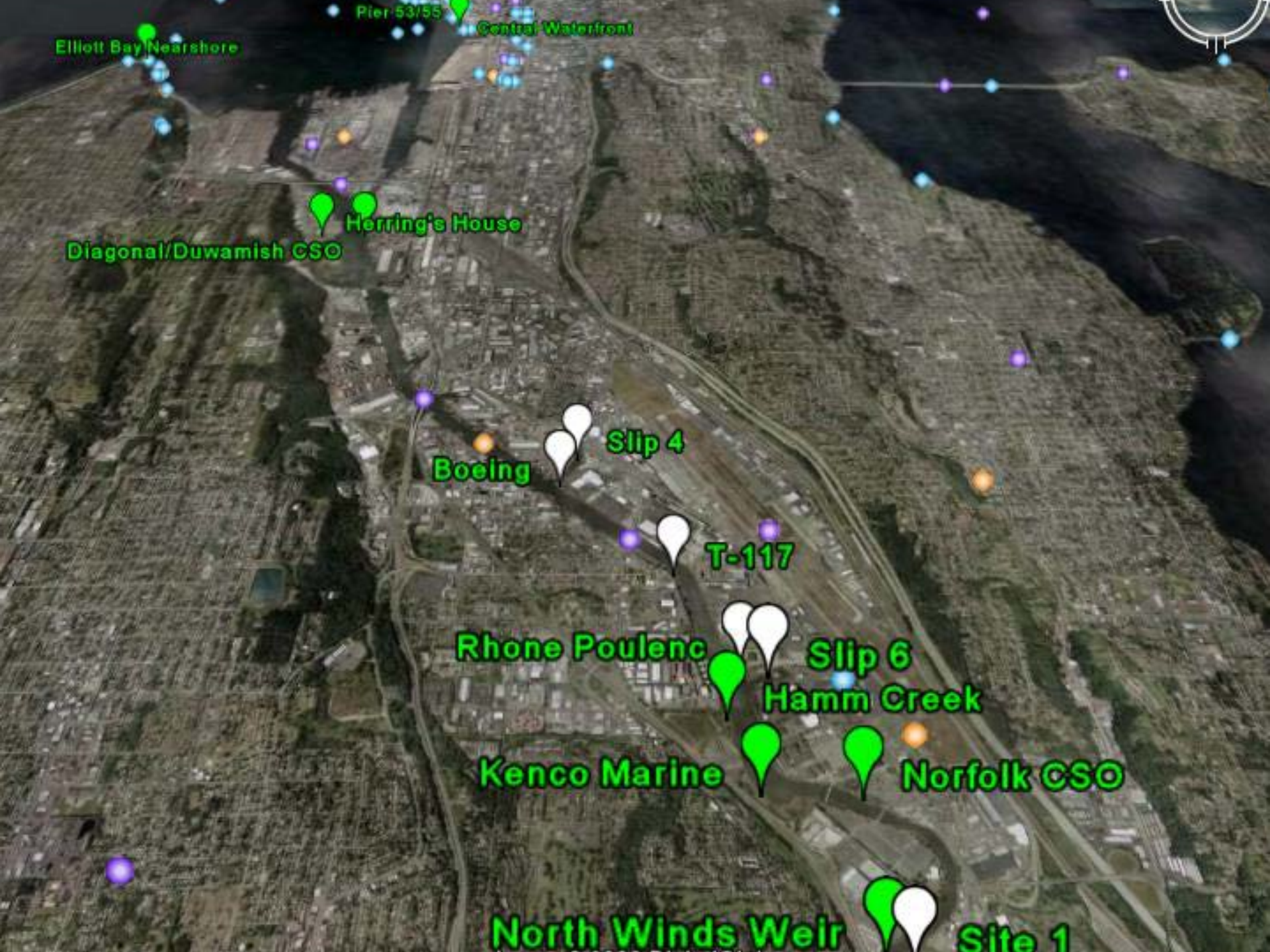
Cleanup Actions



ADPC= area of potential concern; ENR= enhanced natural recovery; MLLW= mean lower low water; SMC= Sediment Management Controls; SCO = berthing, sediment cleanup objective

Restoration Action Objectives

- Implement restoration with a strong nexus to the injuries caused by releases of hazardous substances in the Lower Duwamish River.
- Provide a net gain of habitat function beyond existing conditions for injured fish and wildlife by restoring important habitat types and the physical processes that sustain them.
- Integrate restoration strategies to increase ecosystem structure and function. Preserve existing threatened functioning habitats while enhancing or creating new high-value habitats.
- Coordinate restoration efforts with other planning and regulatory activities to maximize restoration potential. Ensure that restoration sites and associated habitat functions are preserved in perpetuity.
- Involve the public in restoration planning and implementation through education and outreach.



Elliott Bay Nearshore

Pier 53/55

Central Waterfront

Herring's House

Diagonal/Duwamish CSO

Boeing

Slip 4

T-117

Rhone Poulenc

Slip 6

Hamm Creek

Kenco Marine

Norfolk CSO

North Winds Weir

Site 1

Lessons Learned

- Establish Clear Project Goals and **Decision Making Process**
- Involve experts early
- Be flexible and open to solutions that achieve function
- **Collaborate and use partners strengths**
- Create solid contract specifications and INSPECT
- Identify and Plan to address risks
- **Be explicit about areas of uncertainty**
- May need to adjust standards or criteria
 - Criteria not of equal value
 - Reference site usefulness
 - Methodology- allow for change
- What is 'stable'
- Statistical relevance
- Reference site usefulness

Lessons Learned

Construction

- Hydrology and in-water work window
 - Dewatering
- Security
- On-site historic resources
 - Community reuse interest
- Earthwork- what's under there?
 - Contaminated soils
 - Cultural resources
 - Utilities
 - Adjacent buildings

Criteria Success

- Riparian planting survival
 - Overplanting necessary
 - Protection of Emergents
- Nuisance species
 - Site maintenance
- Irrigation
 - Site maintenance
- Protection of Emergent vegetation

So What?

- Overall improvement at restoration sites, but how does this contribute to overall PS Recovery?
 - Projects measure short-term impact of actions
 - Habitat created and its use
 - Large-scale and long-term indicators of overall recovery of the large estuary respond to collective impacts
 - Long-term indicators respond slowly and affected by multiple pressures not addressed in remediation or restoration

2015 State of the Sound: Report on the Puget Sound Vital Signs

Puget Sound Vital Signs

Is the health of Puget Sound improving? Are there fewer toxic chemicals in Puget Sound and more salmon? How much habitat has been restored? And are the Puget Sound Partnership's ecosystem recovery targets met? These are just some of the questions that the evaluation of the Puget Sound Vital Signs helps answer.

PUGET SOUND VITAL SIGNS

INDICATORS OF PUGET SOUND'S HEALTH AND RECOVERY

WATER QUALITY

- Drinking Water Quality
- Marine Mollusks
- Marine Fishes
- Estuaries
- Freshwater Quality
- Marine Water Quality
- Toxics in Fish
- Ornate Sewage
- Shellfish Beds
- Outdoor Recreation

HEALTHY HUMAN POPULATION

- Local Food
- Quality of Life
- Human Wellbeing
- Community Resilience
- Economic Vitality
- Long Term Investment
- Sense of Place
- Cultural Practices
- Orca
- Chinook Salmon
- Pacific Herring
- Birds
- Species and Food Web

PROTECT AND RESTORE HABITAT

- Eelgrass
- Intertidal Wetlands
- Wetlands
- Coastal Wetlands
- Marine Mollusks
- Marine Fishes
- Estuaries

QUALITY OF LIFE

What are the Vital Signs and their indicators?

While the Vital Signs represent the different overarching measures for determining the health of Puget Sound, indicators representing each Vital Sign serve as the specific and measurable metrics. Examples of indicators include eelgrass acreage under the Eelgrass Vital Sign, Chinook salmon abundance under the Chinook Vital Sign, and the number of Southern Resident Killer Whales under the Orca Vital Sign.

The Puget Sound Partnership adopted an initial collection of indicators and targets in 2010 and 2011. In July 2015, the Partnership adopted new Vital Signs and indicators of human wellbeing. These Vital Signs and indicators are primarily associated with the Healthy Human Population and Quality of Life goals.

For a summary of what the Puget Sound Vital Sign indicators are telling us, take a look at the [2015 State of Sound](#).

- 37 Vital Sign Indicators
Mixed results and few indicators on trajectory to meet 2020 goals.
 - 10 indicators improving
 - 6 indicators no change
 - 4 indicators mixed results
 - 5 indicators worse
 - 12 indicators no data
 - 4 indicators meet 2020 goals

Vital Sign Indicators con't.

- Pressures continue
 - Land conversion
 - Shoreline armoring
- Species indicators signal trouble
- Habitat indicators most progress
- Local improvements in water quality likely short-lived- do not match regional trends
- Looking Forward
 - Climate change
 - Ocean acidification
 - Much work still to be done!