Build a Better Planet

Lower Duwamish Waterway Stakeholders Meeting
Boeing Plant 2 Early Action Site

Brian Anderson

April 15, 2014

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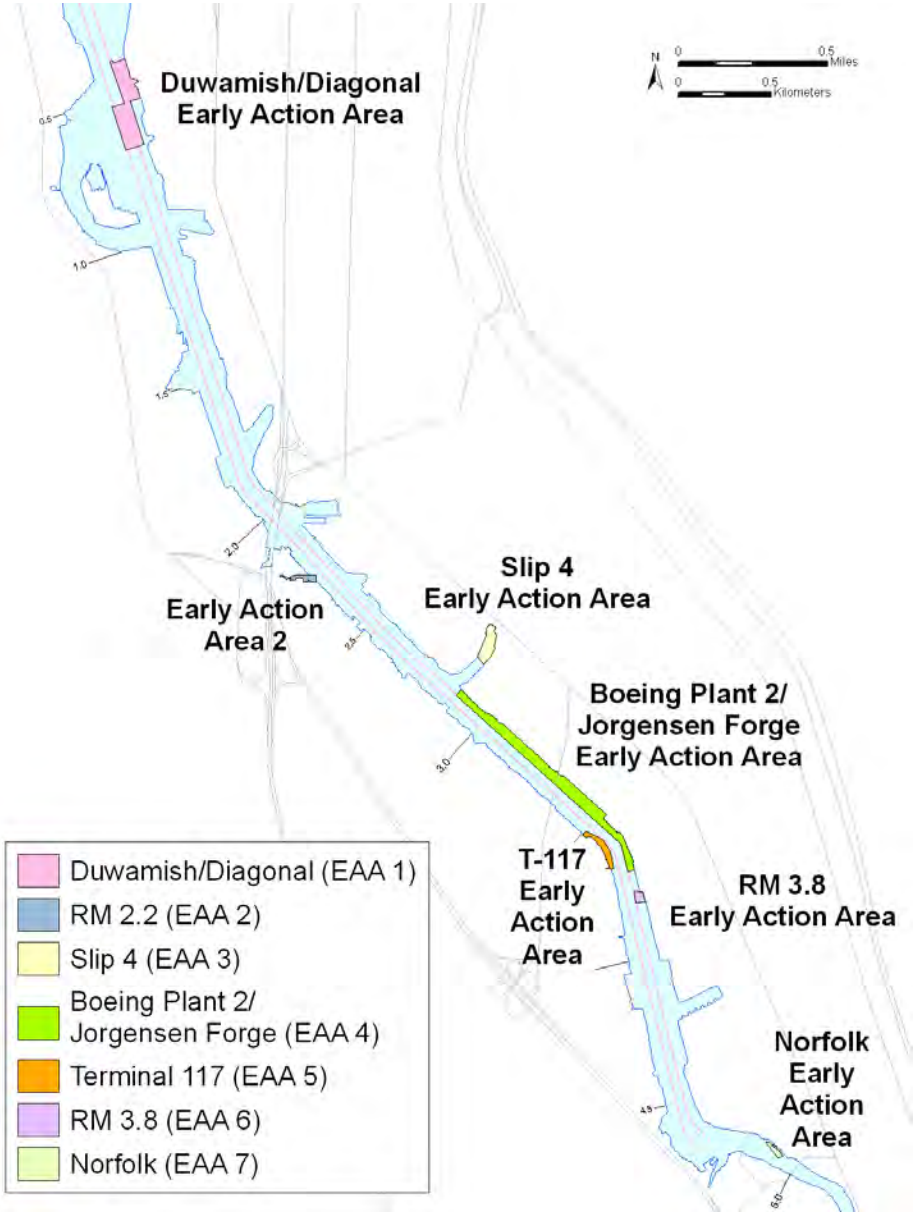
Lower Duwamish Early Action Sites



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Lower Duwamish Early Action Activity

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Boeing Plant 2
Two Seasons of Dredging Completed

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Boeing Plant 2 | Active Dredging

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Boeing Plant 2 | Dredging Overview

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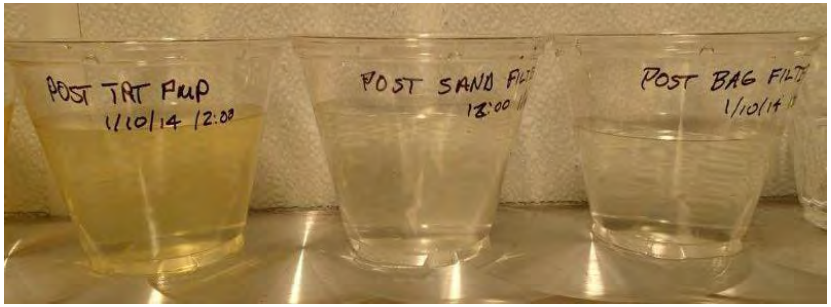
Boeing Plant 2 | Dredge Return Water System



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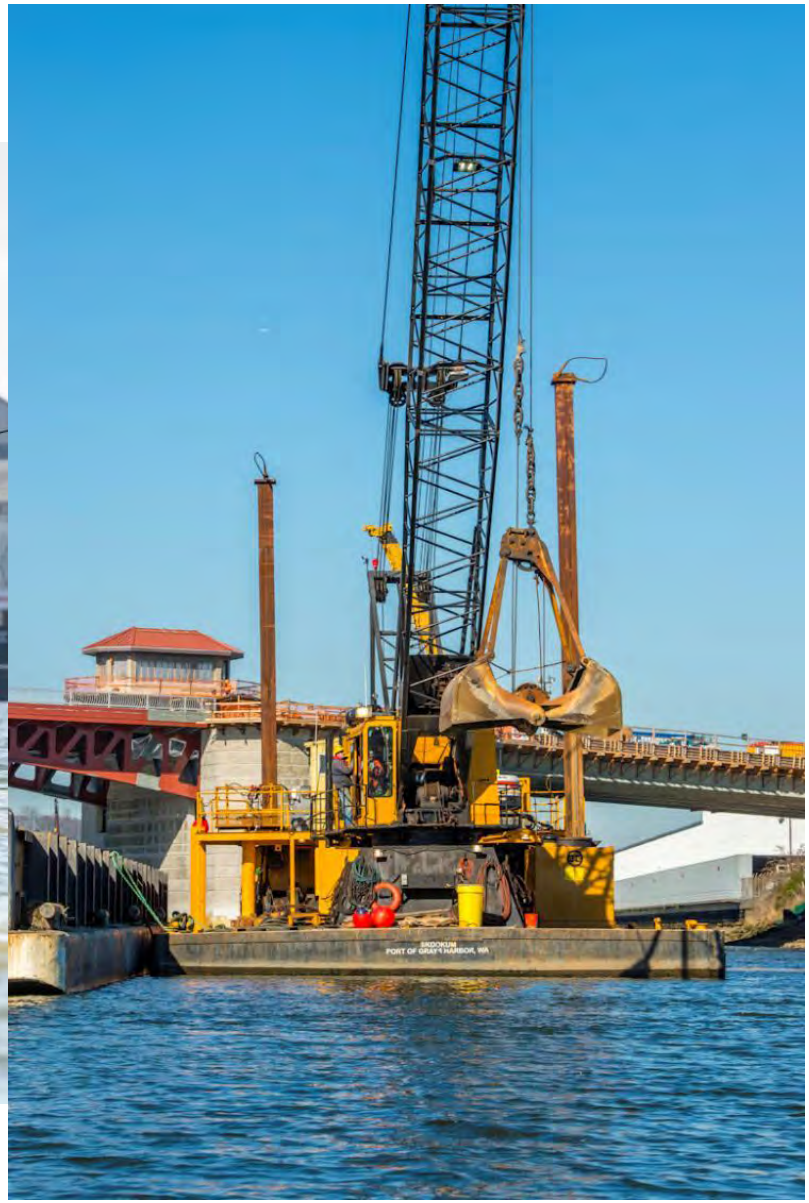
Backfilling with Clean Sand



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Boeing Plant 2
Construction Season 2 Production Summary

Construction Season 2 Production Summary

Parameter	Units	Productivity
Dredging		
a. Quantity - Actual	CY	48,513
b. Quantity - Planned	CY	46,312
Backfilling		
a. Initial Backfill	Tons	6,155
b. Average Thickness	Feet	0.5
c. Intermediate Backfill	Tons	49,247
Transload		
a. Barges	Barges	178
b. Quantity	Tons	66,990.00
c. Rail Cars to Landfill	Cars	617
d. Trucks to Landfill	Trucks	38
Water Treatment		
a. DRWTS Treated	Gallons	9,299,800
b. Solids Disposal	Tons	1705

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Water Quality Monitoring

In situ Instruments

- Monitored water quality upstream and downstream
- Measured turbidity, pH, temperature, dissolved oxygen & salinity every 5-min
- Data posted to website

Dredge Return Water System

- Measured turbidity, pH, temperature, dissolved oxygen and salinity every 30-sec to 1-min when discharging
- Met turbidity criterion during discharge
- One anomalous exceedance of copper criterion during discharge

Dredge Monitoring

- Monitoring of dredging operation conducted on 26 days
- Turbidity exceedances on 4 days attributable to dredging operations
- Measured 1 exceedance of PCB chronic water quality criterion; additional BMPs implemented and no further exceedances observed

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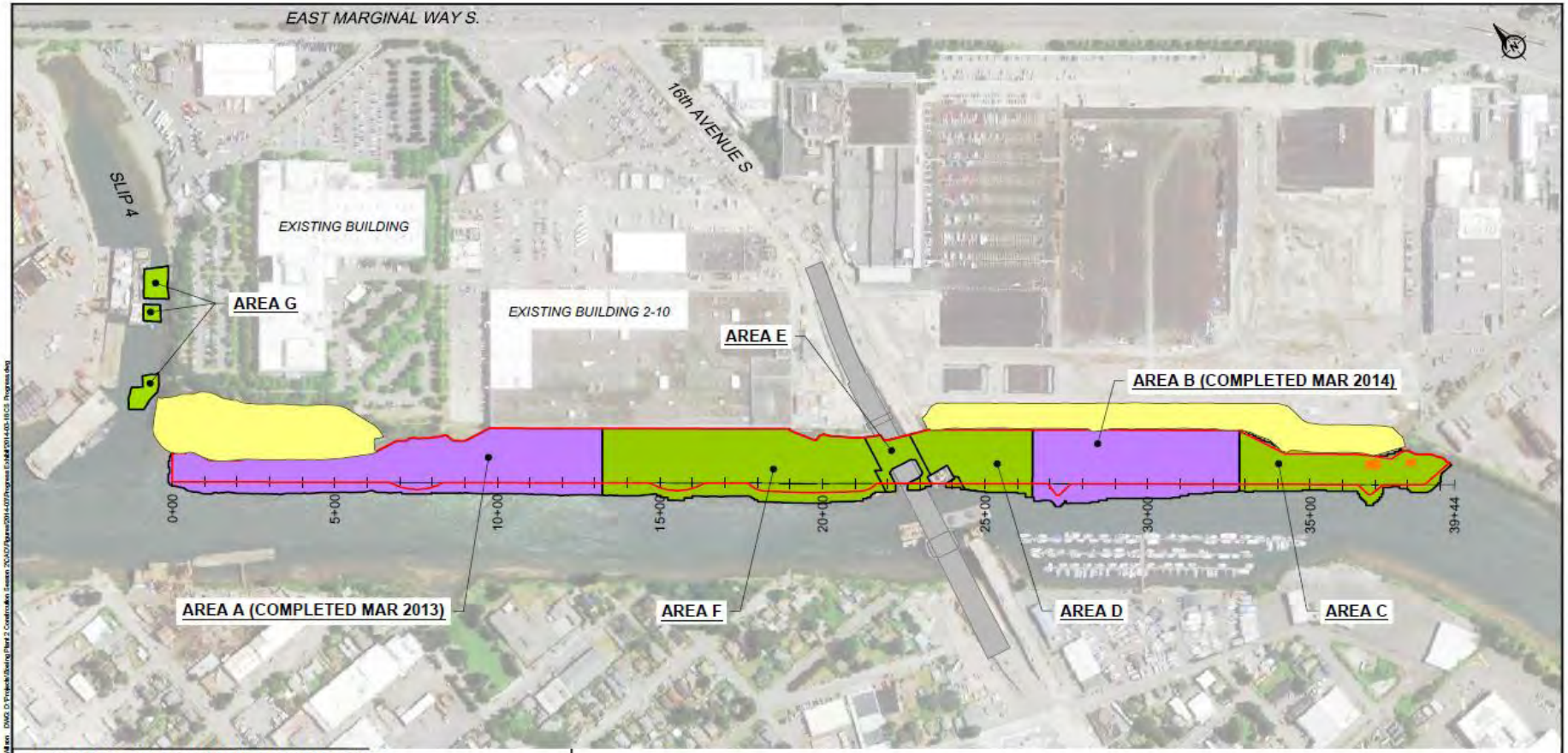
Boeing Plant 2 | Project Status



ESTIMATED SEDIMENT QUANTITIES

	Actual	Predicted
Area A CS1 Project Area (Completed Mar 2013):	34,275 cy	- cy
Area B CS2 Project Area (Completed Mar 2014):	48,513 cy	- cy
Area C Phase 1 Upstream End:	- cy	22,937 cy
Area D Phase 2 Upstream of Bridge:	- cy	11,195 cy
Area E Phase 5 Remaining Bridge Project Area :	- cy	4,400 cy
Area F Phase 3 Downstream of Bridge:	- cy	42,492 cy
Area G Phase 4 Remaining Slip 4 Project Area :	- cy	1,850 cy
Total:	82,788 cy	82,874 cy

Note: Predicted 10% below design for remaining open access areas.

0 300
Scale in Feet

DRAFT

LEGEND

- DSOA Sediment Cleanup Boundary
- TSCA Areas
- Shoreline Habitat Area (Completed Summer 2013)

THE BOEING COMPANY
SEATTLE, WASHINGTON
BOEING PLANT 2
DUWAMISH WATERWAY SEDIMENT REMEDIATION
CS PROJECT BOUNDARIES AND ESTIMATED PROJECT DREDGE STATUS AFTER CS2

DOF DALTON OLMSTED FUGLEVAND

FIGURE 1
MARCH 11, 2014

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Boeing Plant 2
Shoreline Restoration and Stormwater Treatment

Copyright © 2014 Boeing. All rights reserved.

Stormwater Outfall Installation

Copyright © 2014 Boeing. All rights reserved.

New Fish & Wildlife Habitat

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New Fish & Wildlife Habitat

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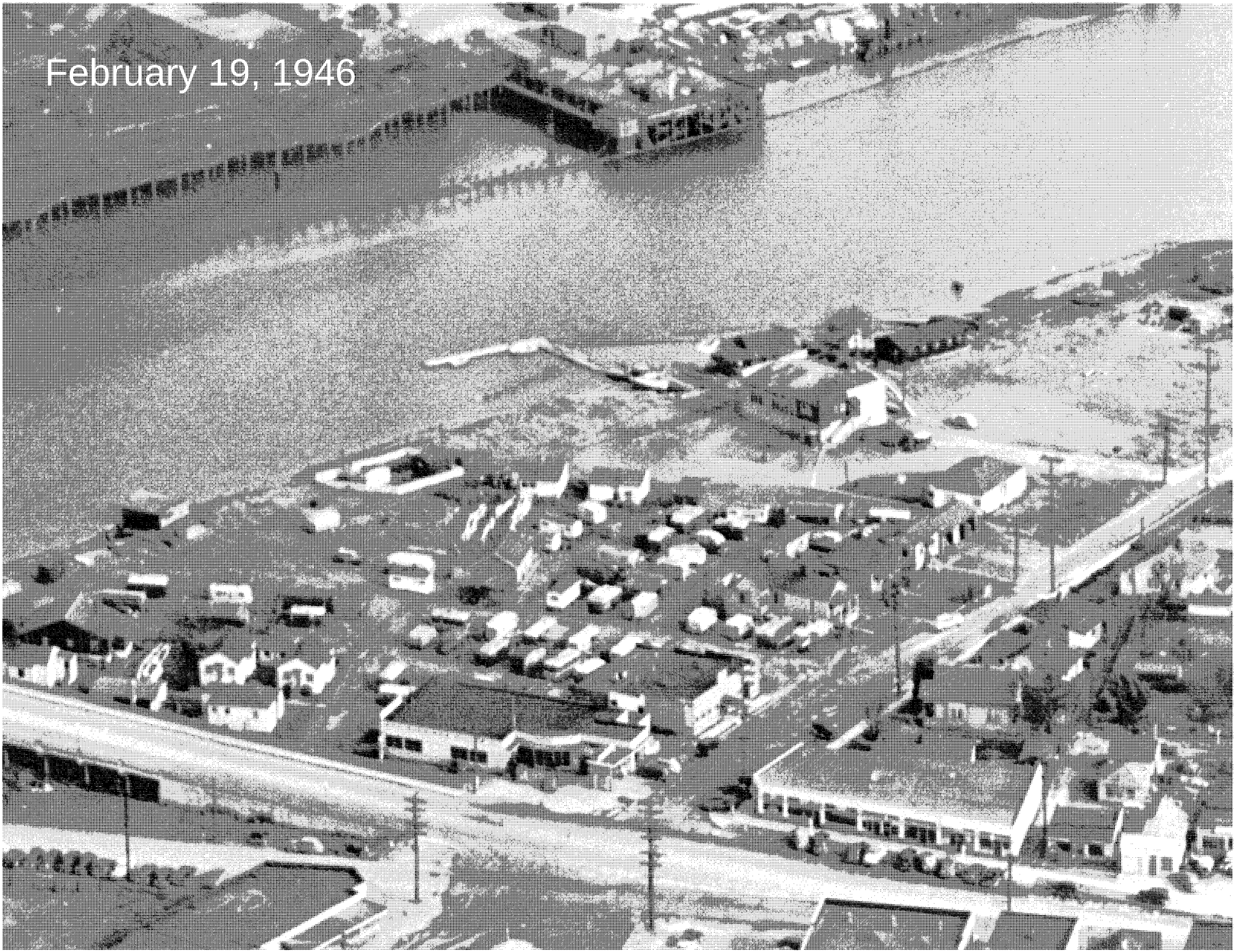
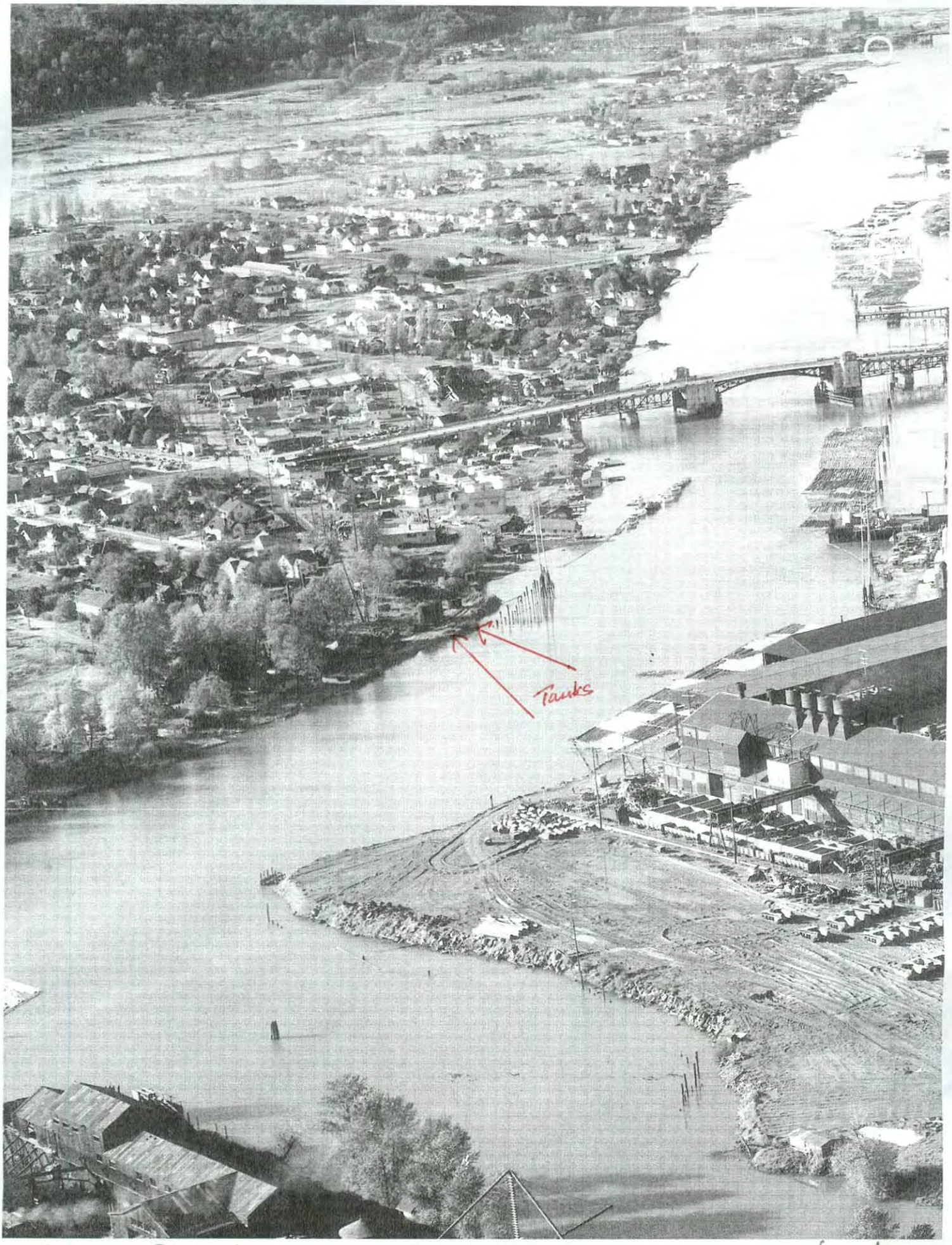
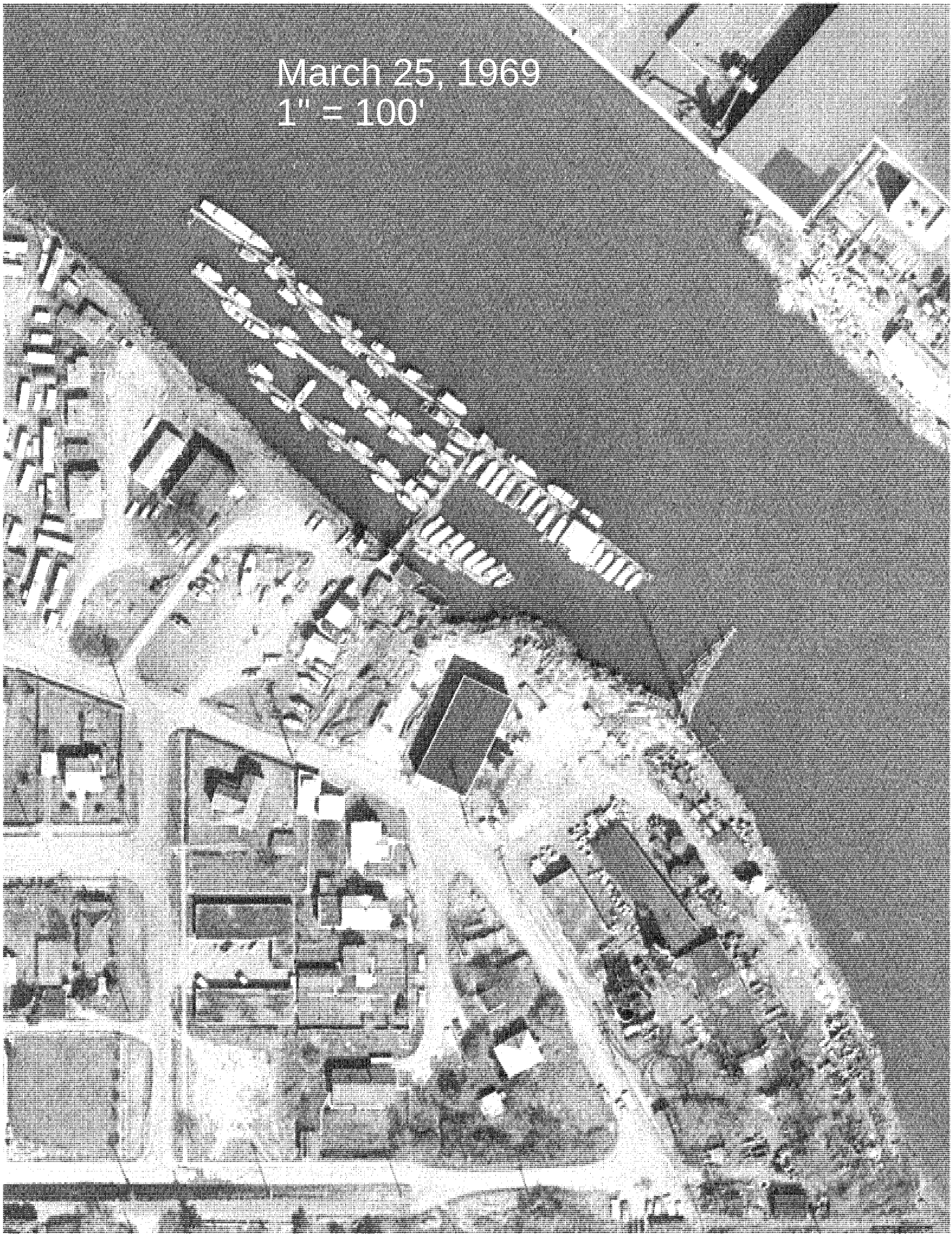

February 19, 1946

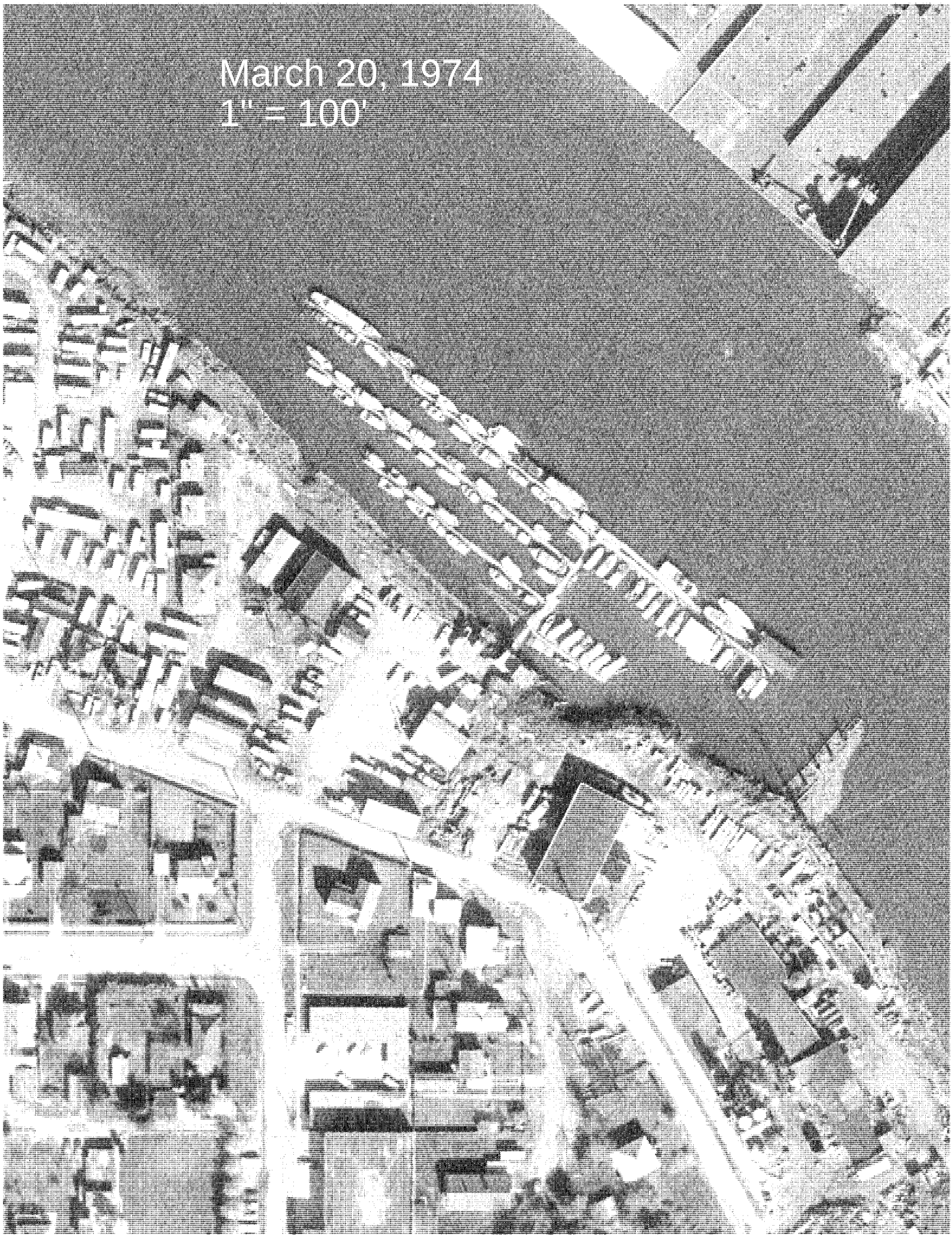
Oct 1947

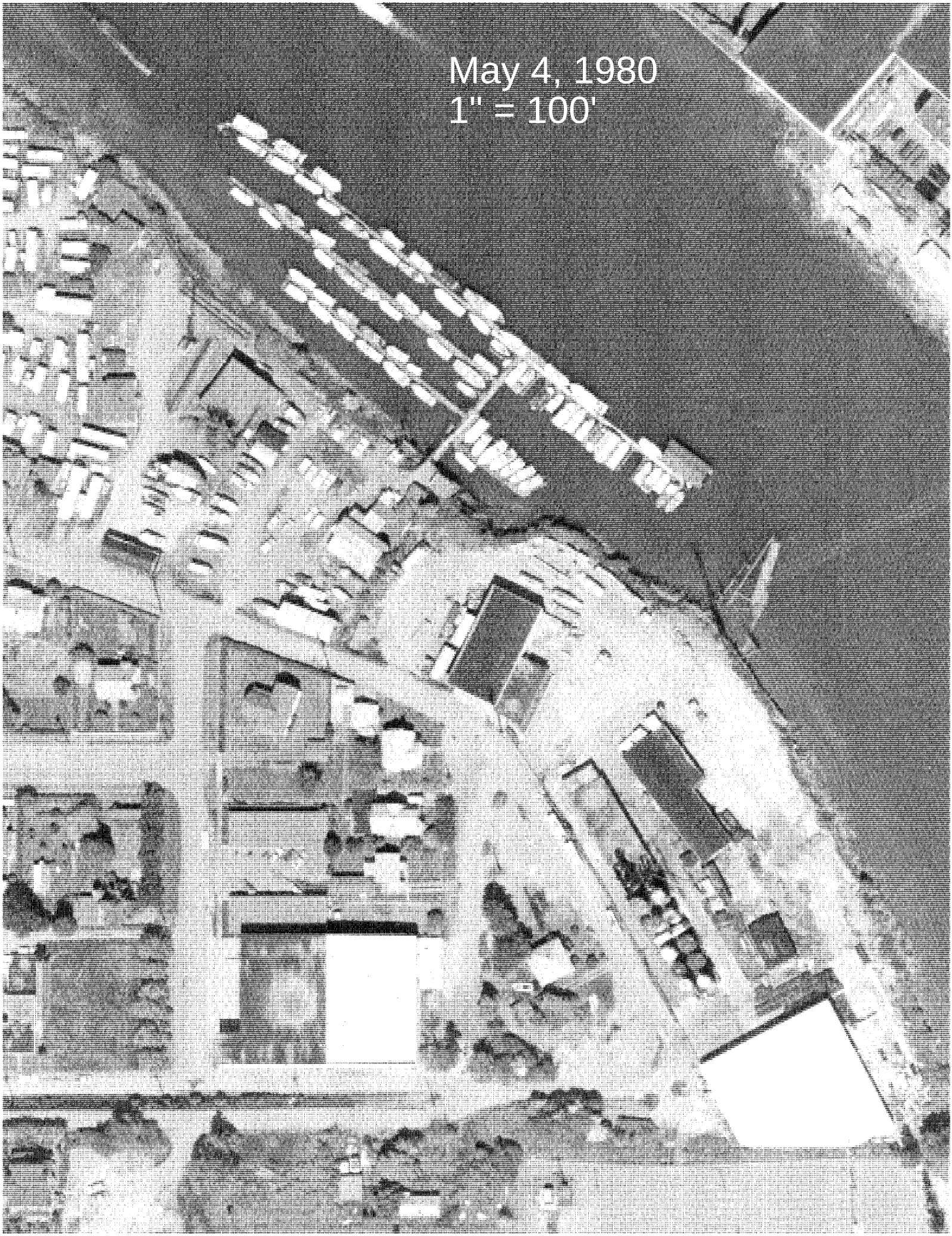


South Park Marina Data Gaps 2007 Appendix A

June 23, 1960
1" = 100'

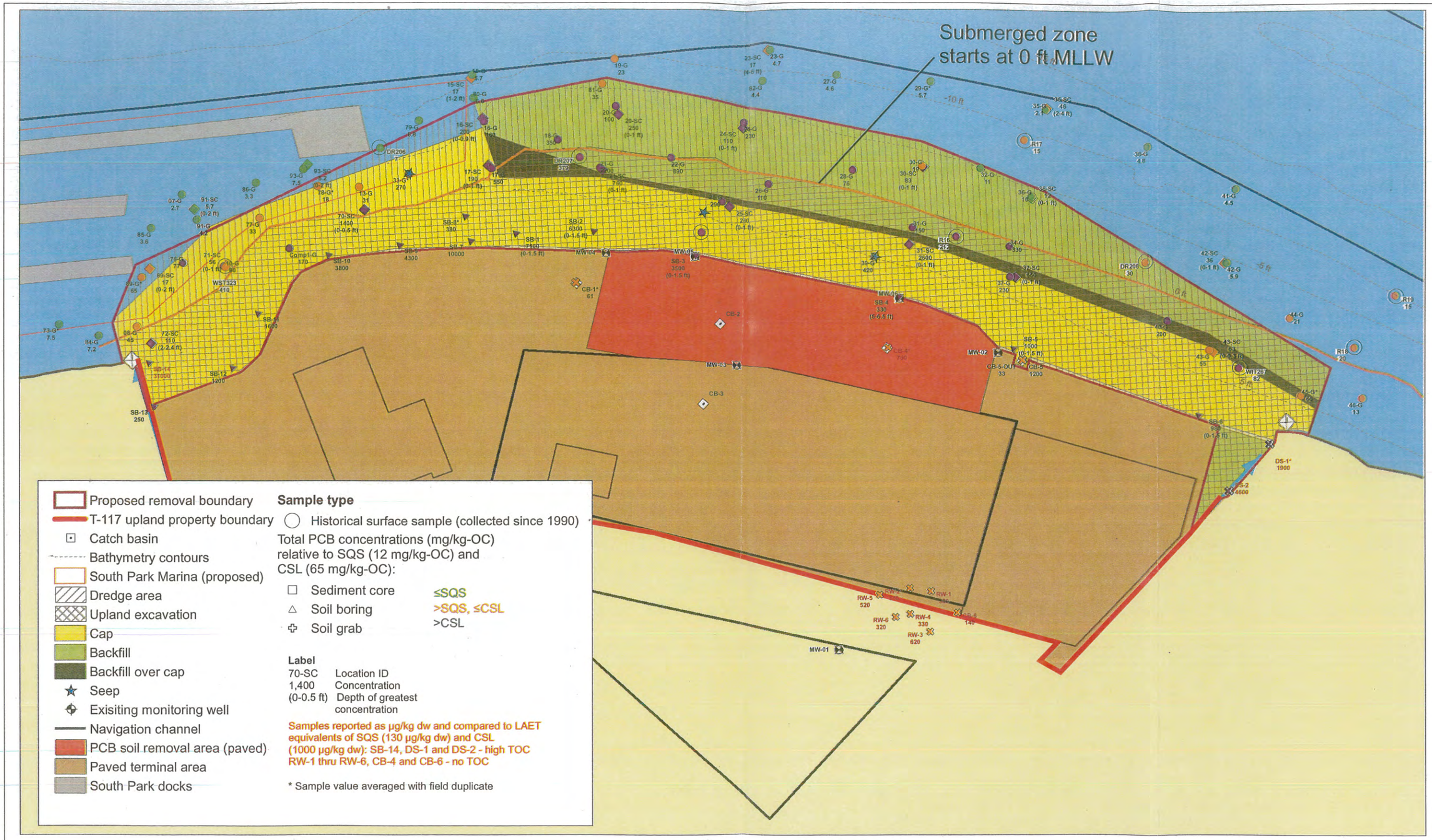

March 25, 1969
1" = 100'


March 20, 1974
1" = 100'


May 4, 1980
1" = 100'

April 22, 1982
1" = 150'

March 3, 1985
1" = 150'



Wind Ward environmental LLC

Prepared by KH 07/14/05, from map 1609, Map 1908

W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\EECA\Updated

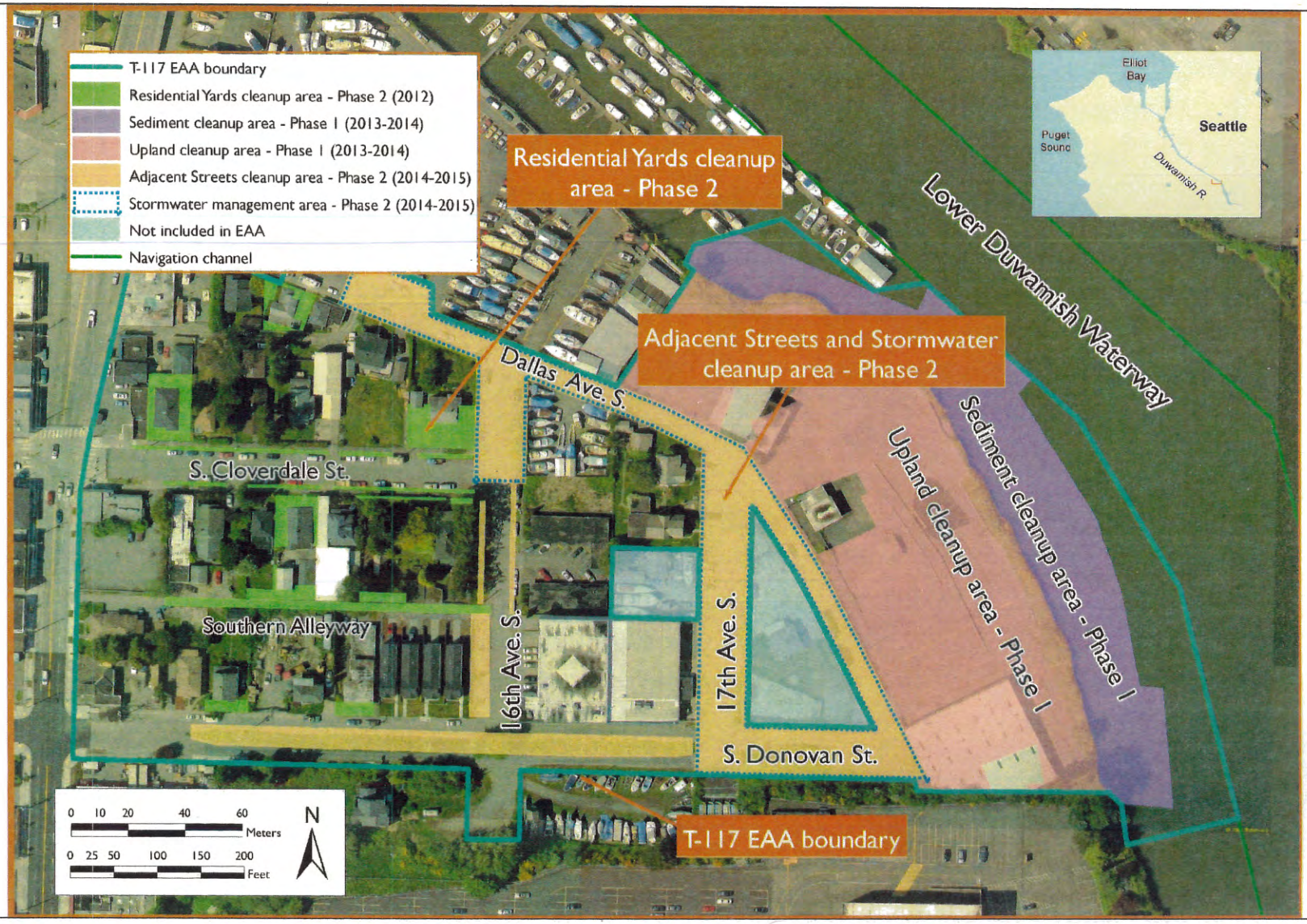
0 25 50 100 Feet

0 4 8 16 Meters

N

For sediment core and soil borings where more than one sample was collected (i.e., SB-1 or 20-SC), the maximum PCB concentration within the core or boring is shown. PCB concentrations for the other subsurface samples are in the report.

Figure 2. Proposed Action



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integral consulting inc.

Figure 1-1.
T-117 Early Action Cleanup Site Overview

Lower Duwamish Waterway

Flow Direction

Flow Direction

Dredge Unit 3

Dredge Unit 2

Dredge Unit 1

+2 Ft Elevation (MLLW) Toe of Slope

+2 Ft Elevation (MLLW) Toe of Slope

North Bank

South Bank

Dallas Ave South

09 08 07 06 05 04 03 02 01

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF GG HH II JJ KK LL MM NN OO PP QQ RR

Legend

Diesel Range Organics Concentration (mg/kg dw)

- 3 - 100
- 101 - 200
- 201 - 400
- 401 - 600
- > 600

- Historic Sample Location (From EECA)
- Sheetpile Wall
- Dredge Units
- Top of Bank
- Adjacent streets
- T-117 Boundary
- Grid Cells

Notes:
1. Diesel Range Organics soil concentrations (0-2 ft bgs) and sample locations shown on this map are from the June 2010 Revised Engineering Evaluation/Cost Analysis Database (2010, Windward).
2. Diesel Range Organics Removal Action Level for soil (RVAL) is 200 mg/kg dw.
3. Concentrations were interpolated using inverse distance weighting. Parameters: power: 5, fixed search radius: 50 ft, cell size: 2ft x 2ft.

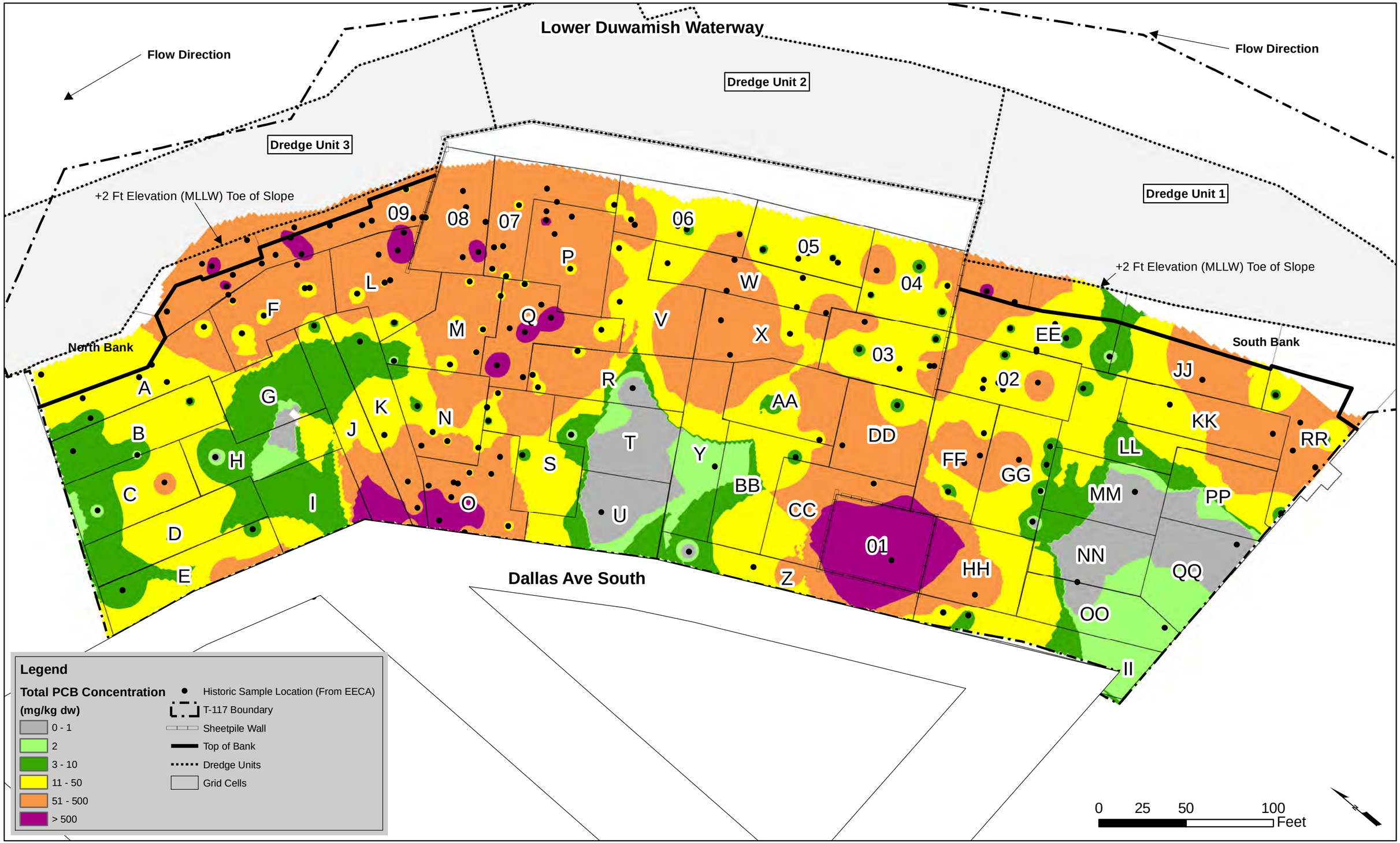
AECOM

0 25 50 100 Feet

T-117 CLEANUP
SEDIMENT AND UPLAND AREAS

T-117 EAA, INTERPOLATED SOIL DIESEL RANGE ORGANICS CONCENTRATIONS 0-TO-2-FT DEPTH RANGE

DATE: 06/26/13 | DRWN:mvi/sea | Revision: 0



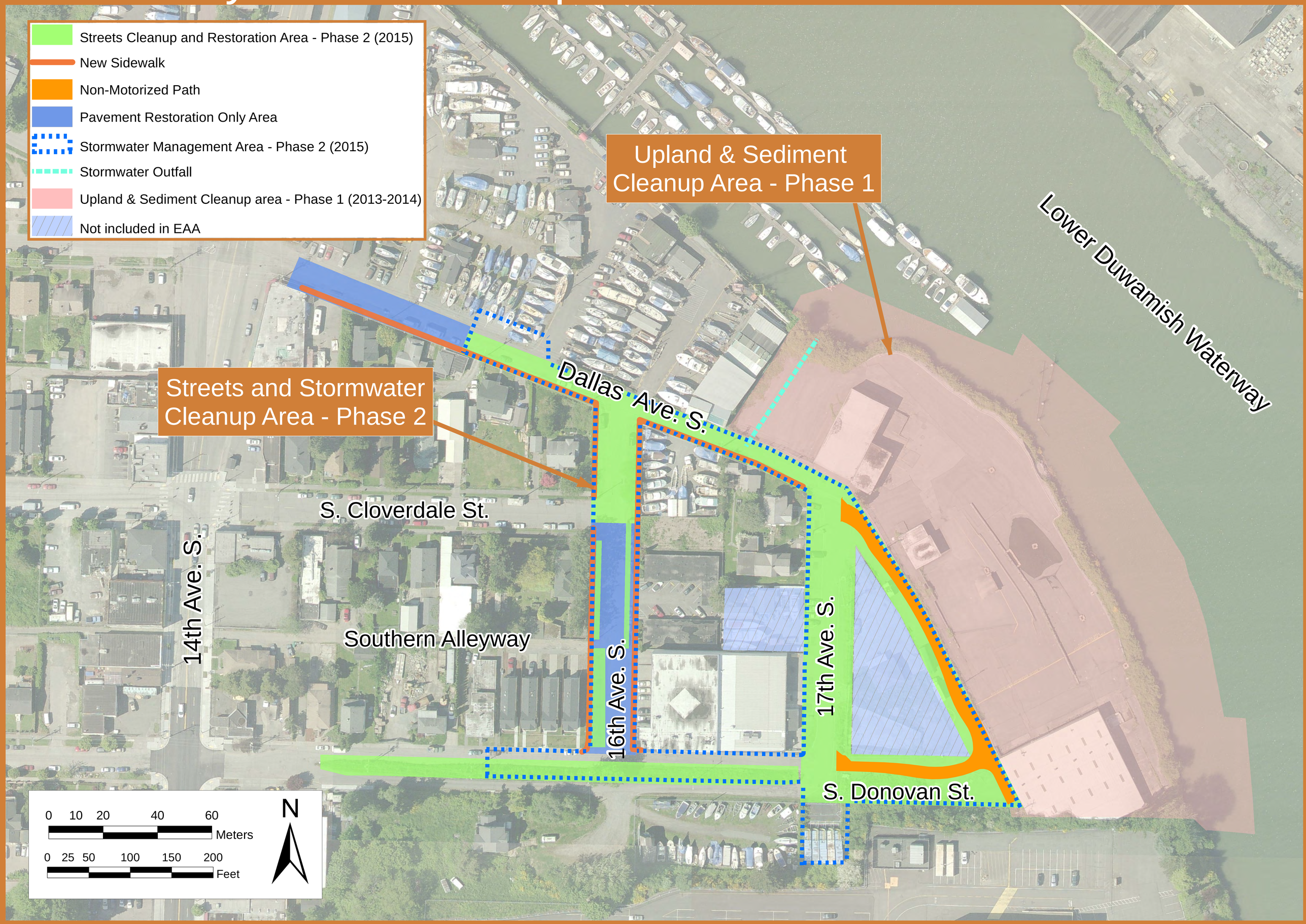
Notes:
1. PCB soil concentrations (0-2 ft bgs) and sample locations shown on this map are from the June 2010 Revised Engineering Evaluation/Cost Analysis (2010, Windward).
2. Total PCB Removal Action Level for soil (RVAL) is 0.65 mg/kg dw.
3. Concentrations were interpolated using inverse distance weighting. Parameters: power: 5, fixed search radius: 50 ft, cell size: 2ft x 2ft.

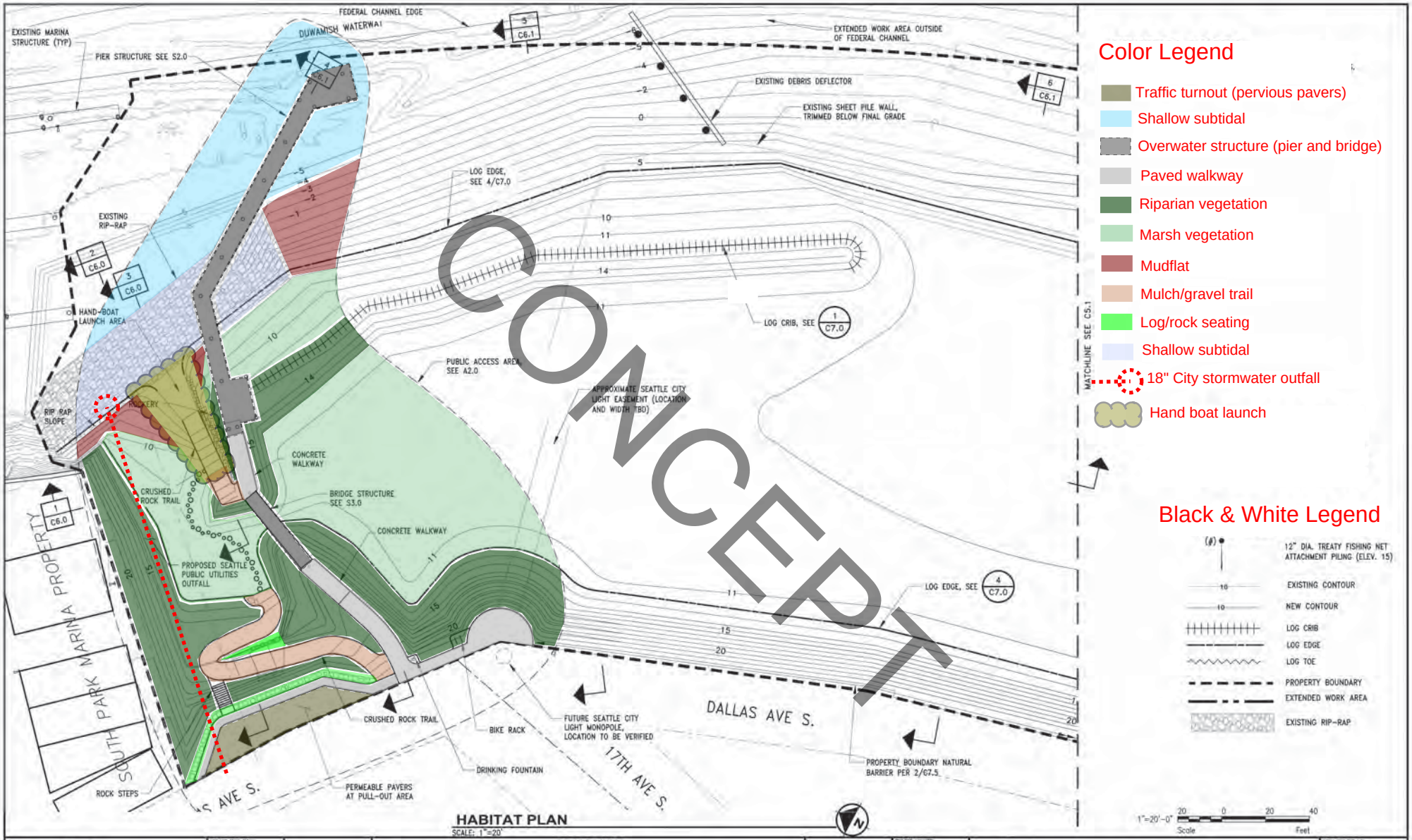
AECOM

T-117 CLEANUP SEDIMENT AND UPLAND AREAS			T-117 EAA, INTERPOLATED SOIL TOTAL PCB CONCENTRATIONS 0-TO-2-FT DEPTH
DATE: 06/26/13	DRWN:mvi/sea	Revision: 0	Project No: 6028925

Path: P:\ENV\PROJECTS\W\Port of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\Total PCBs.mxd

T-117 Early Action Cleanup Site Overview





HABITAT PLAN

SCALE: 1"=20'

CALL 2 DAYS BEFORE YOU DIG 1-800-424-5555

REVISIONS

Port of Seattle SEAPORT DIVISION

PROJECT: SITE 23 & 25 RESTORATION

SHEET TITLE: HABITAT PLAN (1 OF 4)

103944 (PIER - 104872)

117-1201 C5.0

90% REVIEW

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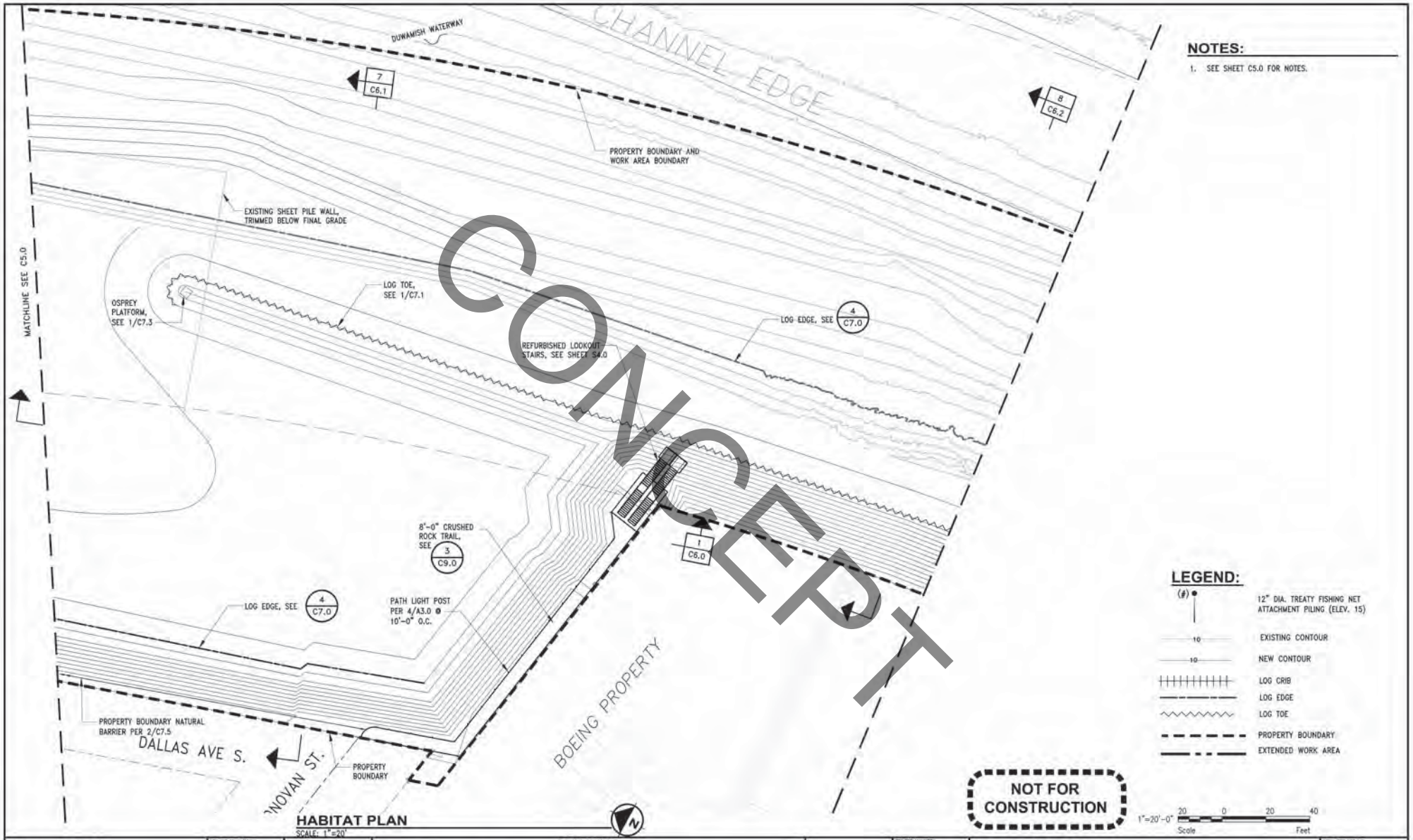

NOTES:

1. SEE SHEET C5.0 FOR NOTES.

LEGEND:

- (#) 12" DIA. TREATY FISHING NET ATTACHMENT PILING (ELEV. 15)
- 10 EXISTING CONTOUR
- 10 NEW CONTOUR
- LOG CRIB
- LOG EDGE
- LOG TOE
- PROPERTY BOUNDARY
- EXTENDED WORK AREA

HABITAT PLAN

SCALE: 1"=20'

CALL 2 DAYS
BEFORE YOU DIG
1-800-424-5555

PROJECT ENGR./ARCH:	
DESIGNED:	
DRAWN BY:	
SCALE:	
DATE:	
CHECKED BY:	
CHECKED/APPROVED BY:	

REVISIONS

NO.	DATE	BY	DESCRIPTION	APP'D	NO.	DATE	BY	DESCRIPTION	APP'D

PROJECT MANAGER:	RONSON MACH
PROJECT ENGINEER:	JOANNA HINGLE
DESIGN ENGINEER:	JOANNA HINGLE
DRAFTER:	KEN LANE
SCALE:	AS SHOWN
DATE:	T.B.D.
CHECKED/APPROVED BY:	

Port of Seattle SEAPORT DIVISION

PROJECT: SITE 23 & 25 RESTORATION

SHEET TITLE: HABITAT PLAN
SHEET 2 OF 4

WORK PROJECT NO: 103944 (PIER - 104872)

CONSULTANT'S NO:

PORT OF SEATTLE NO: 117-1201 C5.1

90% REVIEW

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Briefing - Evaluation of Exposure to Arsenic of the Eastern Soft Shell Clam

Regional Applied Research Effort (RARE):

Bioaccumulation of Arsenic in *Mya arenaria* Exposed for 60 Days to Suspended Sediments and Undisturbed Bed Sediments from the Lower Duwamish Waterway

15 April2014

Lab-Based Questions

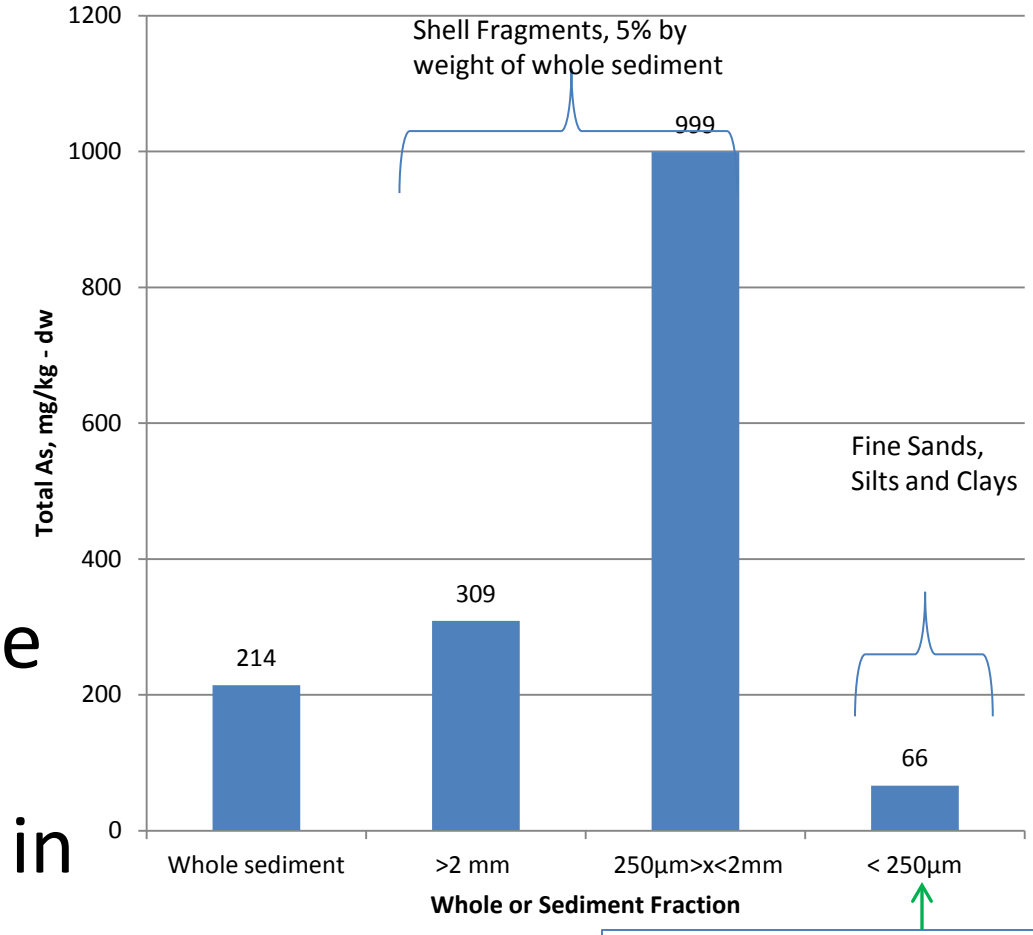
Experimental objective: half of the risk from seafood consumption arises from clam inorganic arsenic; so, lab studies asked:

1. Which is a more important exposure route: suspended material or sediment? (→If sediment, a better likelihood of remedial intervention.)
2. Is high inorganic arsenic a *Mya* pattern or a site-specific pattern? (→Is there something special going on in the LDW?)

Sediment Collections Sediment Fractions

Intertidal collections:

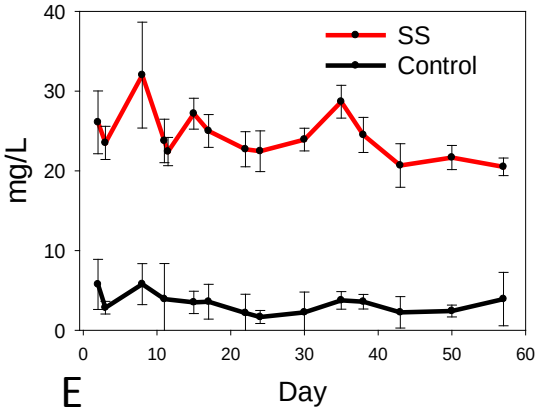
- North of Kellogg Island
- Slip 1
- ~60% inorganic arsenic in composite sample shown
- Bulk of arsenic was in shell fragments!



Used for suspended and bedded exposures

Exposure Methods

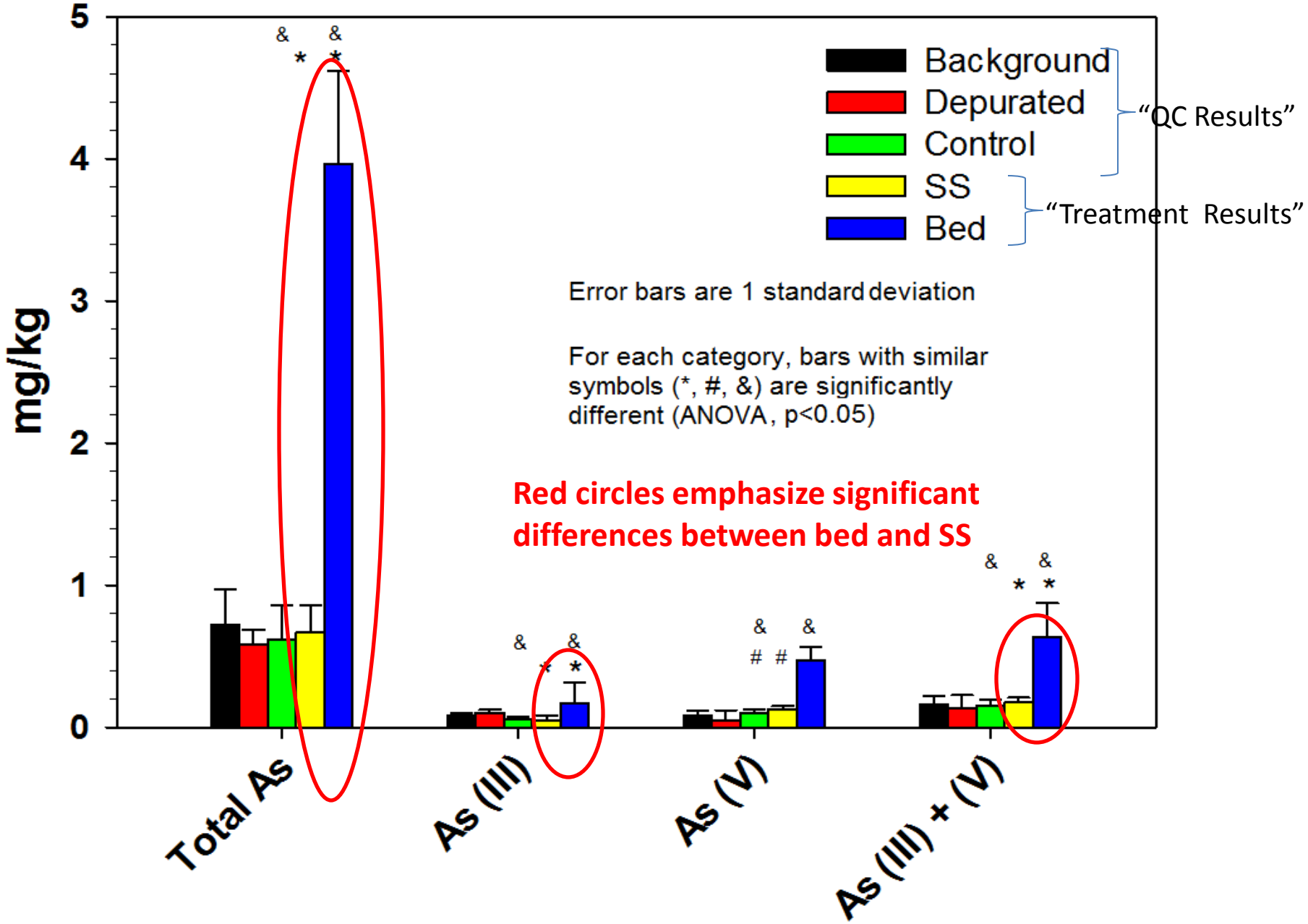
A – Depuration
B – Exposure to "BED"
C – Clam "sandwich"
D – Exposure to Suspended Solids (SS) @ 30 mg/L in FLEES*
E – SS and Control suspended sediment monitoring in FLEES



E

*Fish Larvae and Egg Exposure System (FLEES, Lutz et al. 2012): NTU measured by optical backscatter every 3 minutes

Tissue Results Comparison (mg/kg ww)



Comparison to RI Data Set

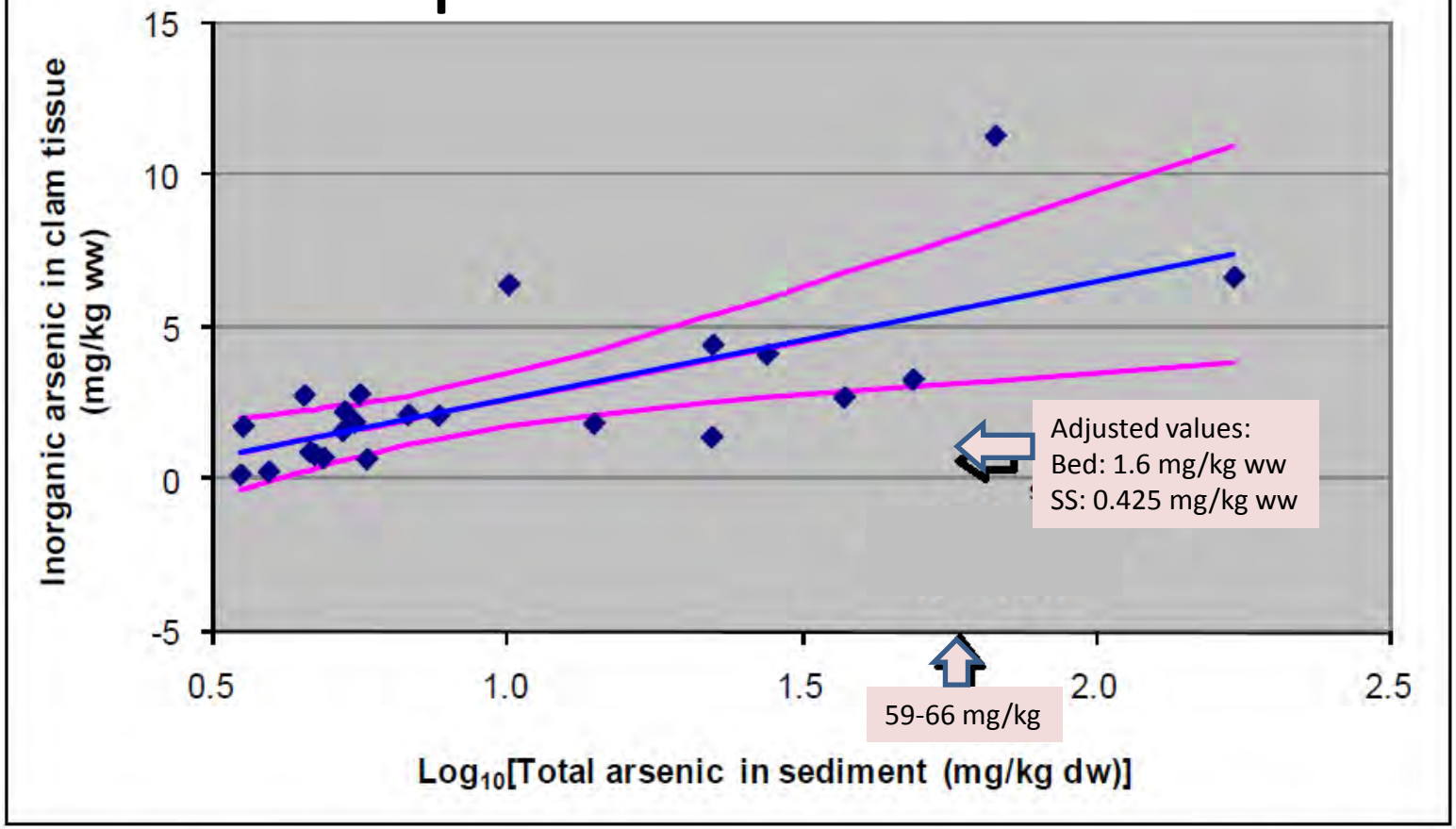


Figure 8-5. **Regression relationship for inorganic arsenic in clam tissue and total arsenic in sediment using 2004 and 2007 data**
(From RI Report)

- Arrows show the adjusted experimental results against the RI field results
- Results are below RI range for field collections

Answers to Lab Questions

- Sediment exposure was more important than suspended material in this experiment; suggests better sediment remediation effectiveness
- Compared to RI field collections, experimental clams had:
  - Similar percent inorganic As**:** *Mya* pattern not LDW alone
  - Less inorganic As: 60-day exposure period appears to be too short to achieve steady state
- Shell fragments hold majority of sediment As – Could this be why RI found poor sediment/tissue relationships?
- *Next steps?* Additional field- based RARE proposal underway and may include in-situ treatment

Further Reading

- CH_2M-Hill. 2014 (Feb). 2013 Salt Chuck Mine Superfund Site Field Data Report - Prince of Wales Island, Alaska. http://www.epa.gov/region10/pdf/sites/salt_chuck_mine/scm_2013_field_data_report_24Feb2014.pdf
- Hatje, V, SM Macedo, RM de Jesus, G Cotrim, KS Garcia, AF de Queiroz, SLC Ferreira. 2010. Inorganic Arsenic Speciation and Bioavailability in Estuarine Sediments of Todos os Santos Bay, BA, Brazil. Marine Poll Bull 60: 2225-2232
- Lutz, CH, DG Clarke, BC Suedel. 2012. A Fish Larvae and Egg Exposure System (FLEES) for Evaluating the Effects of Suspended Sediments on Aquatic Life. ERDC TN-DOER-E32

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PROTECTING FISH CONSUMERS IN EPA'S SUPERFUND CLEANUP

Rebecca Chu, Remedial Project Manager, U.S. EPA

A CLEANUP GOAL FOR HUMAN HEALTH

- *Unacceptable risks exists associated with consuming contaminated fish and shellfish:*
  - *Resident fish: live within Duwamish for entire life;*
  - *Salmon are the healthier choice.*

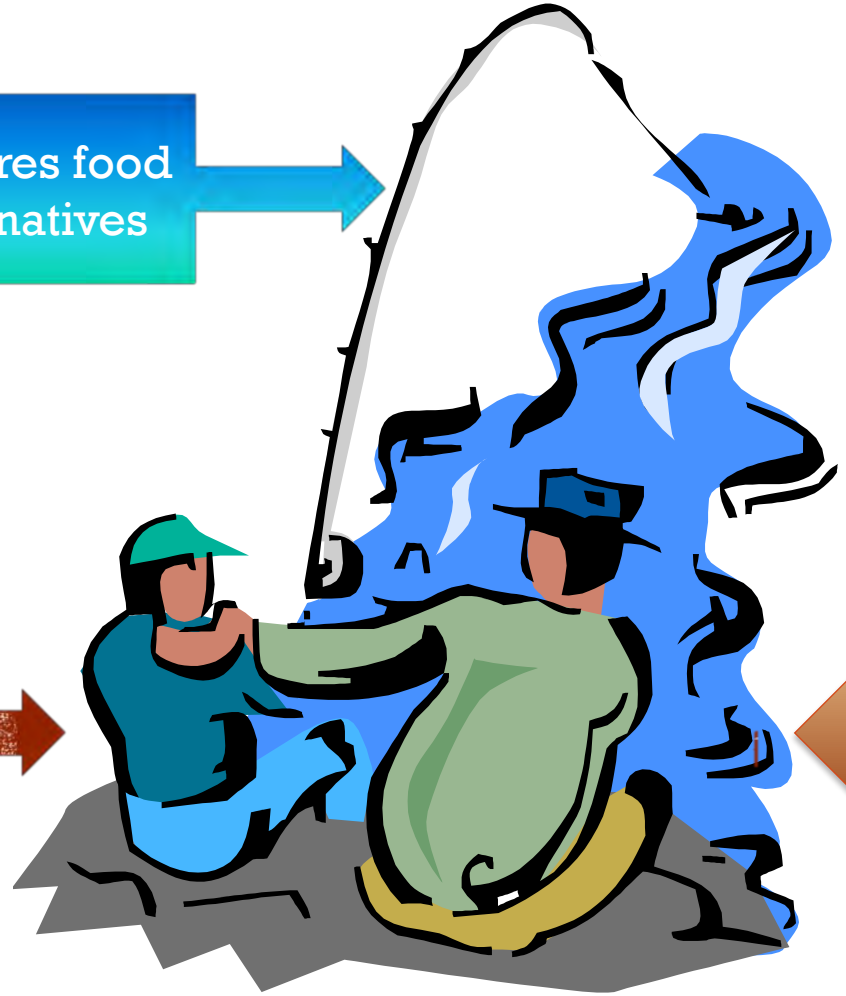
- *We want to reduce these risks!*

DUWAMISH: A HOME AND RESOURCE

FISHERS + CONTAMINANTS = ADVISORIES

Do Advisories Work?

WHY DON'T ADVISORIES WORK?



Requires food alternatives

Cultural Component

Consumer responsible for addressing risk

WHY PEOPLE FISH LDW:

What I do for fun, exercise, relax, food

For survival. I fish all of my life from generation to generation.

Family tradition. For food.

Hang out with friends, feed family and thrill of fighting fish

People fish for sport. They like to consume fish because it is healthier then meat. To share with family and friends

Eat fresh fish free. I cook fish for my whole family

Like to catch catfish, carp, perch crab.

Affected groups must be involved as partners or co-managers at every point in the risk communication process. ***This is the single most important lesson that EPA and other agencies should take away from this discussion of effective fish consumption advisories.*** *(p. 109)*

November 2002 (revised)

FISH CONSUMPTION AND ENVIRONMENTAL JUSTICE

A Report developed from the National Environmental Justice Advisory Council Meeting of December 3-6, 2001

A Federal Advisory Committee to the U.S. Environmental Protection Agency

HOW DO WE INCLUDE THE COMMUNITY?

SOUNDS GOOD- LET'S DO IT!

Legally Bound By Order

Lower Duwamish Waterway Group

Tribes

Washington Department of Health

E.P.A.

Washington Dept. of Ecology

Seattle King County Public Health

DRCC/TAG (EPA's CAG)

COMMUNITY BASED PARTICIPATORY RESEARCH

Who Is Most At Risk?

Highest Risk: Women of child bearing age, pregnant women and children

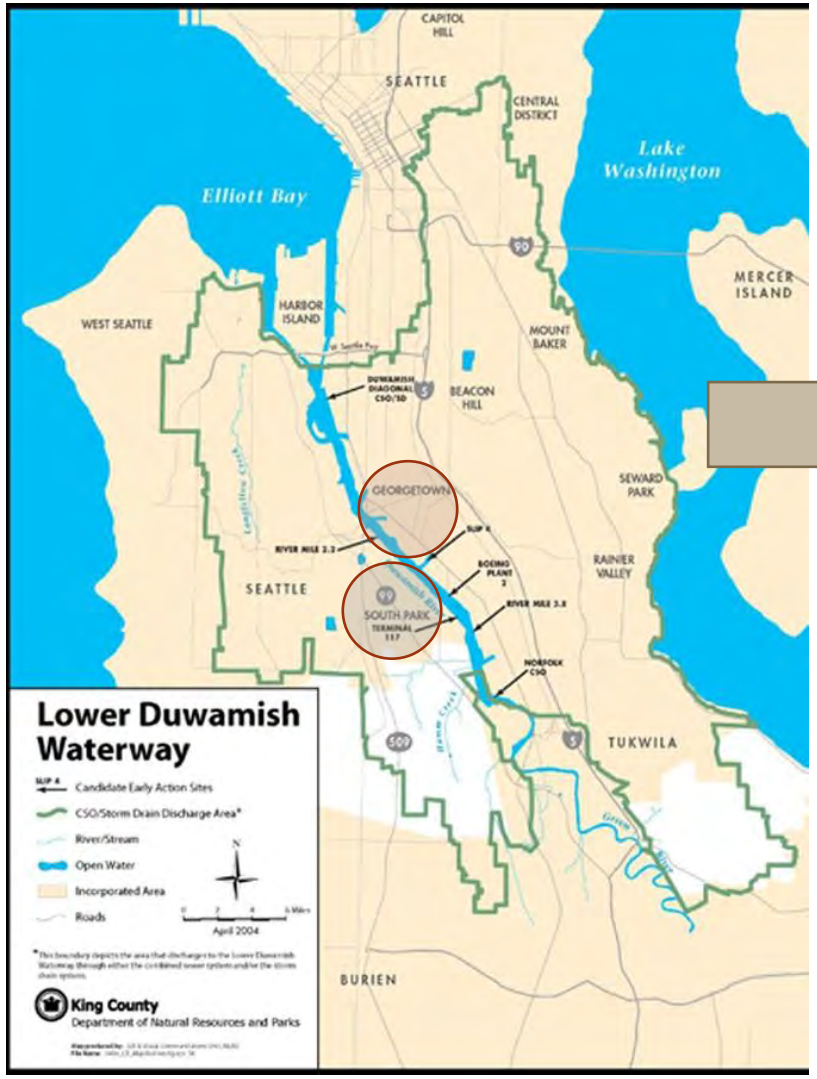
Historically: Fisher

≠

Intended Audience

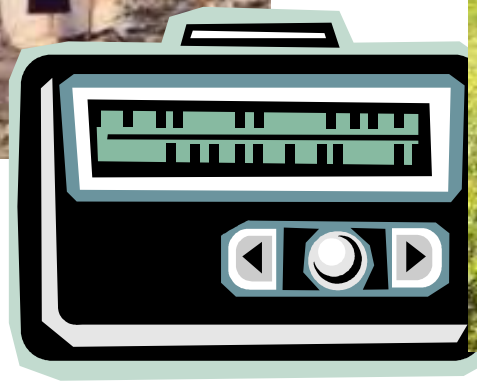
Lower Duwamish Waterway
CAPITOL HILL
SEATTLE
CENTRAL DISTRICT
Elliott Bay
MERCER ISLAND
WEST SEATTLE
HARBOR ISLAND
MOUNT BAKER
BEACON HILL
GEORGETOWN
SEWARD PARK
RAINIER
SEATTLE
SOUTH PARK
TUKWILA

“Community”

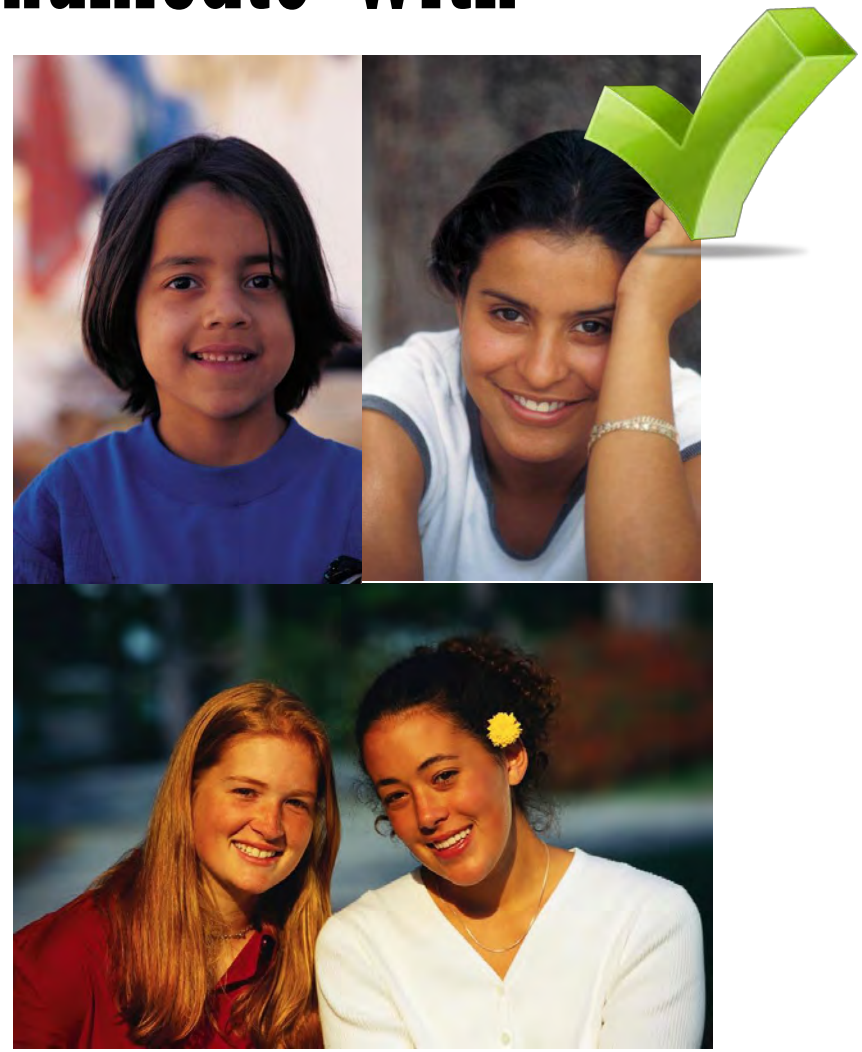


“Community”

How you communicate (within a culture)



Who you communicate with



GETTING AND MAINTAINING INVOLVEMENT

Life: one more thing!

HARD- BUT BROADER APPLICATIONS

What's Next?

Finalize Implementation Plan

Pilot Project

Initiate Study

Lower Duwamish Waterway Source Control

TOXICS CLEANUP PROGRAM

NORTHWEST REGIONAL OFFICE

Dan Cargill

April 15, 2014

PRESENTATION OVERVIEW

- Cleanup & Inspections
- Source Control Studies
- Coming Attractions

Site Cleanup & Inspections: Site Cleanups

Ecology

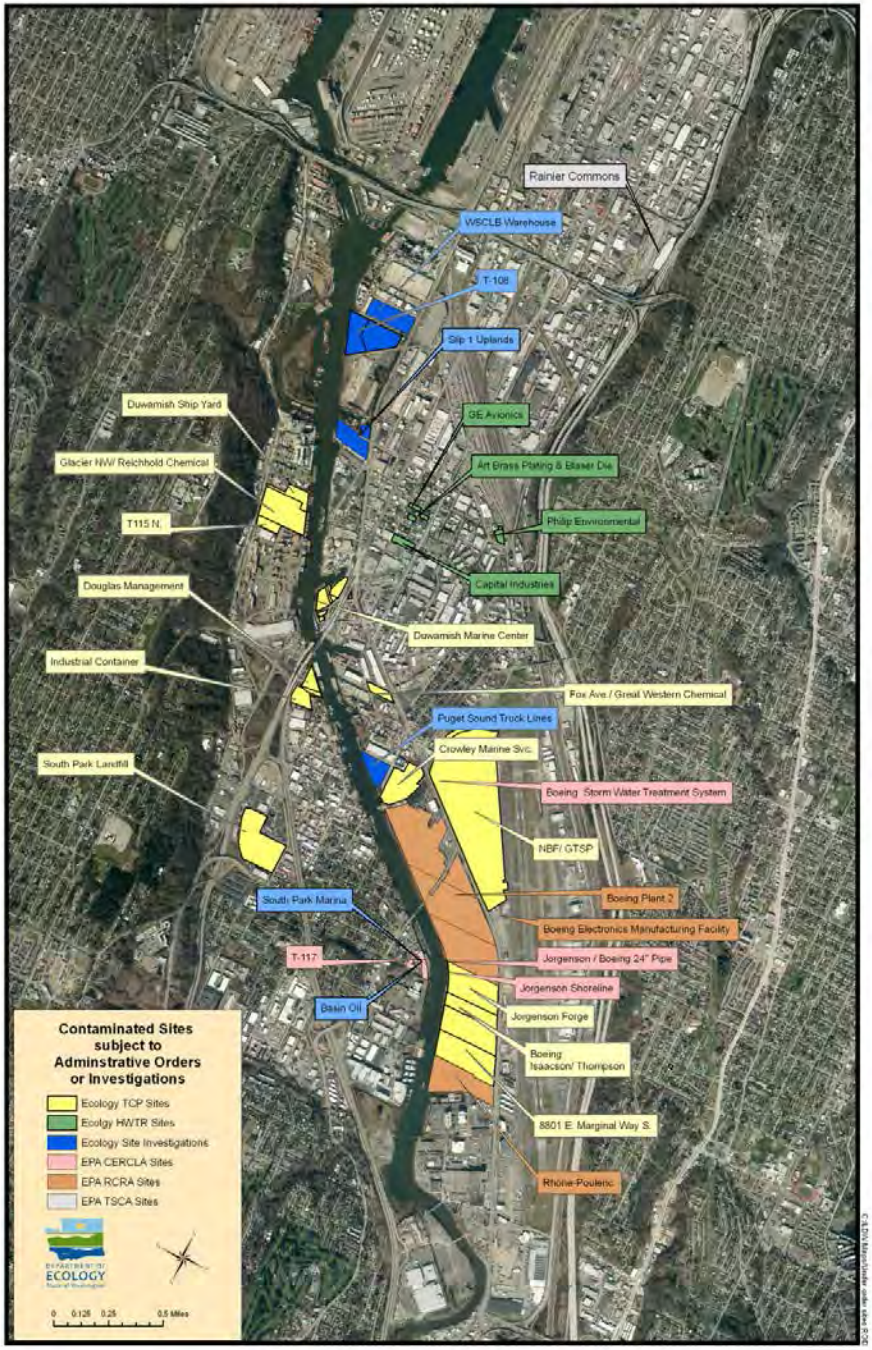
18 facilities with Agreed Orders
- 13 in Toxics Cleanup Program
- 5 in Hazardous Waste Program

6 site investigations

4 voluntary cleanup program sites

EPA

6 facilities with CERCLA, RCRA or TSCA orders



Site Cleanup & Inspections
Compliance Assurance

Business Inspections - 2013

- **Seattle – 284** inspections at **177** businesses
- **Ecology Urban Waters – 207** Inspections at **176** businesses
- **King County - 15** Inspections at **12** businesses
- Level III stormwater treatment
- Engineering design reviews

"Source control is like laundry. It is never finished." *(Kris Flint, USEPA, retired)*

PRESENTATION OVERVIEW

- Cleanup & Inspections
- Source Control Studies
- Coming Attractions

Source Control Studies
Air Deposition

First look at air deposition as a source

Goals:

- Catalogue stationary air sources
- Identify Sources of Chemicals of Potential Concern
- Compare contributions from stationary vs. mobile sources
- Literature review of local and national studies

Source Control Studies
Air Deposition

Report Conclusions:

- **Differences in reporting methodologies for air emission inventories made comparisons between sources, and between emissions and loadings difficult.**
- **Local sources contribute a significant portion of contaminant loadings to the LDW for:**
  - arsenic
  - cPAHs
  - PCBs
- **Background and regional sources contribute most of the contaminant loadings for:**
  - dioxins/furans
  - mercury

Source Control Studies
Stormwater Pollution Prevention Plans & Outfall Inventory

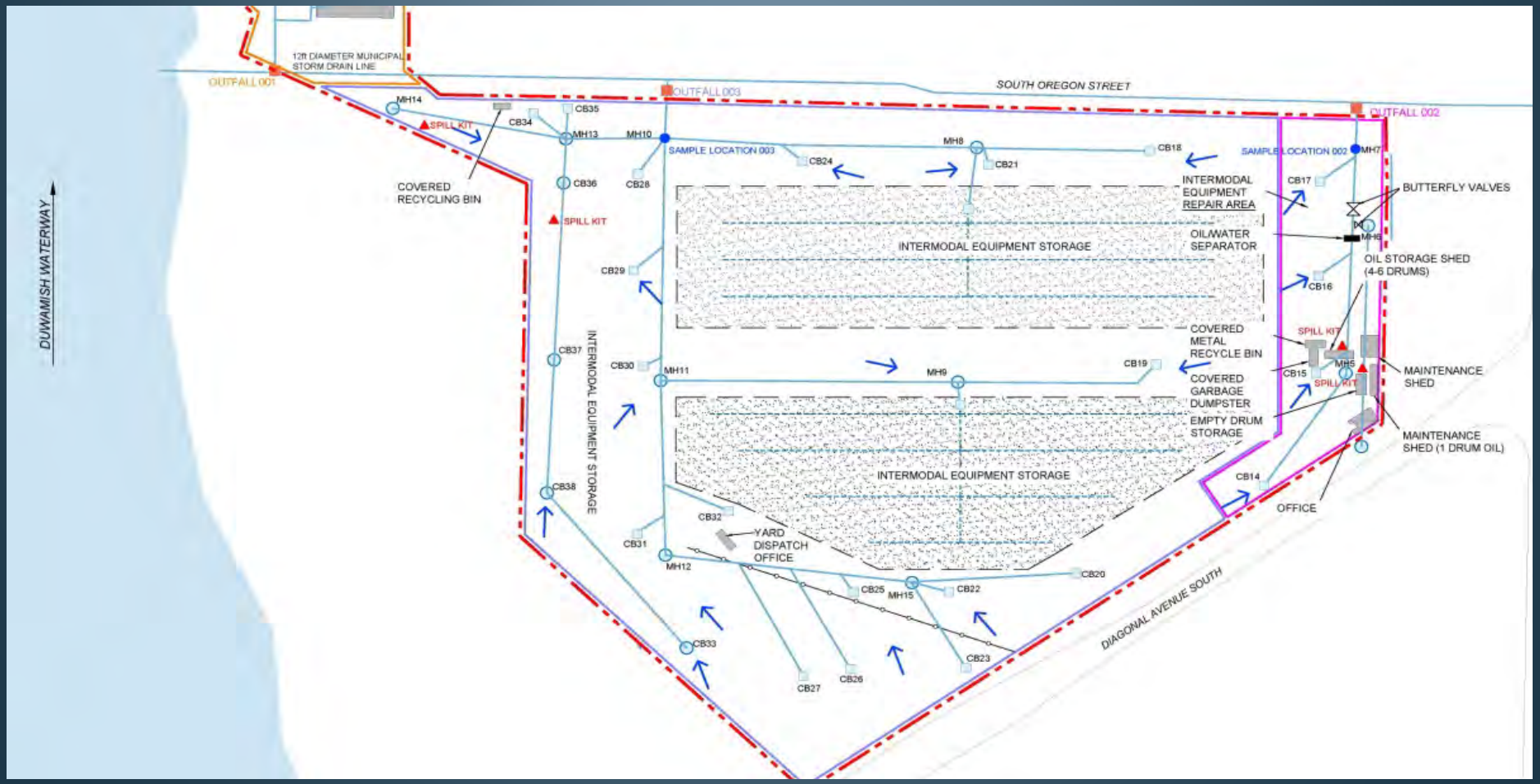
Goal: **Match NPDES discharges to specific outfalls**

Results:

- All NPDES discharges can be linked to a specific outfall
- Previously undocumented outfalls identified
- 104 SWPPPs updated or created
- Improve ISGP implementation

Source Control Studies

Stormwater Pollution Prevention Plans & Outfall Inventory



Source Control Studies
Stormwater Pollution Prevention Plans & Outfall Inventory

Results:

- Herrera 2003 outfall survey & LDW RI Appendix H
- 285 outfall/discharge locations
- National Pollutant Discharge Elimination System permits
- Sediment samples collected in proximity
- Stormwater and storm drain solids samples

Glacier Northwest Inc
8132
8133
8134
8135
2149
2148
2150
2233
2232
2156
2151
HRE-1
2154
DUWAMISH AVE S
ConGlobal Industries
S NEVADA ST
S Nevada St SD
EAST MARGINAL WAY S
RockTenn CP LLC Seattle
Union Pacific Railroad Co Dawson St
General Recycling Or Washington LLC
2146
2147
2145
2144
2157
Cleanscapes MRF
Evergreen Trails Inc
Siphon-West CSO
2155
2153
ConGlobal Industries
2140
2142
2141
2226
2143
Evergreen Trails
2002
2225
DIAGONAL AVE S
T107 Park
2003
2006
FedCtrS
16TH AVE SW
15TH AVE SW
Fog Tile Inc.
PUGET BLVD SW
2005
2004
2246
2247
5000
5001
2245
WEST MARGINAL WAY SW
2139
2138
Lafarge 003
Lafarge 004
2244
2223
Lafarge Corporation
Lafarge 005
Chemithon Corp
2007
2008
5002
5003
2137
5004
5005
2009
Alaska Marine Lines Seattle Terminal
Saint Gobain Containers LLC
Outfall Location
Active or Presumed
Inactive or Presumed Inactive
Abandoned
Unknown
Utility Lines
Storm Drain Line
Combined Sewer Line
Ditch or Trench
Building
Parcel
NPDES Permitted Facility
0 200 400 800 Feet
Glacier Northwest Inc
8132
8133
8134
8135
2149
2148
2150
2233

Source Control Studies: Industrial Facilities Stormwater Characterization Study

Goal: Additional characterization of stormwater quality (expanded parameters - LDW COCs)

Method:

- Used NPDES authority for site access and TCP contractor for data collection
- Inspected and sampled 11 facilities in 2013

Source Control Studies: Industrial Facilities Stormwater Characterization Study

Results:

- Preliminary review shows many LDW COCs have been found above screening levels
- Basis for additional monitoring requirements and probably individual permits

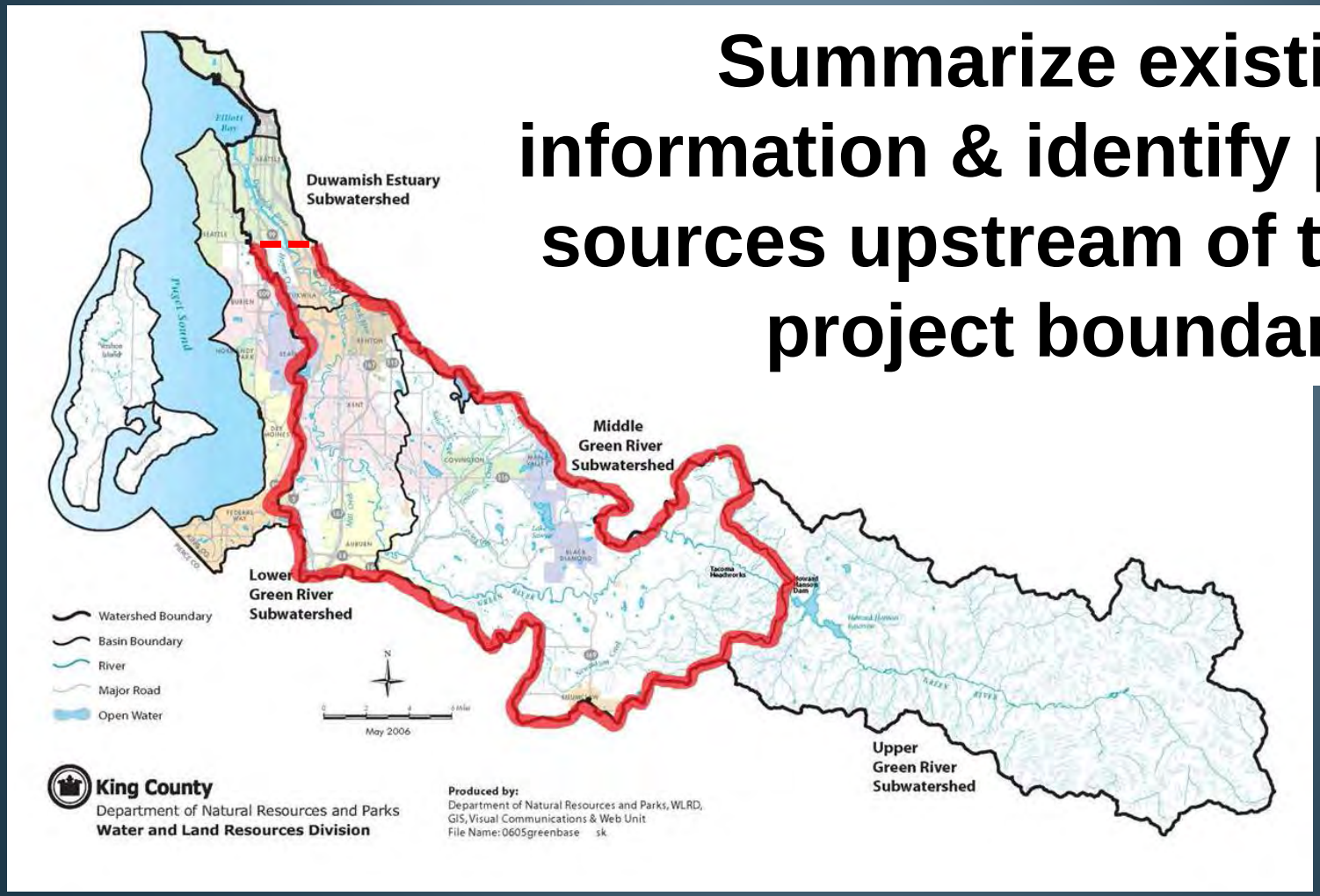
Next Steps:

- Sampling in 2014

Source Control Studies

Green-Duwamish River Scoping Study

Summarize existing information & identify potential sources upstream of the LDW project boundary



Source Control Studies
Green-Duwamish River Scoping Study

- **Plot**
  - Contaminated sites, hazardous waste generators, NPDES permittees, air permits
  - Available sediment data
- **Map**
  - All storm drains and discharge locations for 14 municipalities & WSDOT

Source Control Studies
Green-Duwamish River Scoping Study

Results: Draft in late April

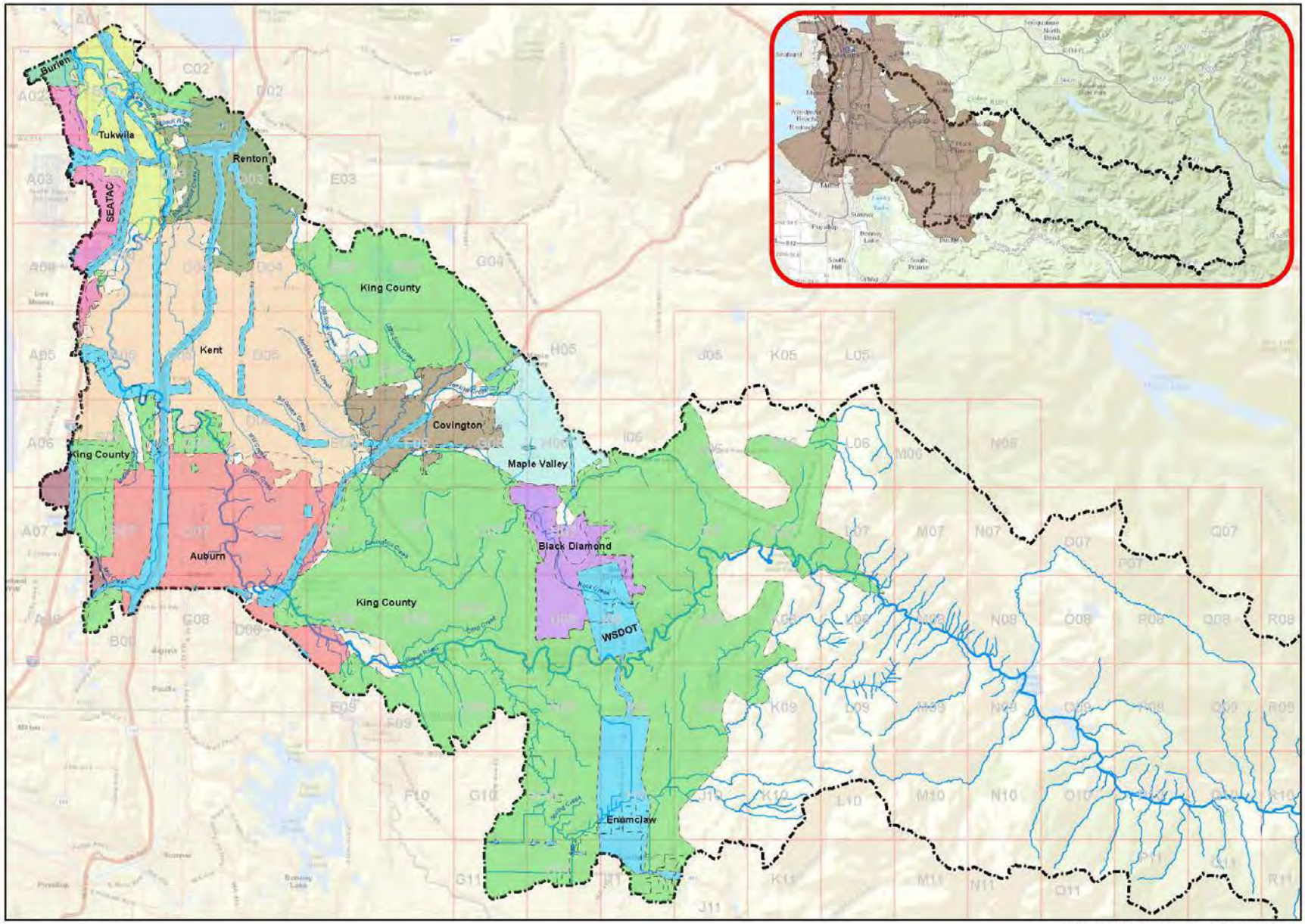
- Compiled Green River sediment and water data
- Catalogued ~2,500 facilities (57 contaminated sites)
- Identified localized contamination in Kent Valley
- First watershed-scale municipal storm drain systems map

MS4 GIS Database Coverage

GIS Data Source

- Enumclaw
- WSDOT
- Tukwila
- Auburn
- Black Diamond
- Burien
- Covington
- Des Moines
- Federal Way
- Kent
- King County
- Maple Valley
- Renton
- Seatac
- Seattle
- Data Overlap

Study_Area



0 0.5 1 Miles

1 inch = 12,000 feet

Source Control Studies Green-Duwamish River Loading Study

Goal

Quantify concentrations and instantaneous loadings of toxic chemicals from the Green River

Source Control Studies
Green-Duwamish River Loading Study

Monitoring Approach

- Whole water, suspended sediment, sediment samples
- Measure discharge and suspended sediment concentration
- Sample during a range of flow and turbidity conditions
- Analyze for suite of analytes, including metals, PAHs, PCBs, and Dioxins/Furans

Source Control Studies
Green-Duwamish River Loading Study

Preliminary Results

- **Metals, PAHs, PCBs, and D/Fs always detected on suspended sediment and bed sediment**
- **Metals, PCBs, and D/Fs (not PAHs) detected in water**
  - More compounds detected during storm
  - Concentrations up to 3.5X higher (PCBs)
- **Instantaneous Loadings**
  - Peak precipitation events

Source Control Studies
Green-Duwamish River Loading Study

Future Research

- Capture fall/early winter storms, seasonal variability
- Estimate annual chemical loading
- Compare to other Puget Sound river systems (i.e. Puyallup)

Source Control Studies: Cement Kiln Dust

Goal:

- Identify locations of cement kiln dust in the LDW
- Map areas of known cement kiln dust fill
- Note any information on leachate, groundwater plumes, seeps
- **What are potential pathways to LDW?**

Source Control Studies: Sediment Trap Pilot Study

Goal:

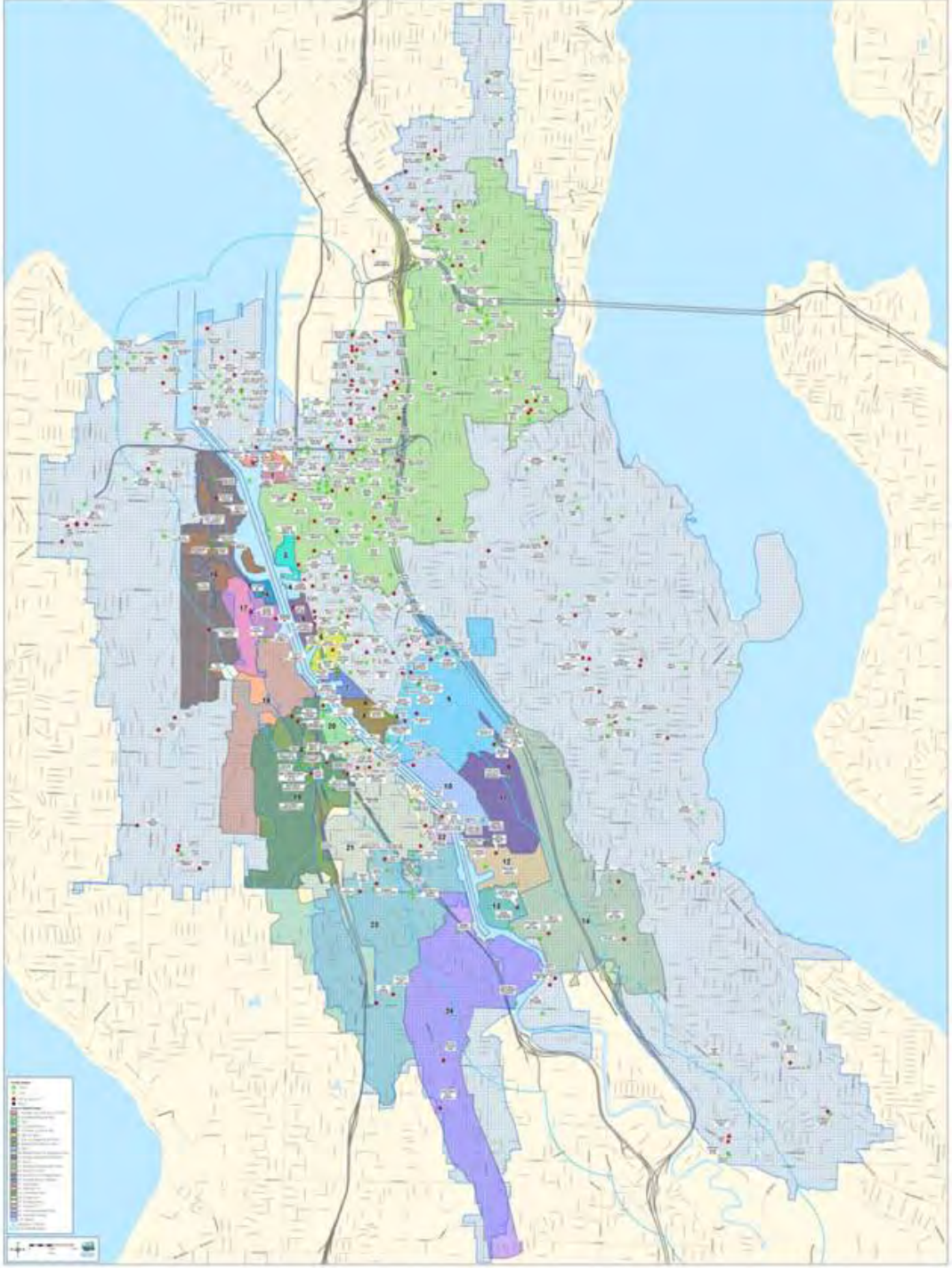
- Build an in-line sediment trap that:
  - Collects solids in less time than current design
  - Can be scaled down to fit pipes smaller than 24-inches in diameter

Status: Two models - testing in summer 2014

Source Control Studies:
Site Hazard Assessments

Goal:

- Conduct Site Hazard Assessments
  - Over 200 confirmed or suspected contaminated sites in the LDW project area have never been ranked
  - Some listed sites unranked since 1988
  - **Sites with significant contamination will be considered for MTCA Agreed Orders**



Source Control Studies: Site Hazard Assessments

PRESENTATION OVERVIEW

- Cleanup & Inspections
- Source Control Studies
- Coming Attractions

Industrial General Stormwater Permit Reissue

Existing permit expires January 1, 2015

Special requirements for discharges to:

- Waterbodies listed as impaired for sediment contaminants
- Contaminated sediment sites undergoing cleanup activities

http://www.ecy.wa.gov/programs/wq/stormwater/industrial/index.html

Industrial General Stormwater Permit Reissue

Upcoming Public Involvement

End of April

Public Comment Period

Draft available for public comment

May 29

Public Workshop & Hearing

1 PM - South Seattle Community College (Georgetown)

6736 Corson Ave S.

Proposed Green-Duwamish Watershed Pollutant Loading Assessment

Goal:

Watershed-wide pollutant loading assessment to guide near and long-term source control planning

Method:

Joint Ecology-EPA water and cleanup programs' project

Proposed Green-Duwamish Watershed Pollutant Loading Assessment

Results:

- Watershed and lateral LDW loading
- Food chain and air (build-up/wash off) assessments
- Correlated water, tissue & sediment concentrations
- Framework for making measurable progress in attaining surface water quality standards

Lower Duwamish Regional Background Study

- **2014**
  - Conduct outreach with stakeholders and tribes to inform development of the draft sampling and analysis plan (SAP)
- **2015**
  - Develop draft SAP
  - Draft available for review and comment
  - Technical workshops to discuss comments
  - Final SAP date subject to comments & complexity
- **Field work & Data Evaluation Report - TBD**

Contact Chance Asher (360) 407-6914 Chance.Asher@ecy.wa.gov

Preparation for Sediment Cleanup

- Assessing source control work load in preparation for sediment cleanup
- **Current Ecology resources are not adequate**
- Additional staff and funding will be necessary to complete source control work in time to meet cleanup schedule

5 Year Workload

- CERCLA Cleanup - Coordination with EPA
- Proposed Plan and Source Control Strategy Comment Responses
- Source Control sufficiency development and evaluation
- Ecology Source Control Strategy and Implementation Plan
- Source control work with municipalities
- Control of industrial stormwater discharges
- Source action item list (SCAP list items)
- MTCA LDW cleanup sites – current and future
- Public involvement
- Site and issue investigations
- Project administration and planning
- WQ Assessment Coordination

5 Year Workload: FTE Required

Current FTEs	Required FTEs
8.5*	16.5

Lower Duwamish Waterway web page

http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/lower_duwamish_hp.html

QUESTIONS?

Update of King County Source Control Related Studies

April 15, 2014
LDW Stakeholder Briefing

by Debra Williston

King County

Final Reports

- Lower Duwamish Waterway Source Control: Bulk Atmospheric Deposition Study Final Data Report
- Sediment Quality in the Green River Watershed
- Lower Duwamish Waterway Source Control: Green River Watershed Surface Water Data Report

http://www.kingcounty.gov/environment/wastewater/Duwamish-waterway/PreventingPollution/PollutionSources.aspx

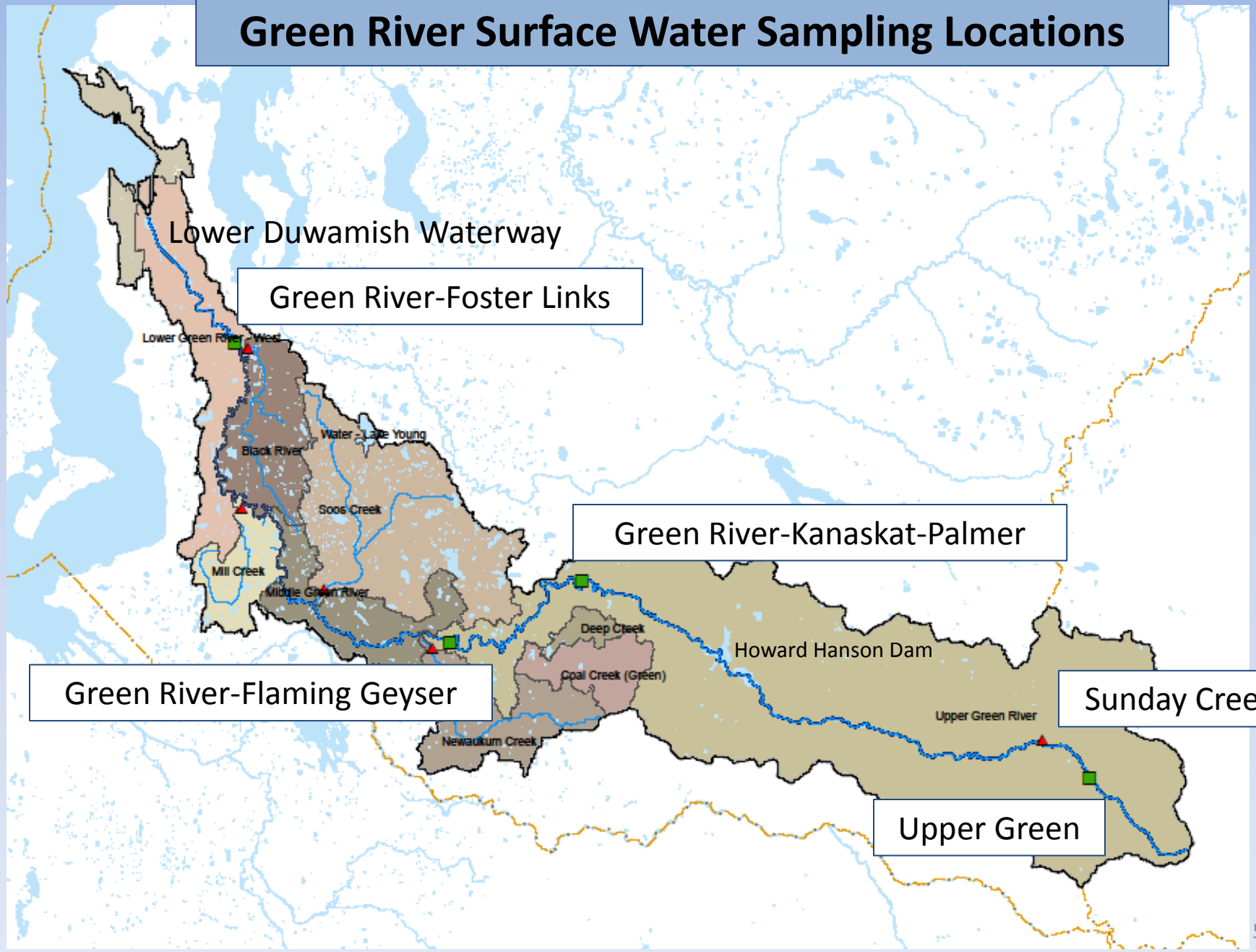
Bulk Air Deposition in Duwamish Watershed

- Additional sampling in 2013
- Sampling Stations
  - Georgetown
  - Beacon Hill
  - Duwamish
  - South Park
- Draft Report 2014

Green River Water Sampling

- Additional Sampling in 2013 and 2014
- Sample Locations
  - Kanaskat-Palmer State Park: further upstream of Flaming Geyser but below Howard Hansen Dam
  - Upper Green River: two locations ~20 miles upstream of Howard Hansen Dam
- Draft Report in 2014

Green River Surface Water Sampling Locations



Green River Basin Suspended Solids Study

- Samples collected in 2013 and continuing in 2014
- Sample Locations
  - Green River at Flaming Geyser and Foster Links Golf Course
  - Soos, Newaukum and Mill creeks
  - Black River Pump Station
- Data Report early 2015

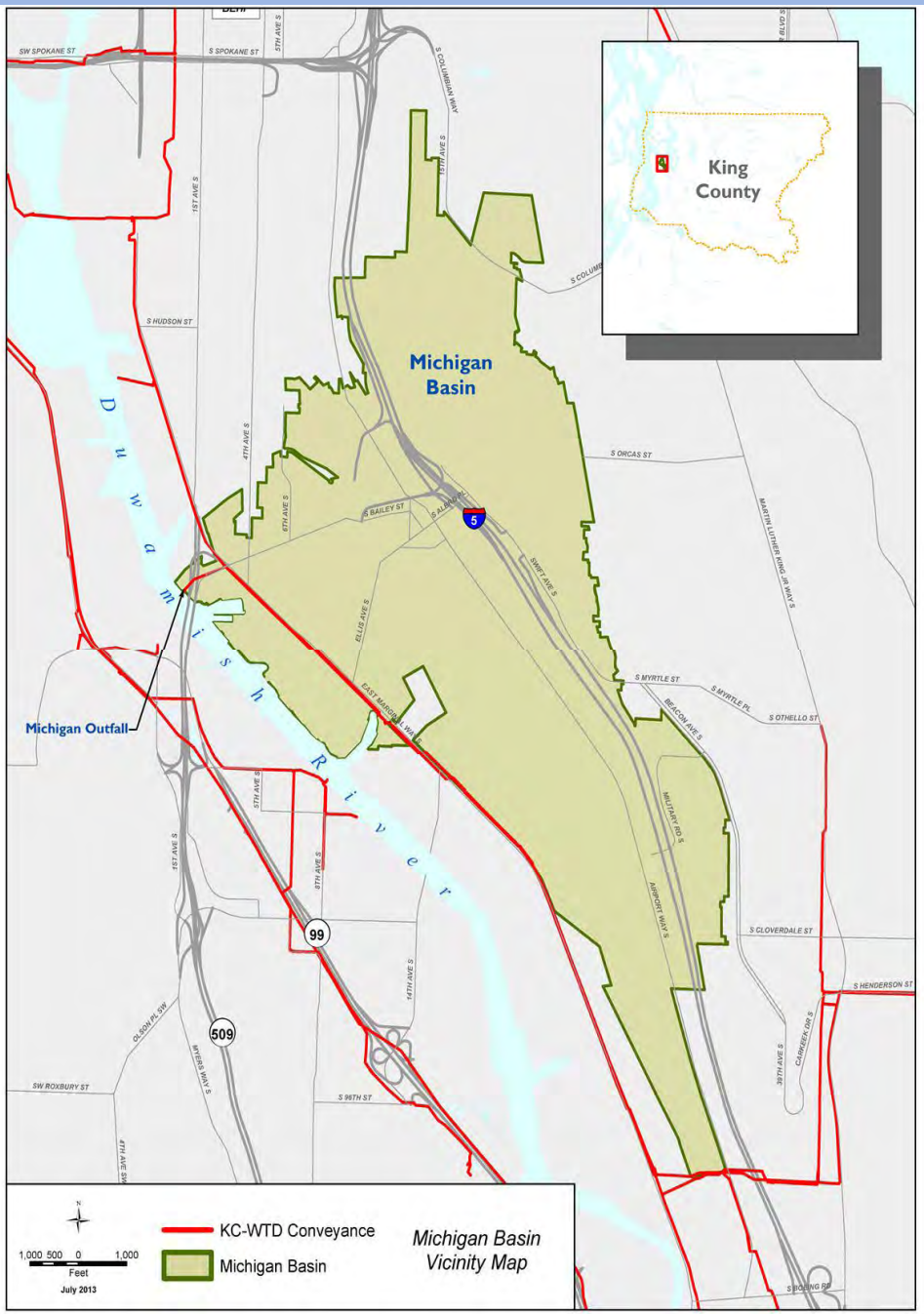
CSO Basin Study

- Objective:
  - to evaluate chemical input apportionment between sanitary/wastewater (dry baseflow), stormwater (storm) and infiltration/inflow (wet baseflow)
- Brandon CSO Basin:
  - three sample locations (mix of industrial & commercial)
  - sample collection and analysis complete
  - data analysis phase

CSO Basin Study

- Michigan CSO Basin:
  - three sample locations
    - east of I-5 representing largely residential land use
    - west of I-5 representing a mix of industrial/commercial/residential land uses
  - samples collected in 2013 and continuing in 2014
- CSO Basin Data Report 2015

Michigan CSO Basin



Presentations

- 2014 Salish Sea Conference
  - Sources of PCBs in the Green/Duwamish Watershed
  - April 30 AM session