LOWER DUWAMISH WATERWAY
RECORD OF DECISION
How did we get here and what's next?

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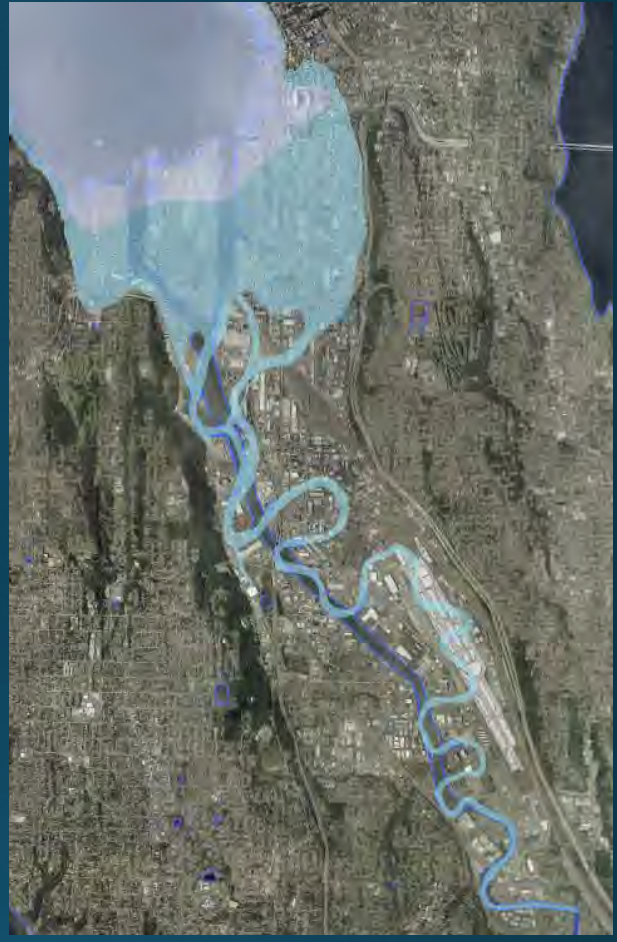
United States Environmental Protection Agency
June 8, 2015

Refresher

- Site added to NPL (list of Superfund Sites) in 2001
- Lower Duwamish Waterway Group (LDWG) performed RI/FS
- EPA issued a proposed plan for public comment in February 2013
- Comment period closed June 2013
- Record of Decision (ROD) issued November 2014, with responsiveness summary
- EPA project manager transition in progress

Why Clean Up the Waterway?

- Over 100 years of industrial and urban use has polluted waterway sediments
- Sediments are contaminated with harmful chemicals
- Major contaminants of concern are PCBs, arsenic, carcinogenic PAHs and dioxins/furans
- Resident fish and shellfish (like perch, sole, crabs) are unsafe to eat



Cleanup Objectives

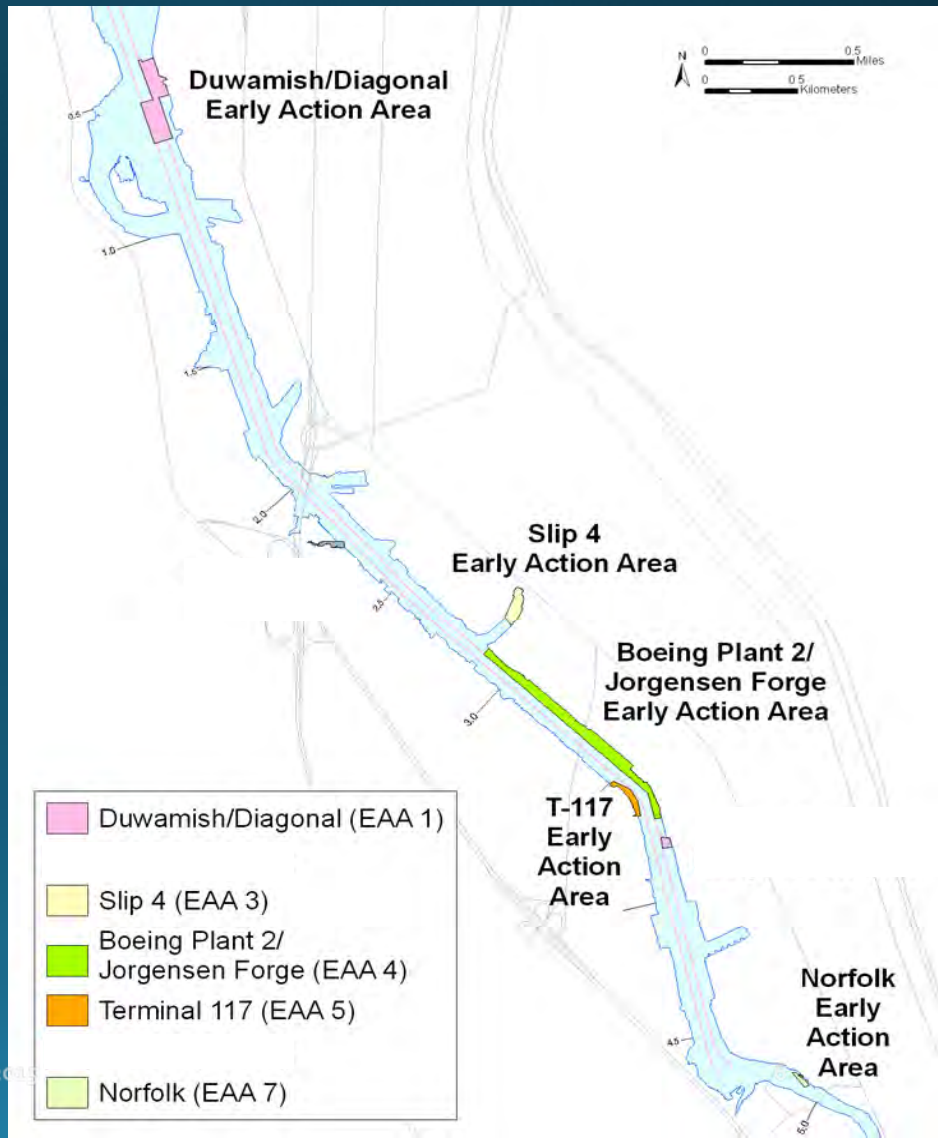
Reduce risks to:

1. People who eat resident fish and shellfish.
2. People coming into contact (skin contact and ingestion) with contaminated sediments.
3. Bottom-dwelling organisms, such as crabs and clams.
4. Fish, birds, and mammals.

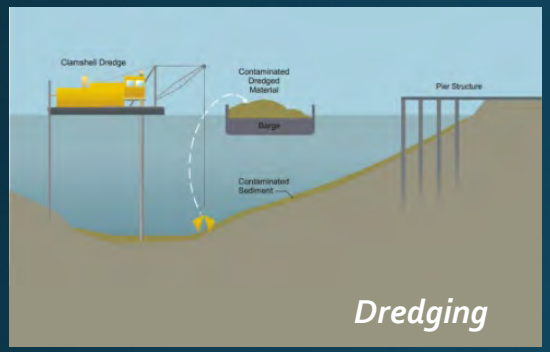
Key Parts of the Cleanup

Clean up Early Action Areas

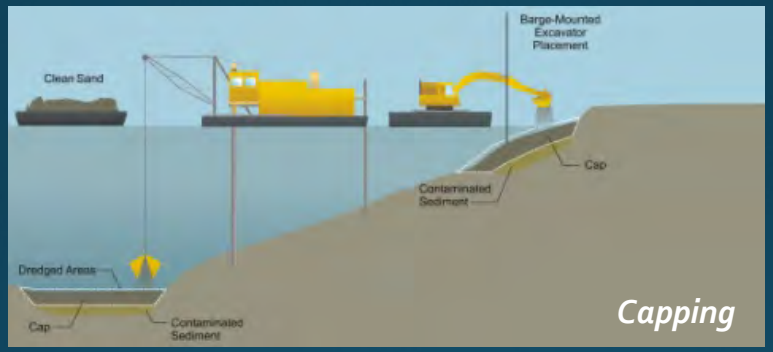
- Will be completed by the end of 2015
- Address 29 acres of the most contaminated areas in the waterway
- Remove approximately 280,000 cubic yards of contaminated sediments
- Projected to reduce surface sediment PCB concentrations by 50%



The Cleanup is Comprised of a Combination of…



Dredging

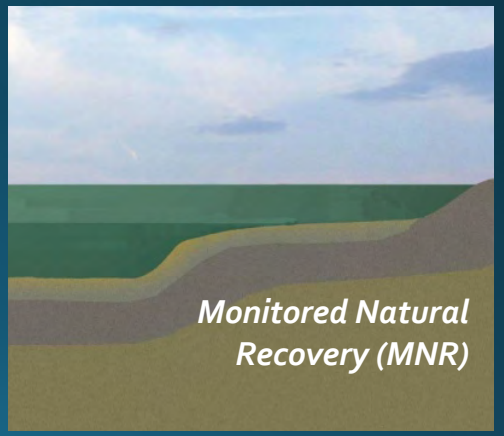


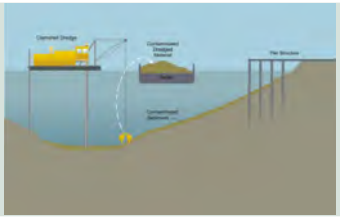
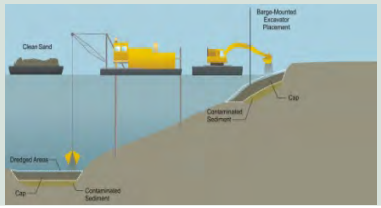
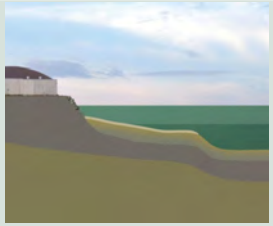
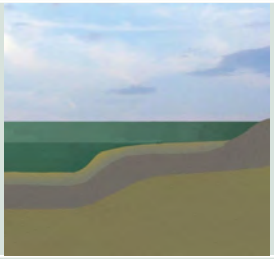
Capping

Removal

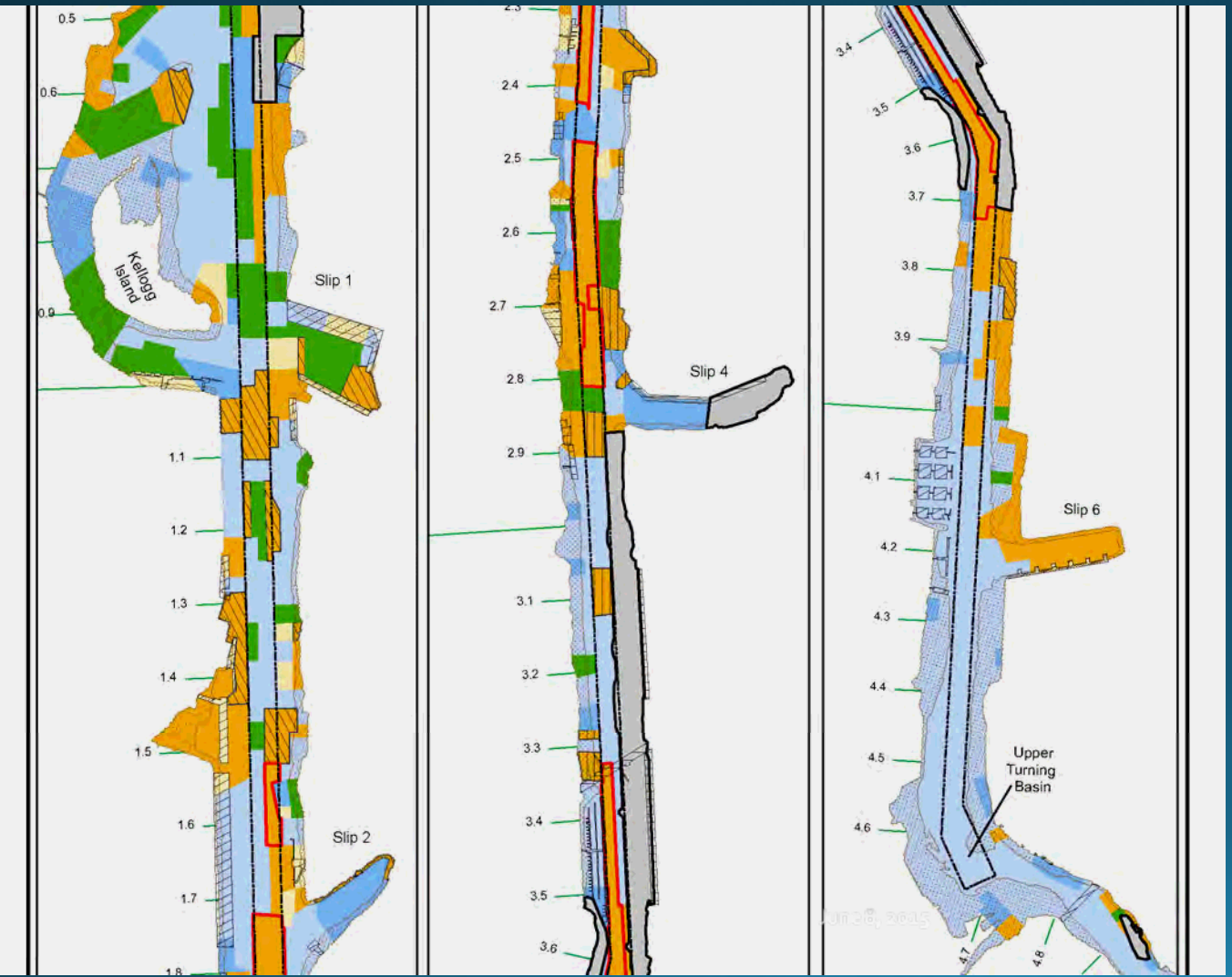
Containment

Natural Recovery



Remedy	Area	Time	Cost	Follow-Up
 ***Dredging***	105 Acres	7 Years	**$342 Million**	
 ***Capping***	24 Acres			
 ***Enhanced Natural Recovery (ENR)***	48 Acres			
 ***Monitored Natural Recovery (MNR)***	235 Acres	10 Years		
	412 Acres	**17 Years**		

EPA's Selected Remedy



- Dredge
- Partial Dredge/Cap
- Cap
- Enhanced Natural Recovery
- Monitored Natural Recovery to SCO
- Monitored Natural Recovery Below SCO
- Early Action Areas

Public Comments

- EPA received over 2300 public comments on the proposed plan
- A wide variety of opinions were expressed in the comments
- Many commenters wanted more cleanup, and many wanted less cleanup
- In general, commenters wanted to ensure the waterway remained available for all uses, including navigation, commerce, recreation, and habitat

What has changed in the Cleanup Plan based on public comment?

- Requires more dredging of contaminated sediments.
- Work with waterway businesses and users to ensure that the cleanup will be as compatible as possible with all uses of the waterway.
- Modifies some of the Remedial Action Levels, or concentrations above which active cleanup is required.
- Uses new sampling data to update dredging volumes and cost estimates.

LDW ROD Cleanup Levels

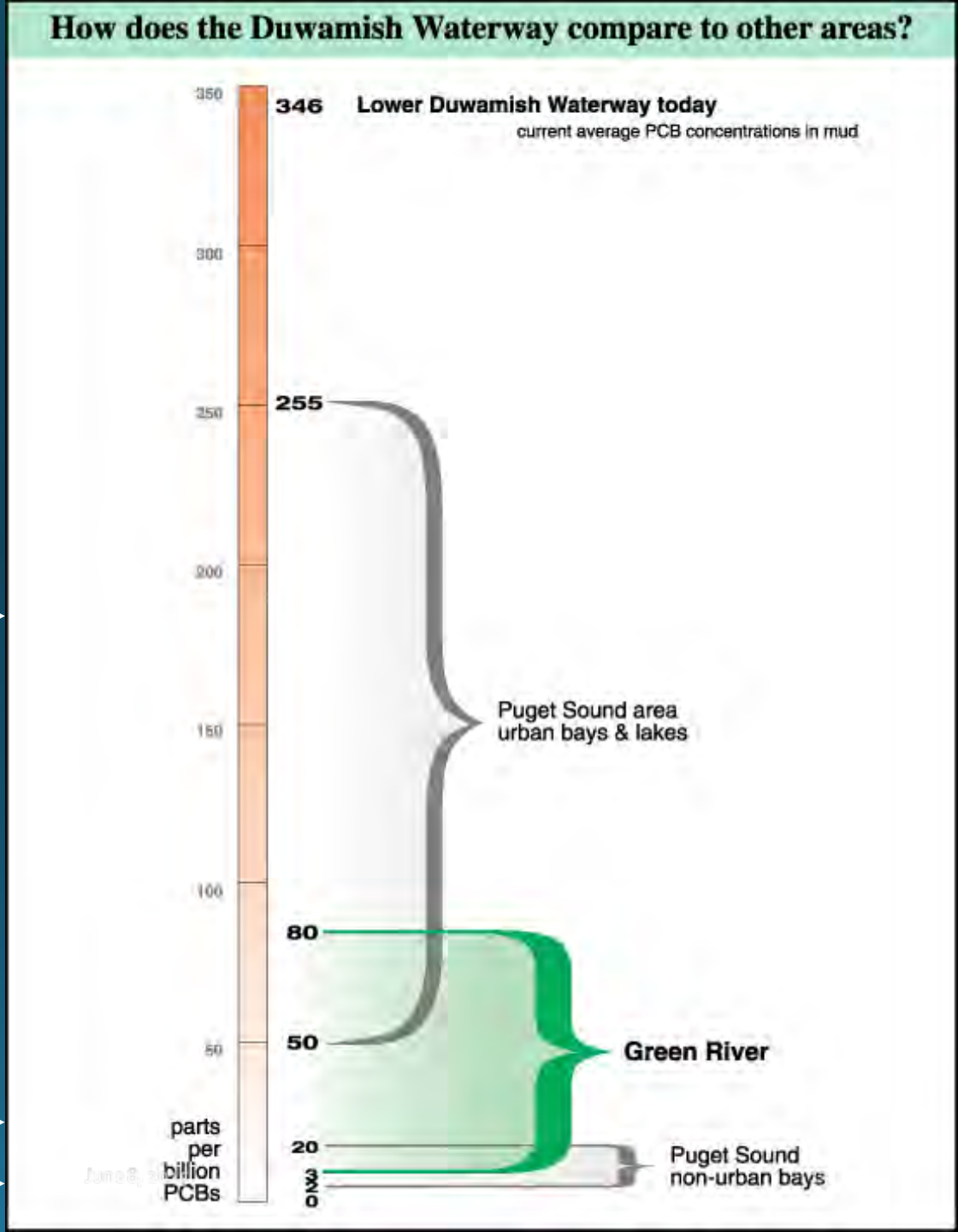
- ROD allows 10 years to meet the benthic sediment cleanup objective (SCO) under the State Sediment Management Standards (SMS) through monitored natural recovery.
  - If not met, additional actions must be taken to meet the benthic SCOs.
- Human health-based SCOs (PCBs, dioxins/furans, cPAHs and arsenic) are lower, based on protection of human health or natural background.
  - If not met in 10 years, EPA will consider whether additional actions are needed and document its decision in a separate decision document.

Duwamish Cleanup Levels

Early actions predicted to reduce PCBs by half

Proposed cleanup is predicted to reduce PCBs by 90% or more

ROD cleanup level is 2 ppb PCBs



What happens if ROD requirements are not met?

- EPA expects that the remedy in the ROD will either meet cleanup levels, or will represent practicable limitations in implementation of source control and sediment remediation.
- Data collection and analysis during long-term monitoring is intended to test this expectation.
- If cleanup levels have not been met after long-term concentrations have reached a steady state, EPA may . . .
  - Select additional remedial action in a ROD Amendment or ESD.
  - Implement additional source control actions separate from the ROD (EPA or Ecology).
  - If EPA determines that no additional practicable actions can be implemented under CERCLA to meet ARARs, EPA may issue a ROD Amendment or ESD providing the basis for a technical impracticability ARAR waiver.

Early Action Area cleanups and the ROD cleanup COMBINED will…

- Clean up over 206 acres through dredging, capping, or and enhance natural recovery;
- Remove over 1.2 million cubic yards of contaminated sediments; and
- Reduce PCB concentrations in the river by at least 90%

ROD considers Environmental Justice

- ROD calls for :
  - Conducting a Fishers Study (already underway) to learn more about those who consume resident fish and shellfish in order to enhance outreach efforts;
  - Continuing to engage the community throughout design and implementation of the cleanup, including convening an advisory group;
  - Continuing to consult with affected Tribes; and
  - Reducing the impact of the cleanup through use of green remediation techniques.

Source Control

Ecology is the lead for source control

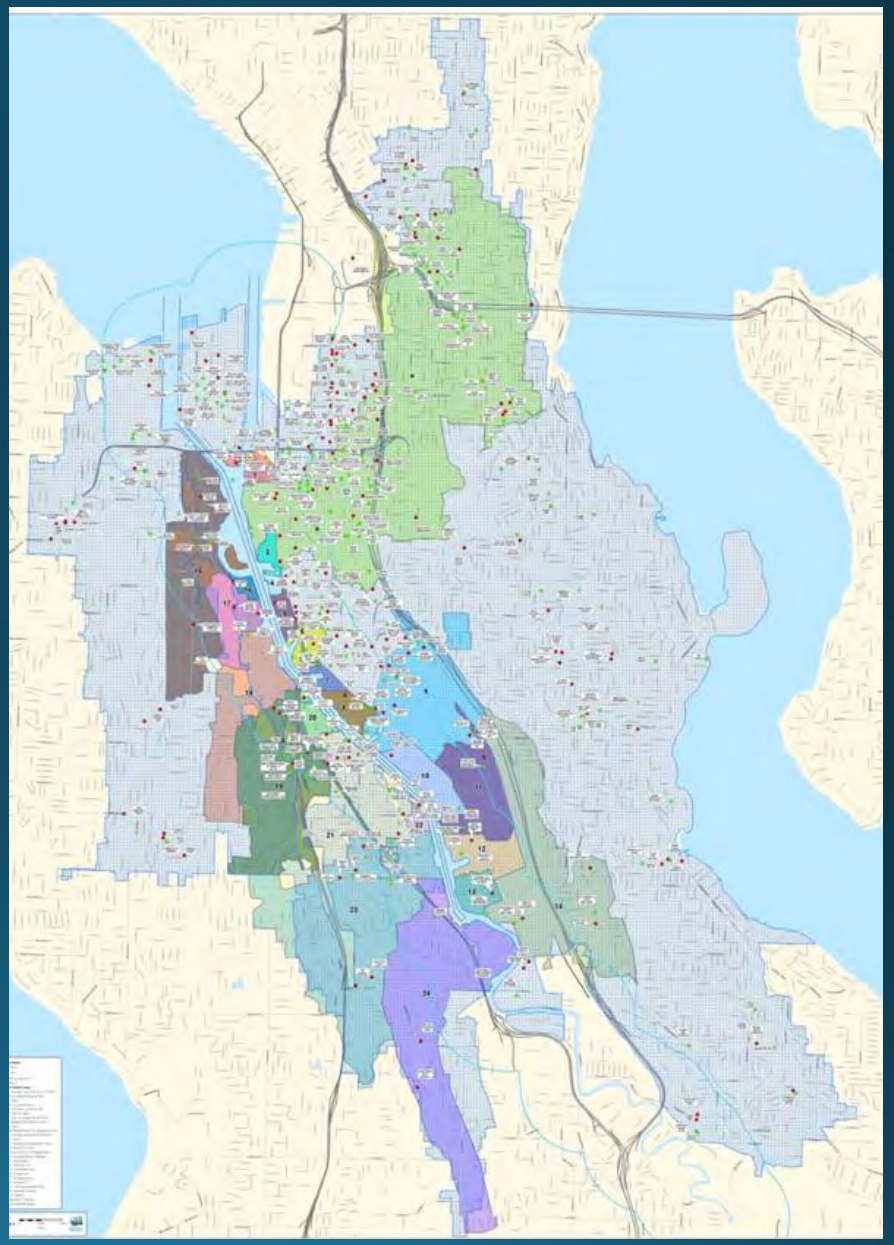
Near-term goal: To control sources "sufficiently" so active sediment cleanup can begin

Long-term goal: Minimize sediment recontamination & improve effectiveness of natural recovery.

Source Control Strategy 2012

24 Source Control Areas

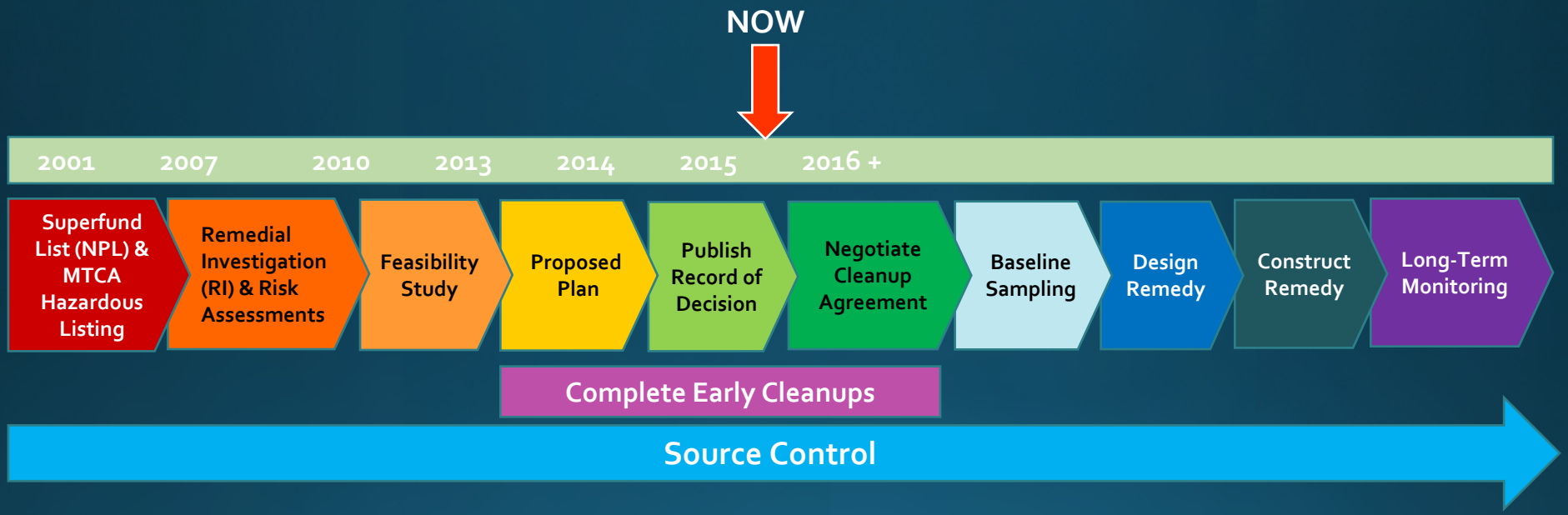
- Data Gaps
- Action Plans



Next Steps…

- Collect baseline data and data to refine the cleanup footprint.
- ROD contains information about how future data will be used to refine cleanup areas.
- Technology application (dredging, capping, etc.) depends on:
  - Remedial Action Levels (RALs) – trigger levels for active cleanup
  - Enhanced Natural Recovery (ENR) upper limits – trigger levels for dredging or capping rather than ENR
  - Potential for deposition or erosion
  - Location – intertidal or subtidal, in or out of navigation channel or berthing area

What Happens Next



Meanwhile …

- Continued Source Control work
- Community Involvement – Updating Plan
- Fishers Study
- Pilot Study –activated carbon
- Completion of Early Action Area cleanups
- Pollutant Loading Assessment

Meanwhile…

Source Control work

- Revised Source Control Strategy expected end of 2015
  - will include detailed source control implementation plans
- Site cleanups
- Water Quality Permitting
- Ongoing Data collection at River Mile 11
- Continued coordination among EPA and Ecology cleanup and water programs

Meanwhile…
Community Involvement

- Community input on the Proposed Plan helped shape changes in the Final Plan
- Interviews will help us update the Community Involvement Plan for the next phases.
- CAG will help EPA minimize impacts of remediation on the community
- …and Fishers Study results will help tailor outreach

Meanwhile…

Fishers Study

- Year-Long Survey
  - Interviews to fill in data gaps.
- Initiated in 2014, funded by LDWG
- Community-centric throughout process, with community input to enhance effectiveness of survey and interviews.

- Initial findings:
  - To date, 50% response rate
  - Some fishers still targeting resident fish and shellfish;
  - Coming from broad geographic area, not just South Park/Georgetown;
  - Diverse fishing community- different languages, cultures.

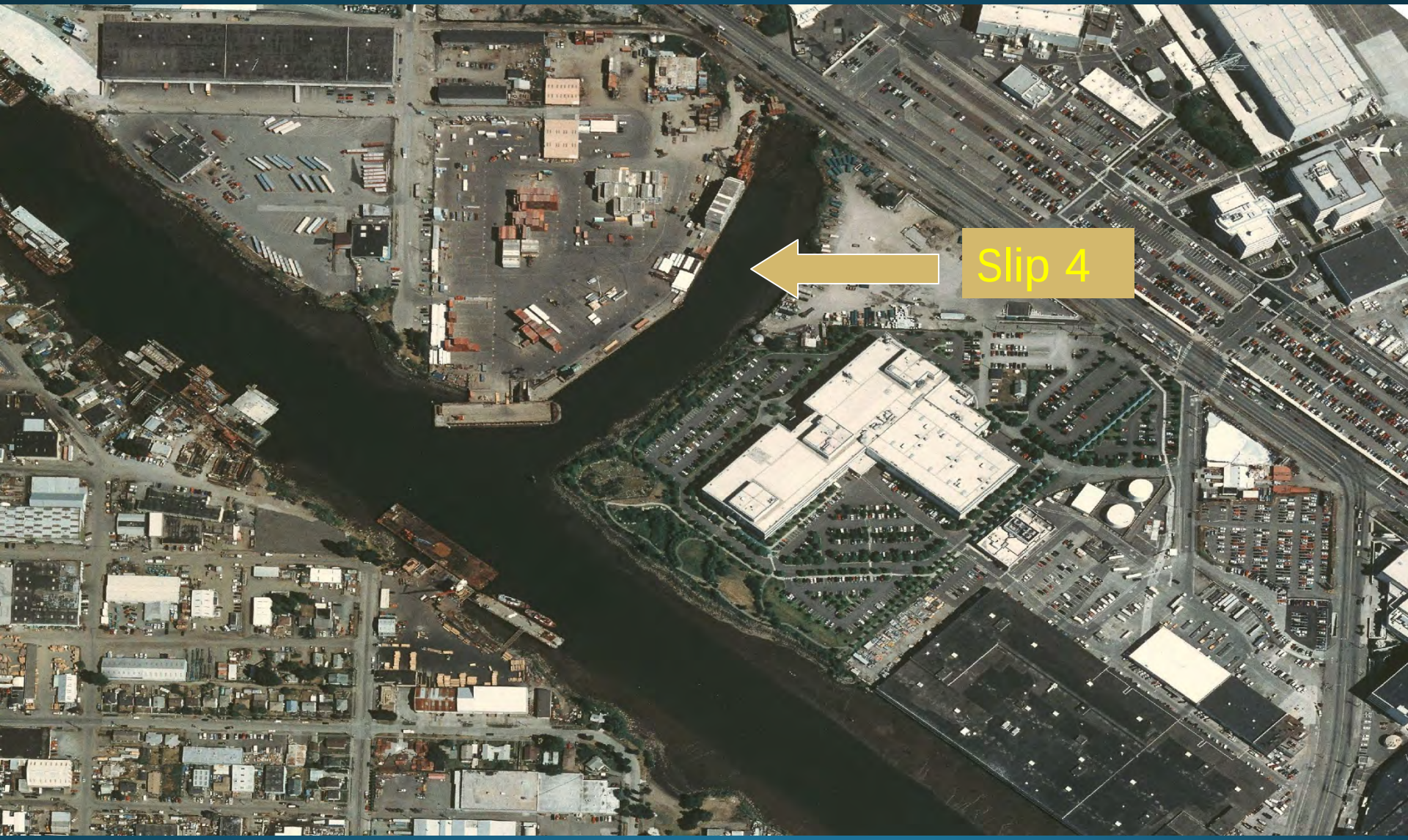
- **Next steps**: using study findings to enhance outreach

Meanwhile…

ENR Pilot Study

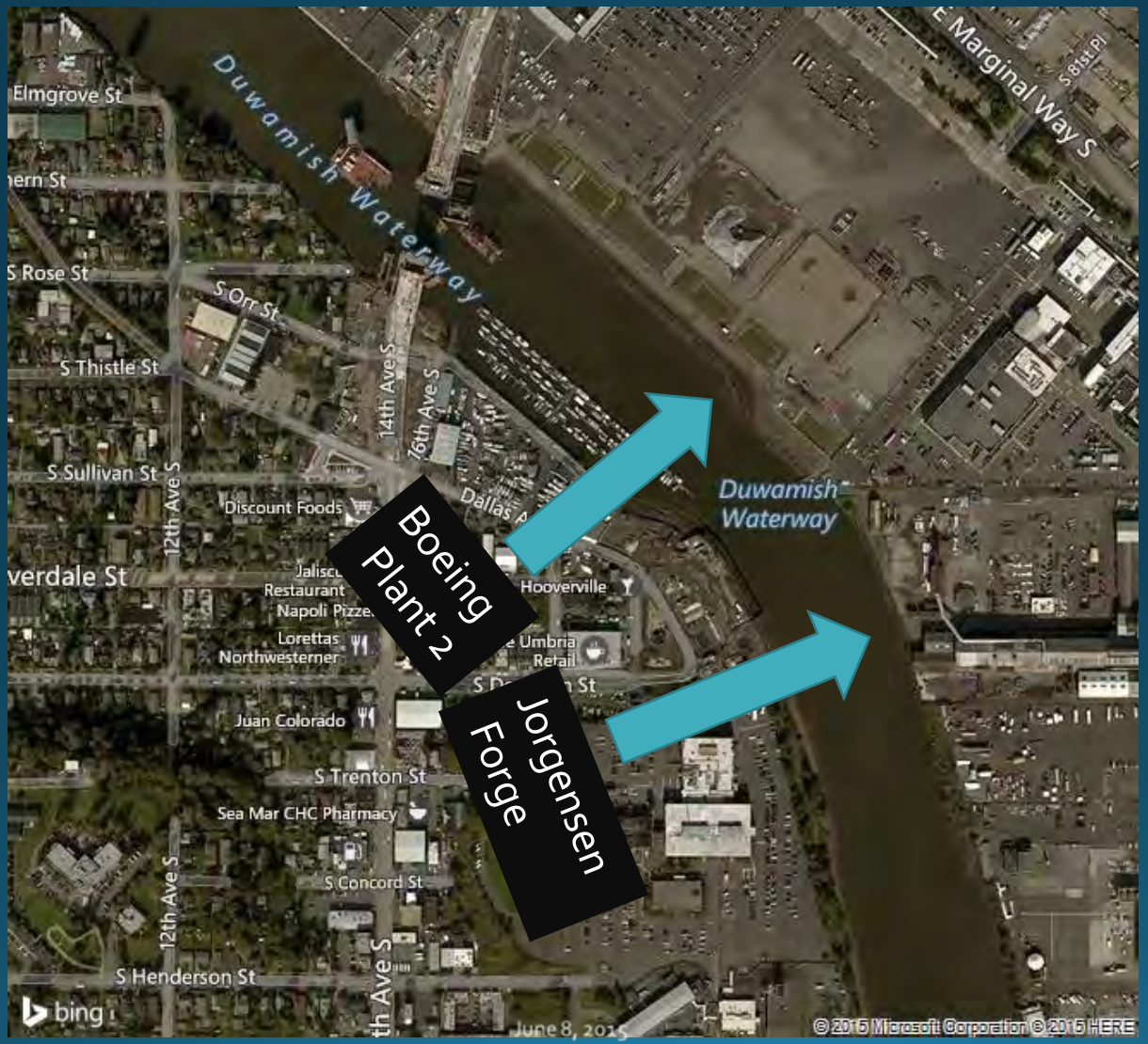
- LDWG will study adjacent test plots to compare Enhanced Natural Recovery (ENR) to ENR with Activated Carbon (AC) addition
- Test plots will be placed in different settings: intertidal and subtidal, including scour and non-scour areas
- Study will assess
  - Acceptable initial placement
  - Stability over time
  - Comparison of PCB bioavailability
  - Comparison of Year 3 benthic communities
- Results will be considered in remedial design

Early Action Area – Slip 4



Early Action Area - Terminal 117

Early Action Area-
Boeing Plant 2/Jorgensen Forge



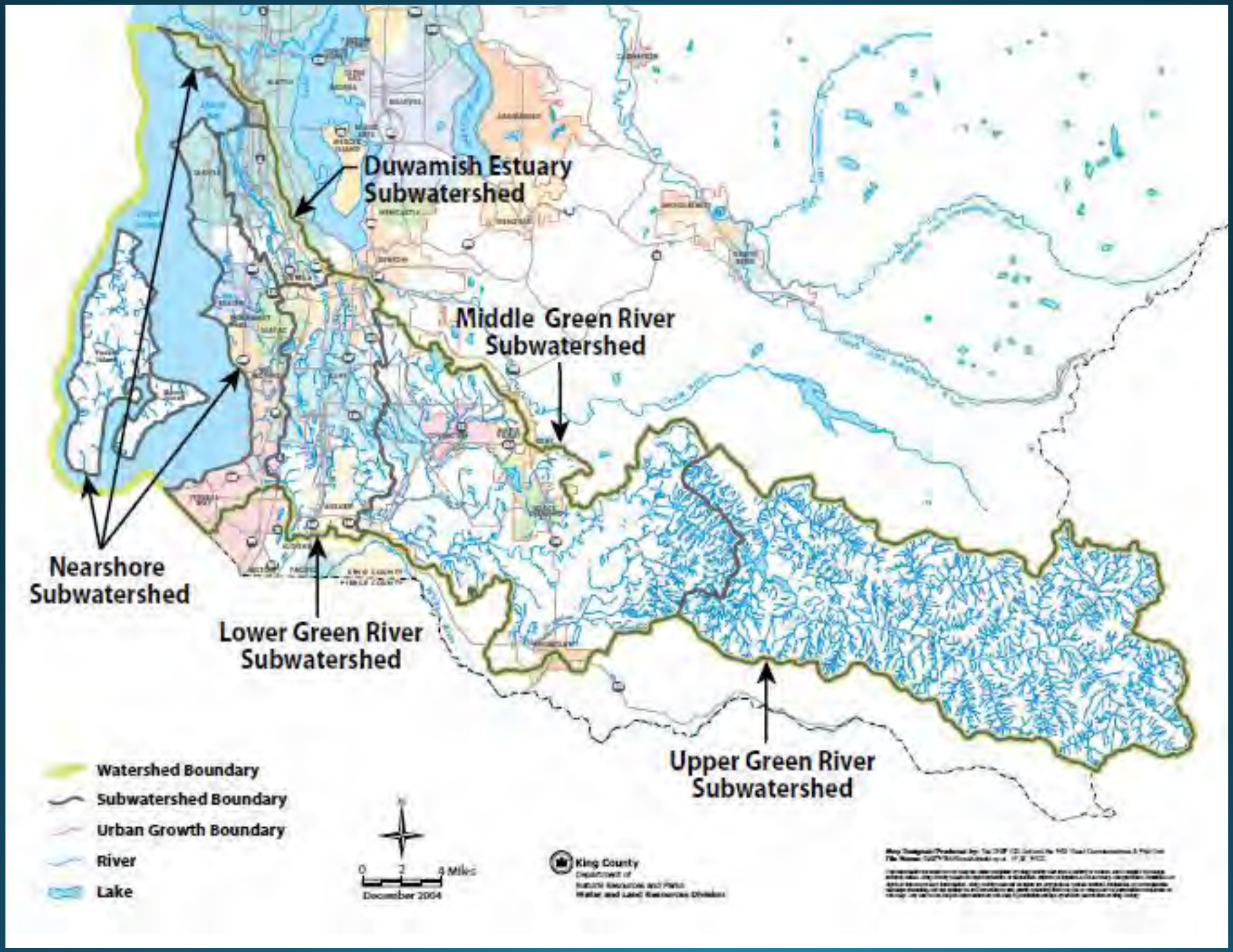
And meanwhile…

Green-Duwamish Watershed Pollutant Loading Assessment

Joint Ecology & EPA project to develop a watershed-based computer "model" to help people understand what is polluting the Green-Duwamish River and where it comes from.

Project Goals:

- Address water, sediment, and tissue quality impairments under the Clean Water Act in the Green-Duwamish watershed, including the Lower Duwamish Waterway (LDW).
- Prioritize pollutant reduction efforts in the watershed to
  - minimize recontamination of remediated LDW sediments and
  - improve the effectiveness of monitored natural recovery.
- Long-term project
- More Information online: http://www.ecy.wa.gov/geographic/GreenDuwamish/pla.html


Duwamish Estuary Subwatershed
Middle Green River Subwatershed
Nearshore Subwatershed
Lower Green River Subwatershed
Upper Green River Subwatershed
Watershed Boundary
Subwatershed Boundary
Urban Growth Boundary
River
Lake
0 2 4 Miles
December 2004
King County

RD negotiations and schedule

- EPA is weighing best approach for negotiating and for phasing the design, considering various factors:
  - Ongoing allocation of responsibility among the parties
  - Willingness and interest of parties
  - Source control schedule
  - Logical phasing of design and remediation, transaction costs of multiple negotiations
- Generally, EPA sends a notice letter with a draft of the legal agreement and statement of work, inviting parties to negotiate
- Parties respond with a good faith proposal
- Negotiations can take months

Some challenges for Remedial Design

Active waterway
- Navigation channel
- Tribal uses
- Residential and industrial uses side by side
- Upstream changes

▷ROD calls for survey of waterway users

Changing conditions:
- source control progress,
- early action areas, and
- possible refinement of upstream sediment load and quality
- climate change

▷ ROD calls for new baseline data, consideration of new information - may change areas where technologies are applied

Intense coordination
- Source control
- Tribal fishing, fish window, ESA
- Ongoing in water construction and permitting

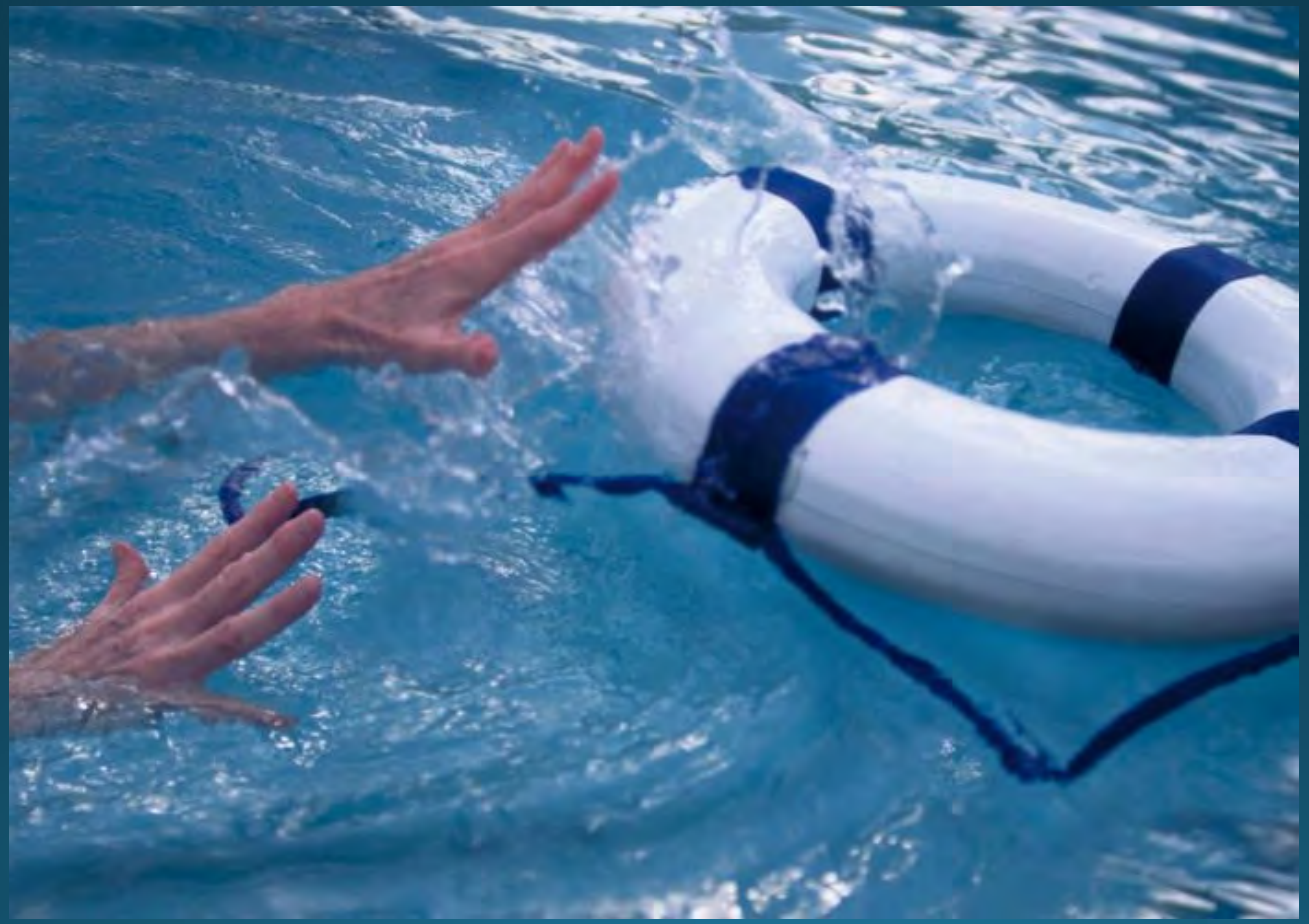
Legal complexities: large number of potentially responsible parties

Technical challenges – e.g., how to address cleanup under existing structures

Wonderfully Active Community
- Engaged in restoration, community outreach and events, effective advocacy

▷ ROD calls for CAG and Fishers Study

Fortunately, Allison and Becky are near!



Questions?