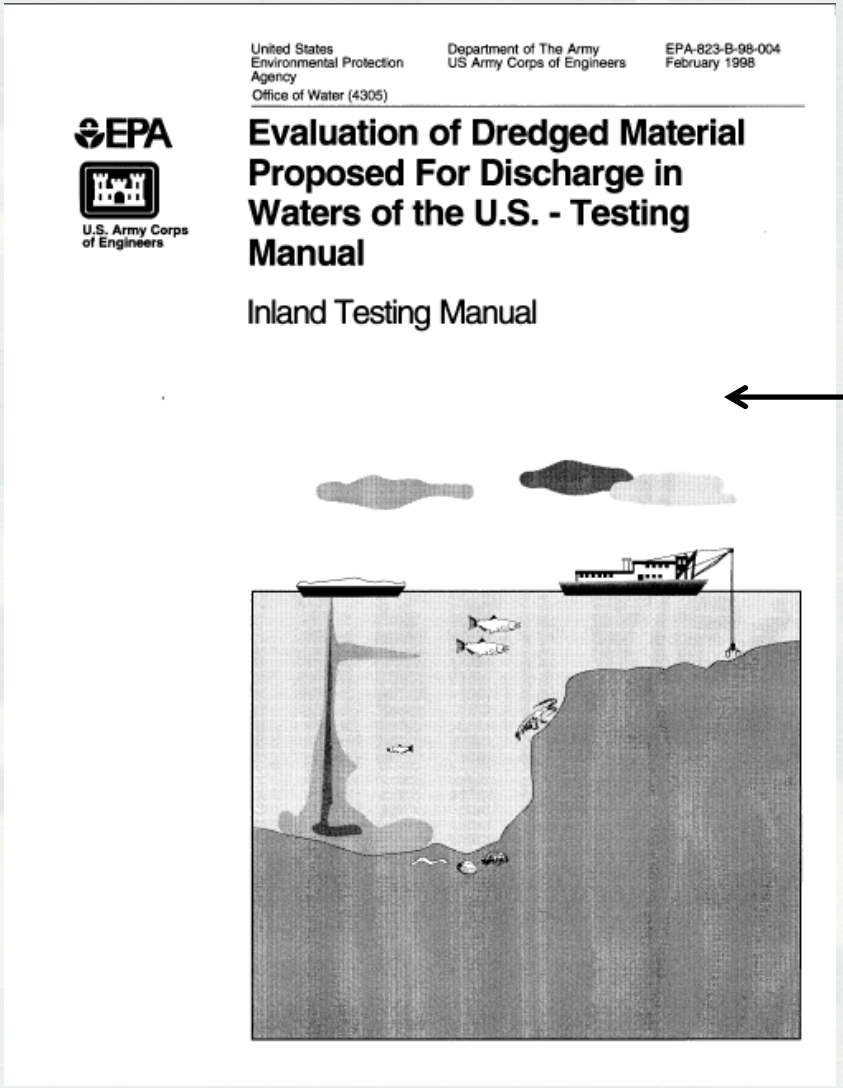
Testing Dredged Material and Disposal Options

1. Background on sediment testing requirements and details on Searsport sediment testing and comparisons with other sites
2. Overlap of this project with the mercury contamination in the bay
3. Background on the selection of a disposal site for the proposed project

What type of sediment testing is required by law for dredged material disposal in Penobscot Bay?



United States Environmental Protection Agency
Office of Water (4305)

Department of The Army
US Army Corps of Engineers

EPA-823-B-98-004
February 1998

EPA

U.S. Army Corps of Engineers

Evaluation of Dredged Material Proposed For Discharge in Waters of the U.S. - Testing Manual

Inland Testing Manual

- testing must provide data to allow assessment of compliance with Section 404(b)(1) of the Clean Water Act
- National guidance manual
- Regional guidance manual provides New England specific information

• guidance provides details on a tiered testing approach

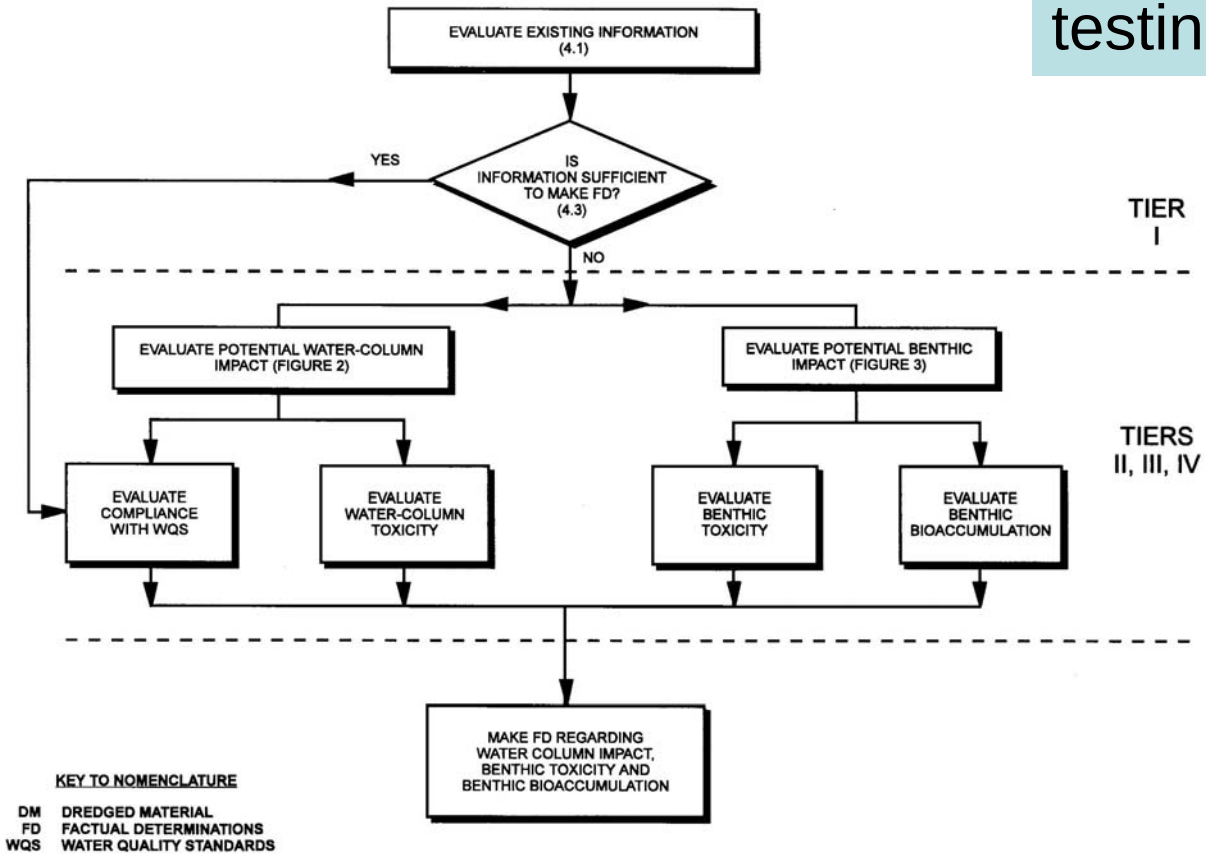


Figure 3-1. Simplified Overview of Tiered Approach to Evaluating Potential Impact of Aquatic Disposal of Dredged Material.

…and more detail

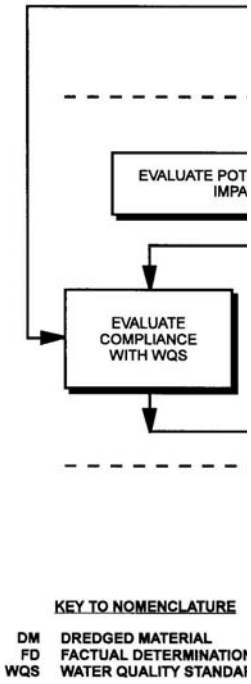


Figure 3-1. Simplified Overvi

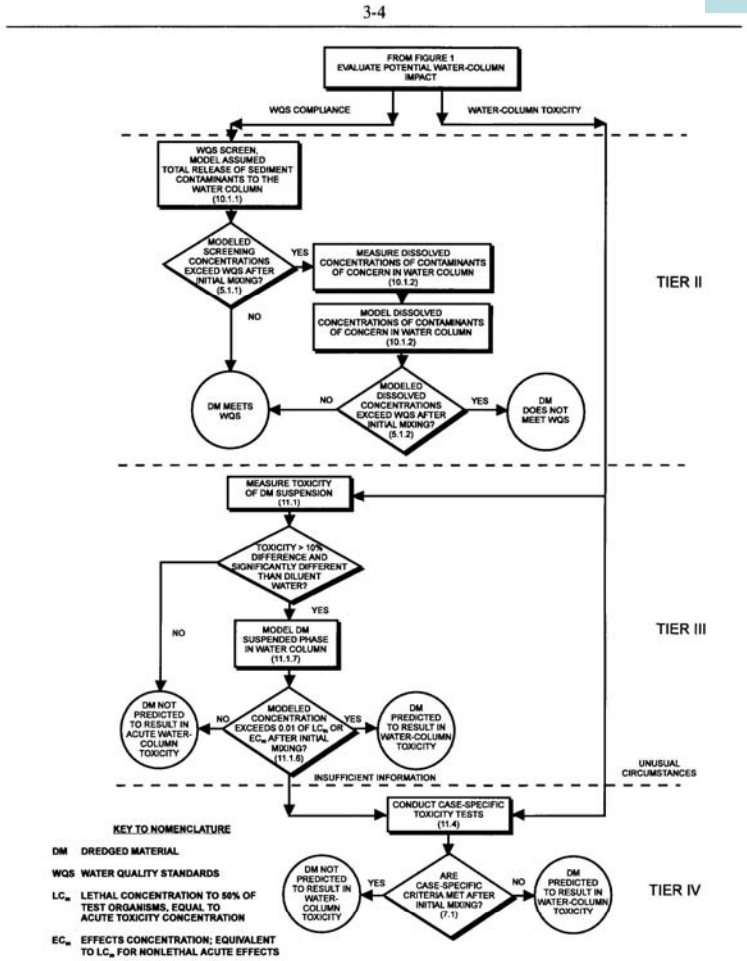


Figure 3-2. Illustration of Tiered Approach to Evaluating Potential Water Column Impacts of Dredged Material.

…and more detail

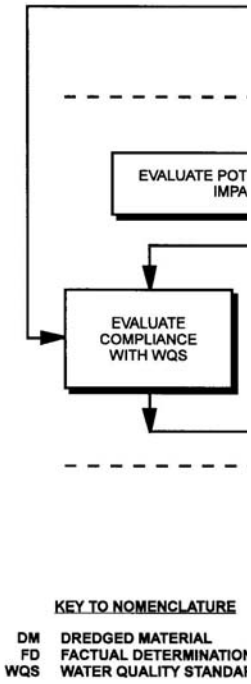


Figure 3-1. Simplified Overvi

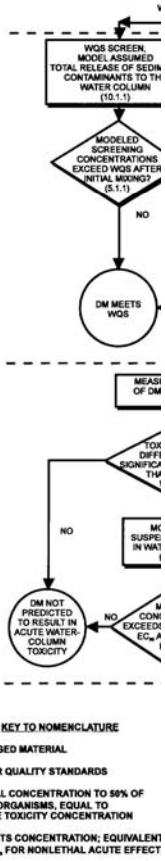


Figure 3-2. Illustration of Tiered A
Material.

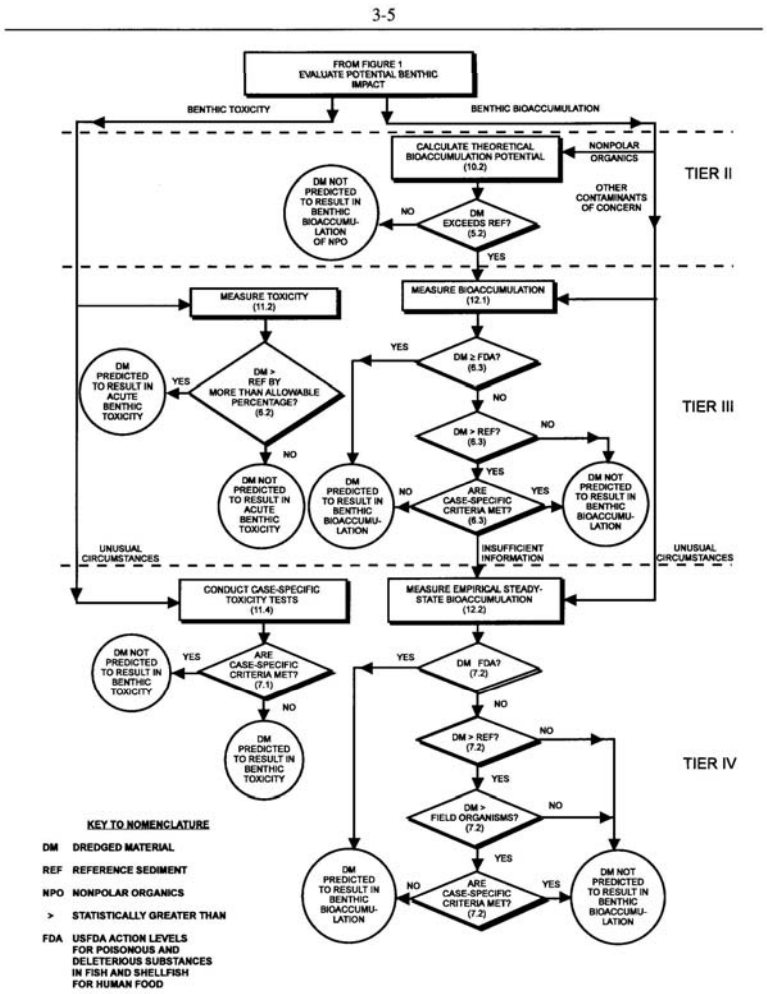
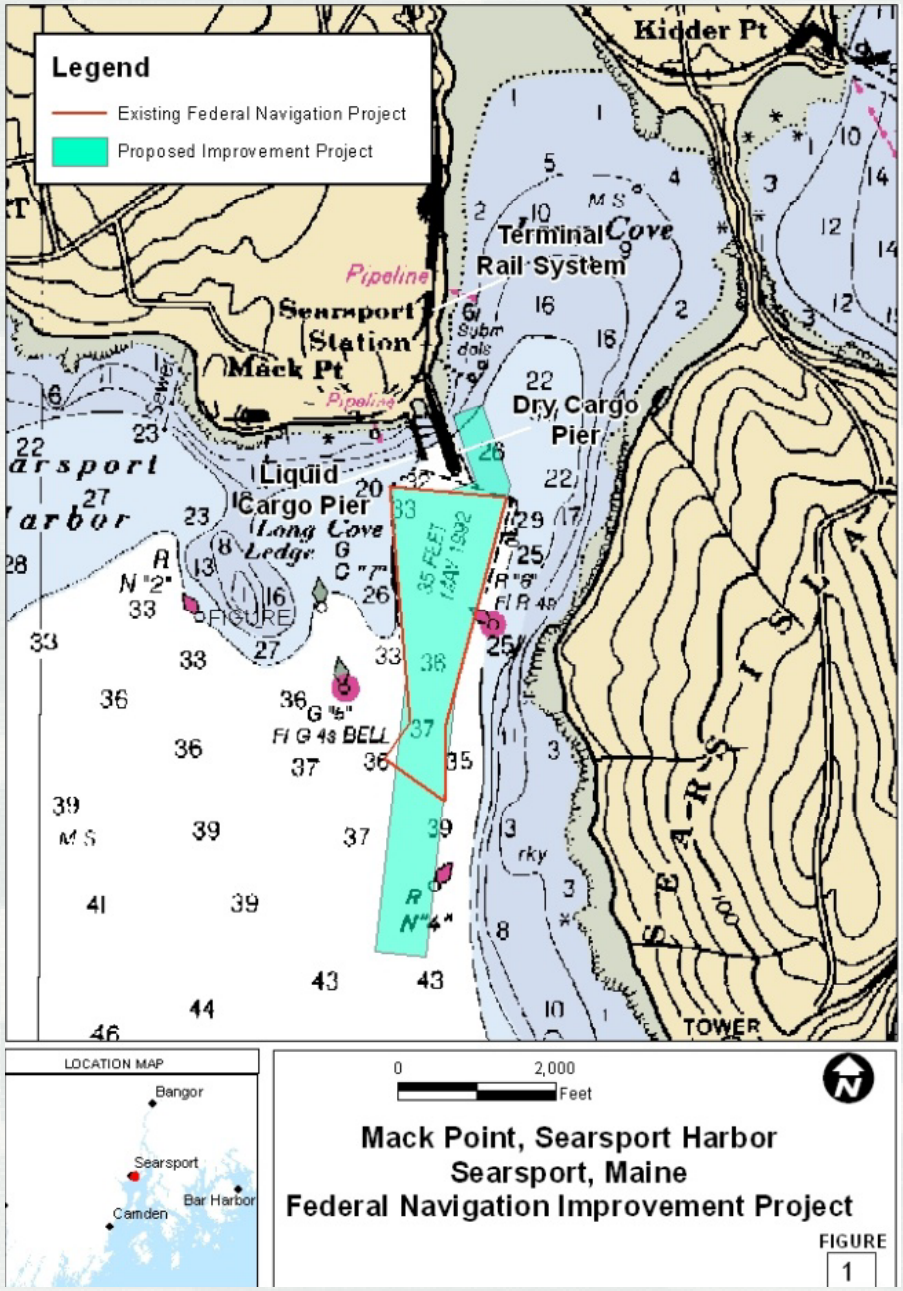


Figure 3-3. Illustration of Tiered Approach to Evaluating Potential Benthic Impacts of Deposited Dredged Material.



Step 1 – gather existing information

- map horizontal and vertical boundaries of proposed project
- map surrounding depths and currents
- record of previous dredging

Step 1 – gather existing information (continued)

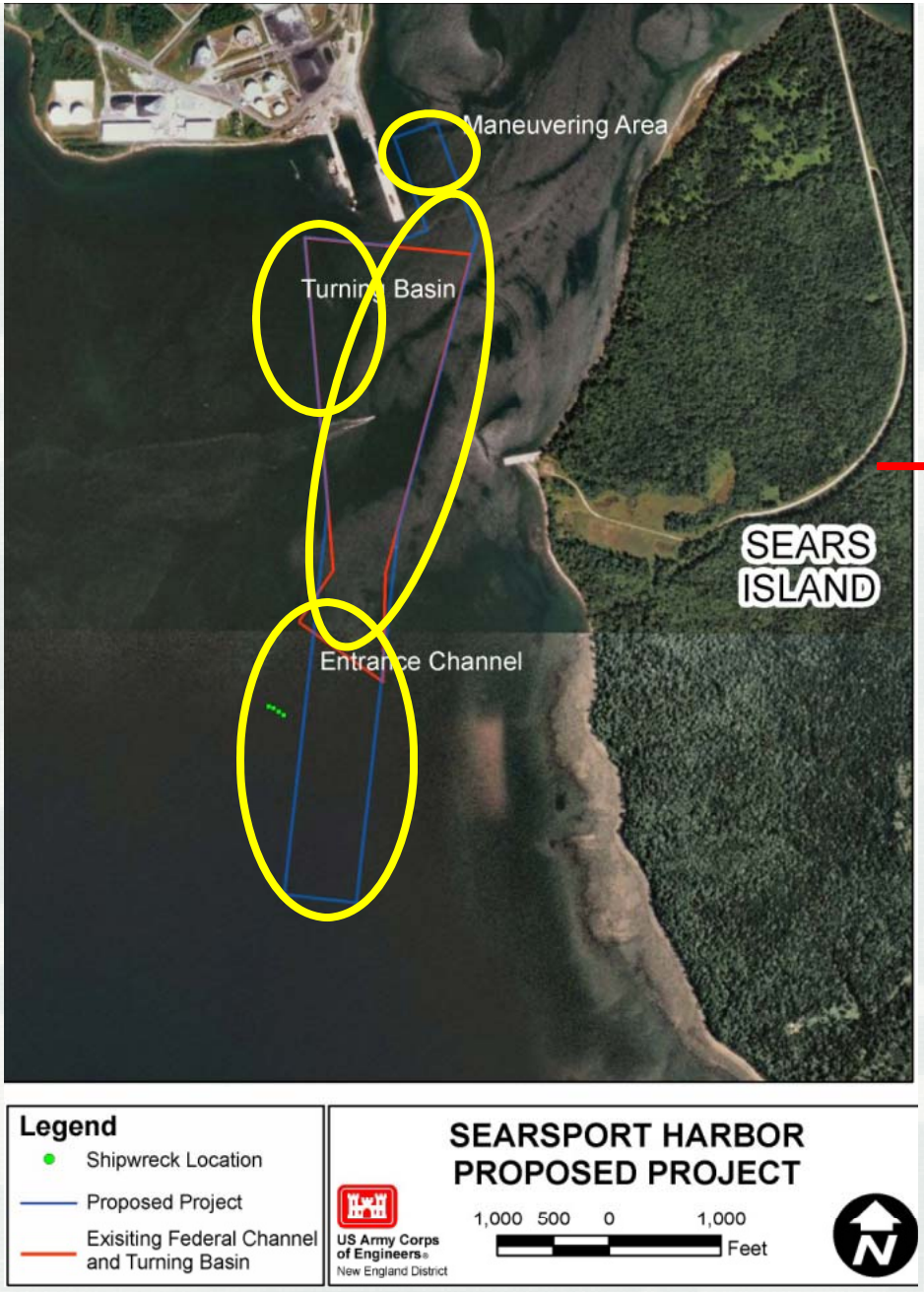
- shoreline development and urban/agricultural runoff potential
- industrial/municipal discharges
- spills and hazardous waste sites
- biological resources

Step 2 – make a plan for sediment sampling

→ define the list of analyses for the sediment samples

- define any distinct areas of the project for separate samples
- select how deep the samples will be collected from

- ***physical properties (grain size, geotechnical)***
- ***metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc)***
- ***organics (PAHs, PCBs, pesticides)***

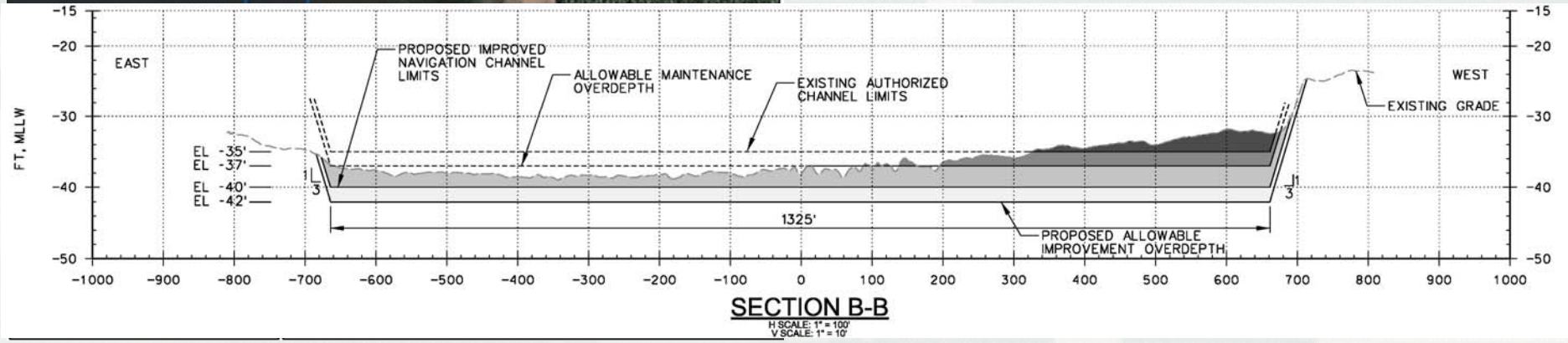


Step 2 – make a plan for sediment sampling

- define the list of chemicals samples will be analyzed for
- define any distinct areas of the project for separate samples
- select how deep the samples will be collected from

Step 2 – make a plan for sediment sampling

- define the list of analyses for the sediment samples
- define any distinct areas of the project for separate samples
- → select how deep the samples will be collected from

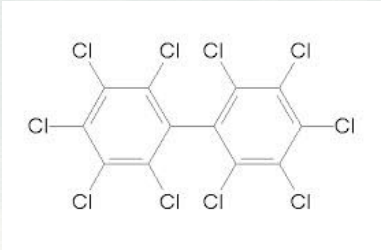


Chemistry Background Information

"Contaminant" has a clear definition…

Contaminant – [from Inland Testing Manual] – A chemical or biological substance in a form that can be incorporated into, onto or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment, and includes but is not limited to the substances on the 307(a) (1) list of toxic pollutants promulgated on January 31, 1978 (43 FR 4109). Note: a contaminant that causes actual harm is technically referred to as a pollutant, but the regulatory definition of a "pollutant" is in the Guidelines is different, reflecting the intent of the Clean Water Act.

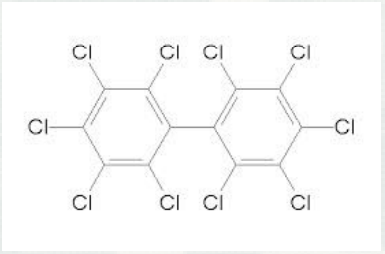
Contaminant – anything that you (or an organism) can ingest, inhale, or absorb that causes harm

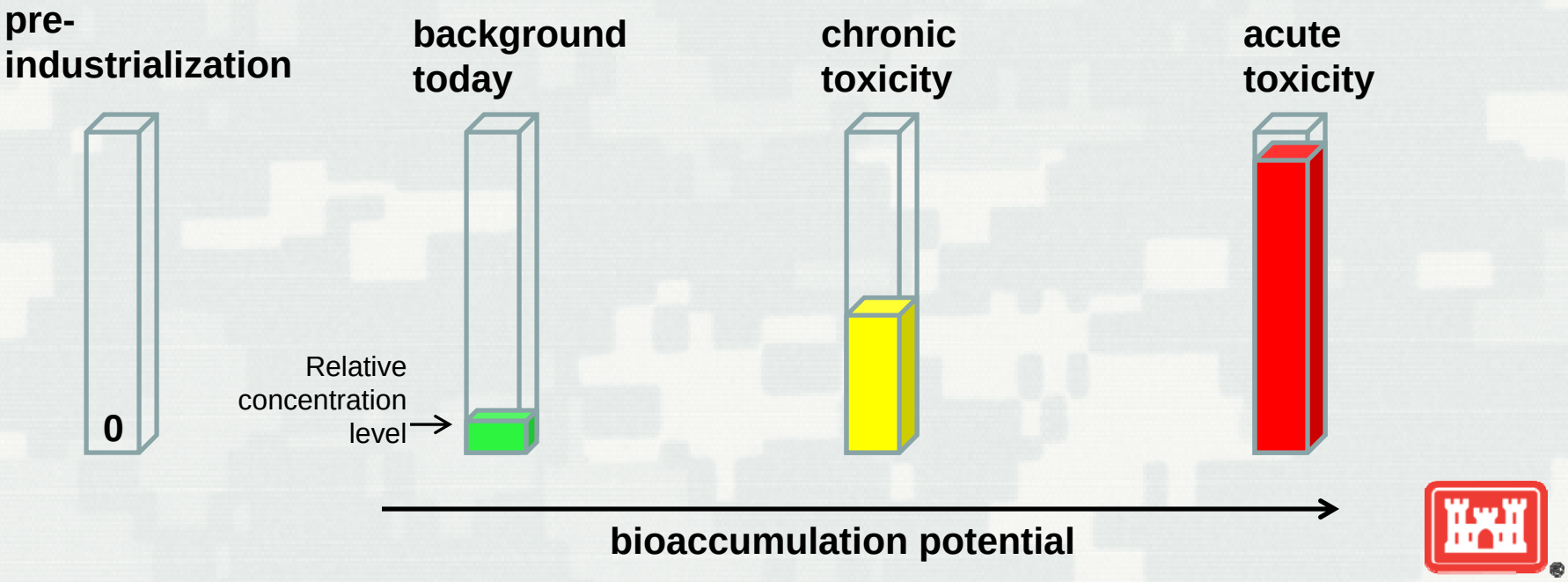


"Contaminated" and "toxic" do not have a specific definition in environmental science, so we compare the measured concentrations with known levels and qualify the term: e.g.
"contaminated above the required cleanup level"
"acutely toxic to marine organisms"

Example Concentration Comparison

PCBs (polychlorinated biphenyls)





Example Concentration Comparison

Arsenic

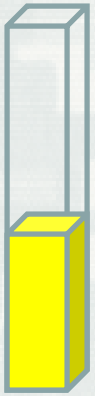
pre-industrialization

to

background today

to

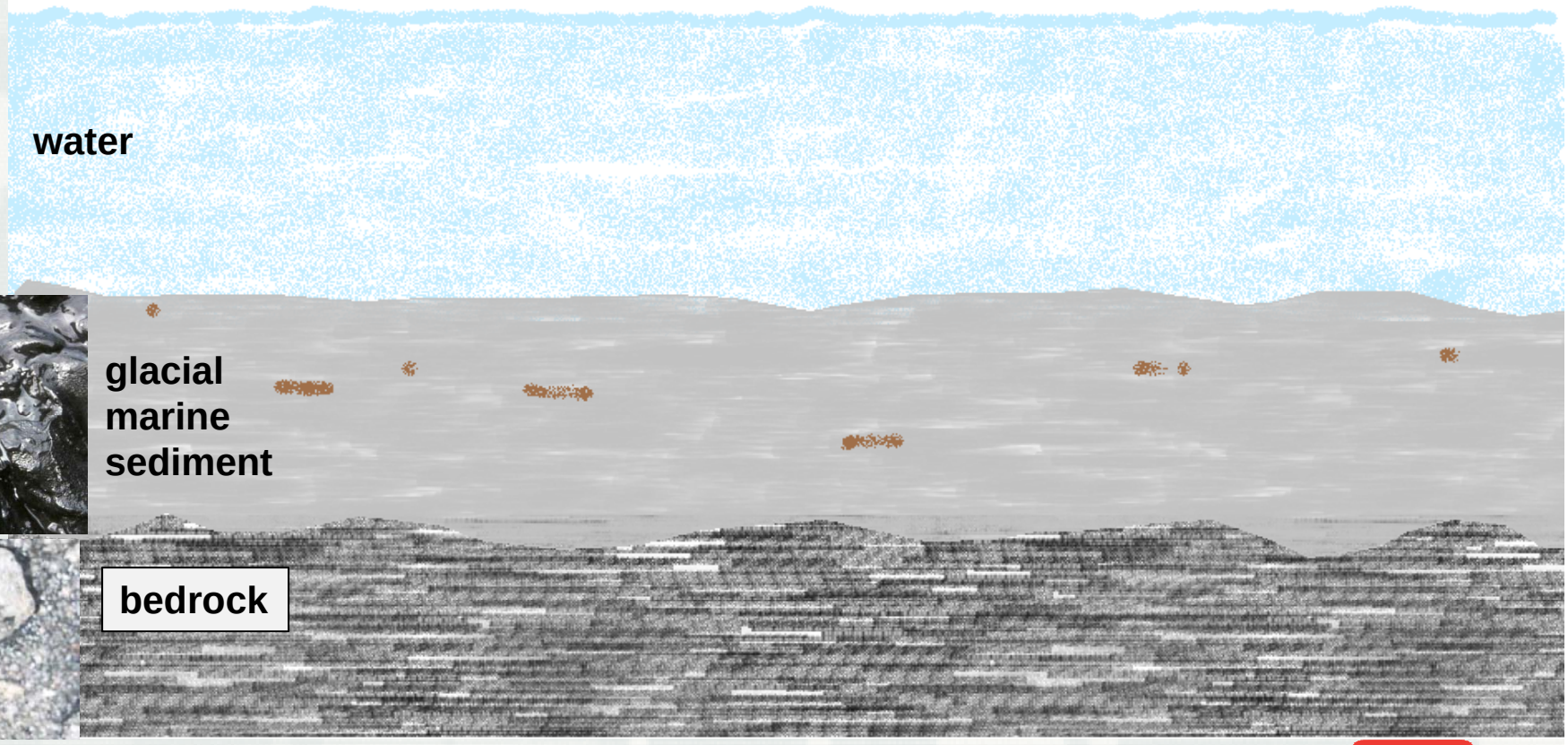
chronic toxicity



acute toxicity

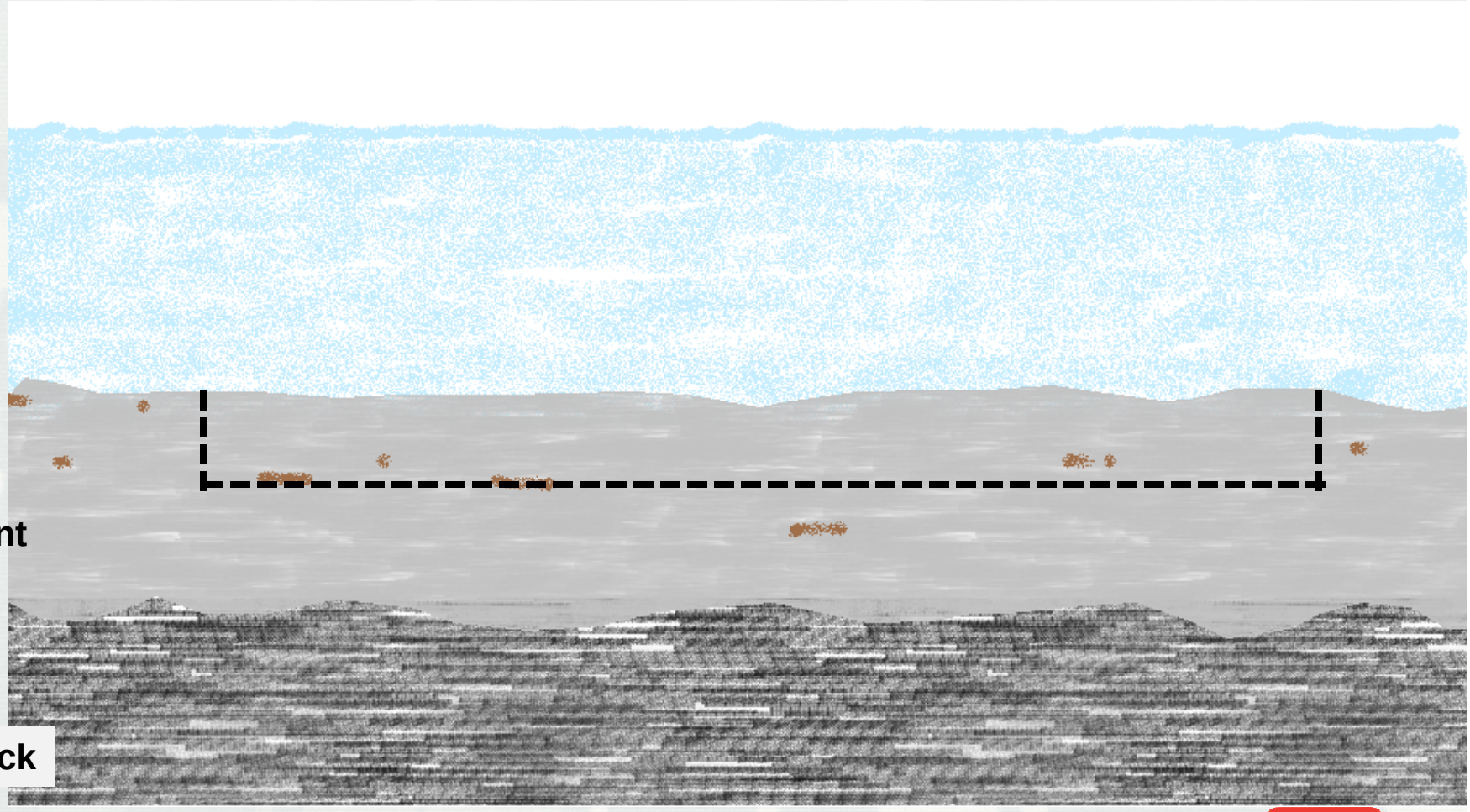
Geology-Sampling Design Background Information

Conceptual cross section prior to port development



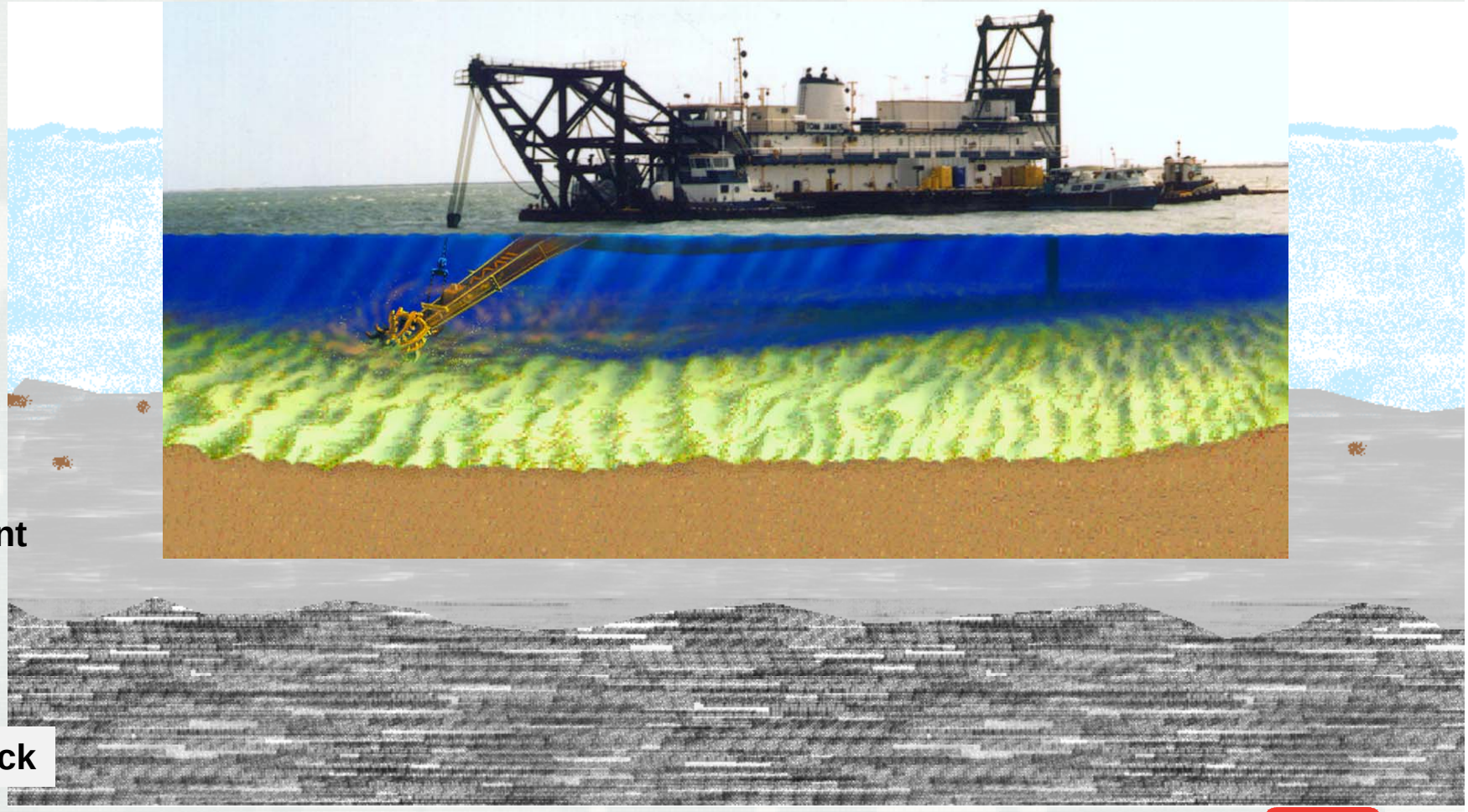
Geology-Sampling Design Background Information

Conceptual cross section – planned initial channel



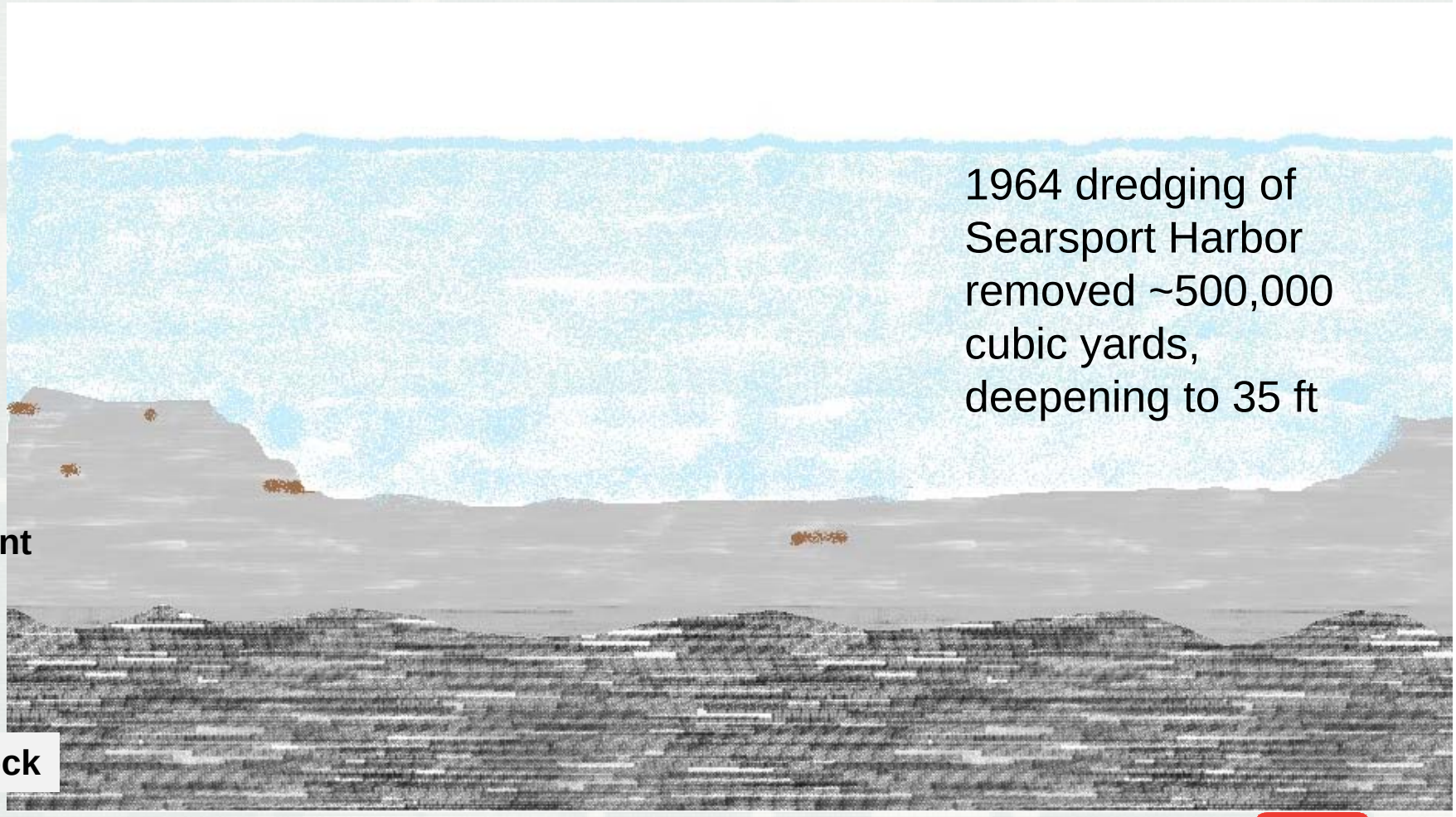
Geology-Sampling Design Background Information

Dredging to project depth or slightly below



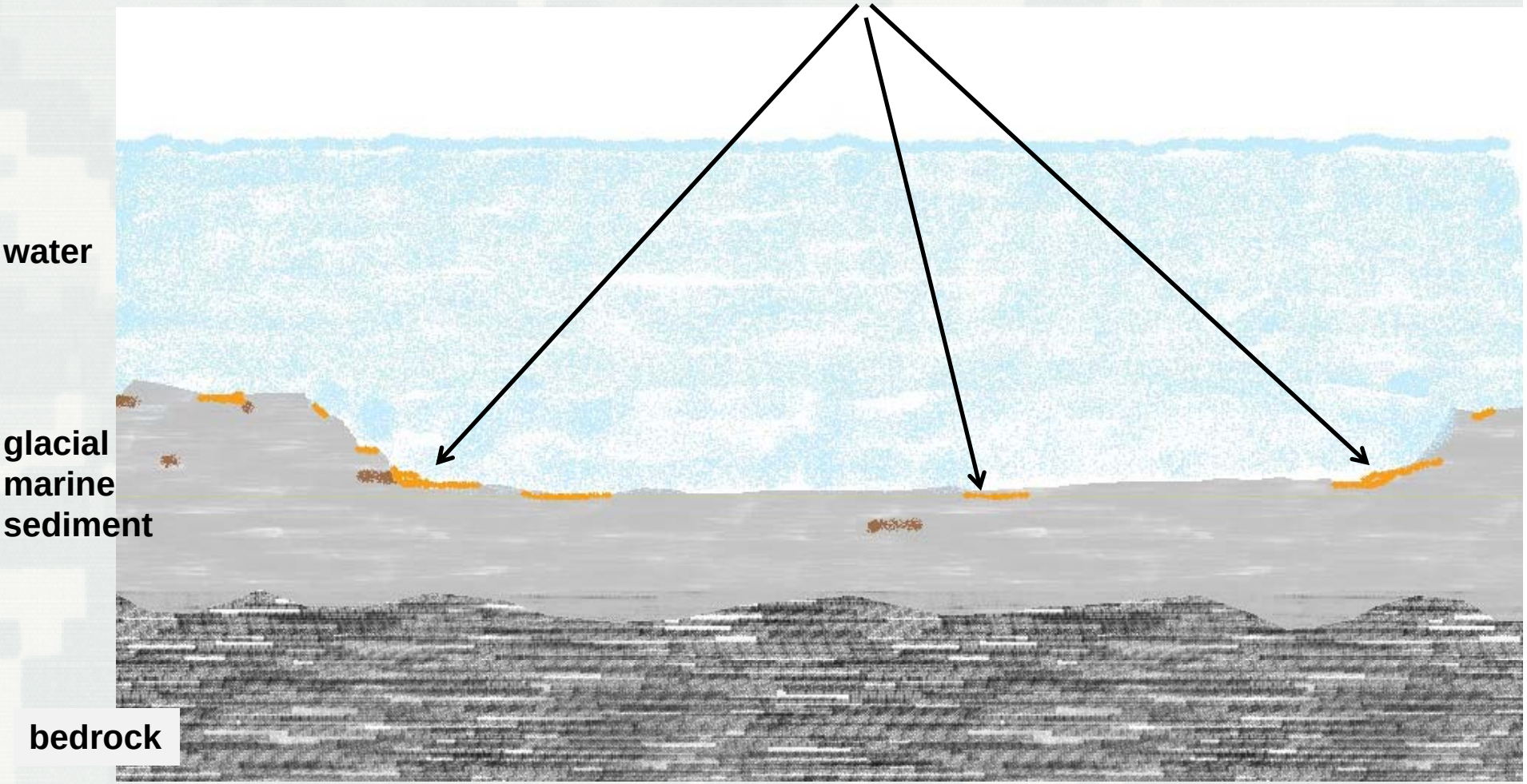
Geology-Sampling Design Background Information

Completed channel



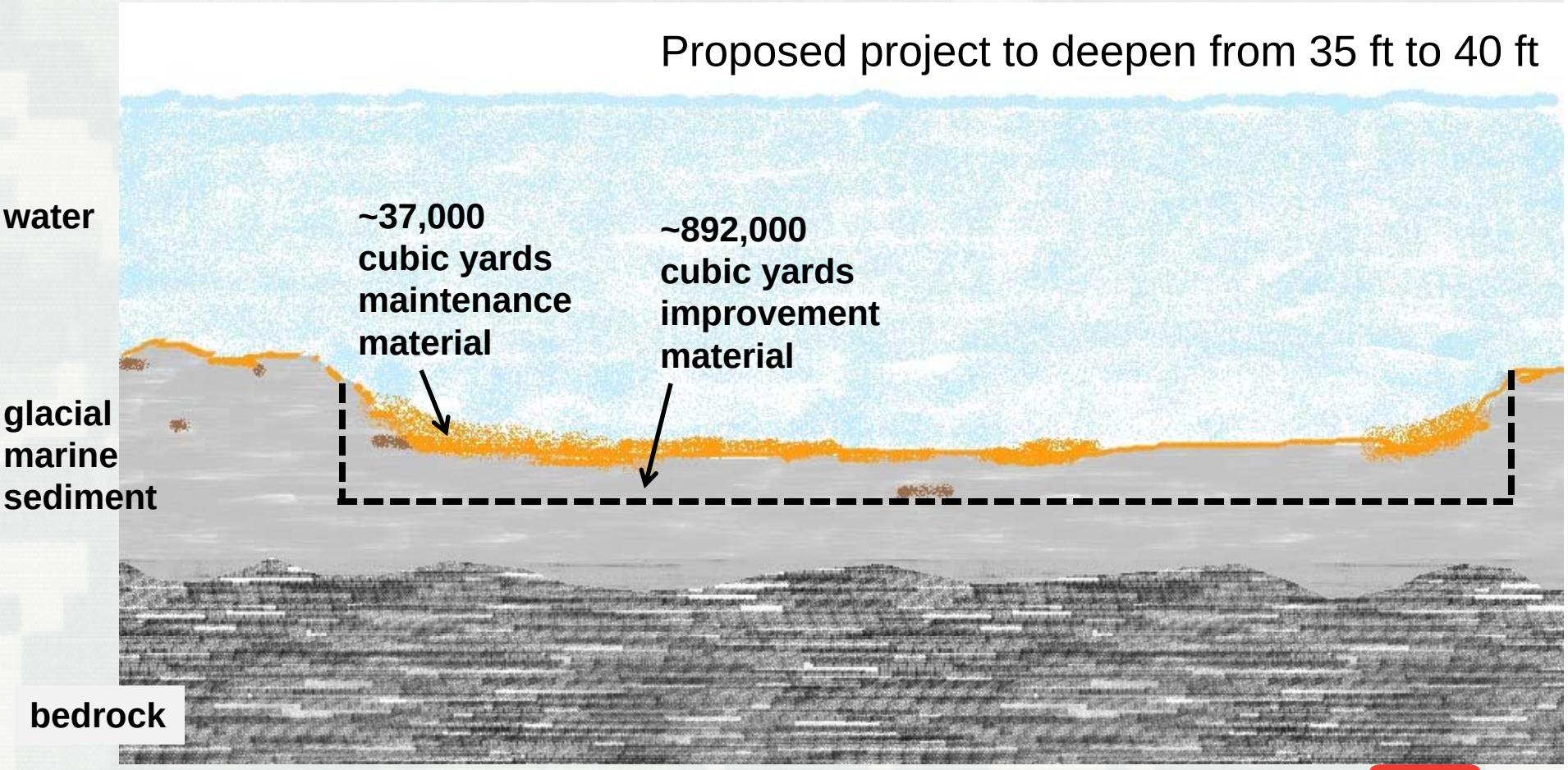
Geology-Sampling Design Background Information

Completed channel within initial deposition of maintenance material



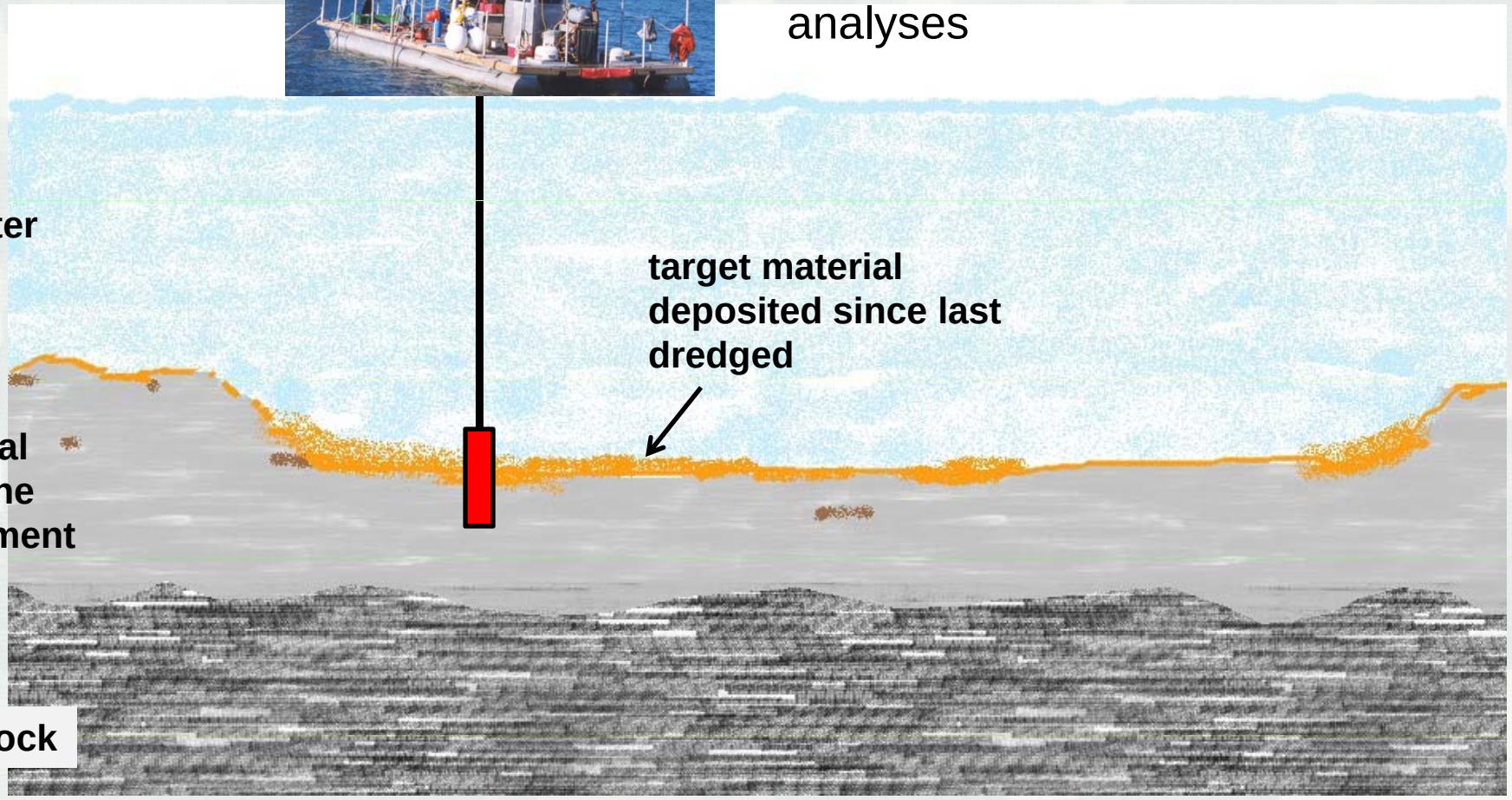
Geology-Sampling Design Background Information

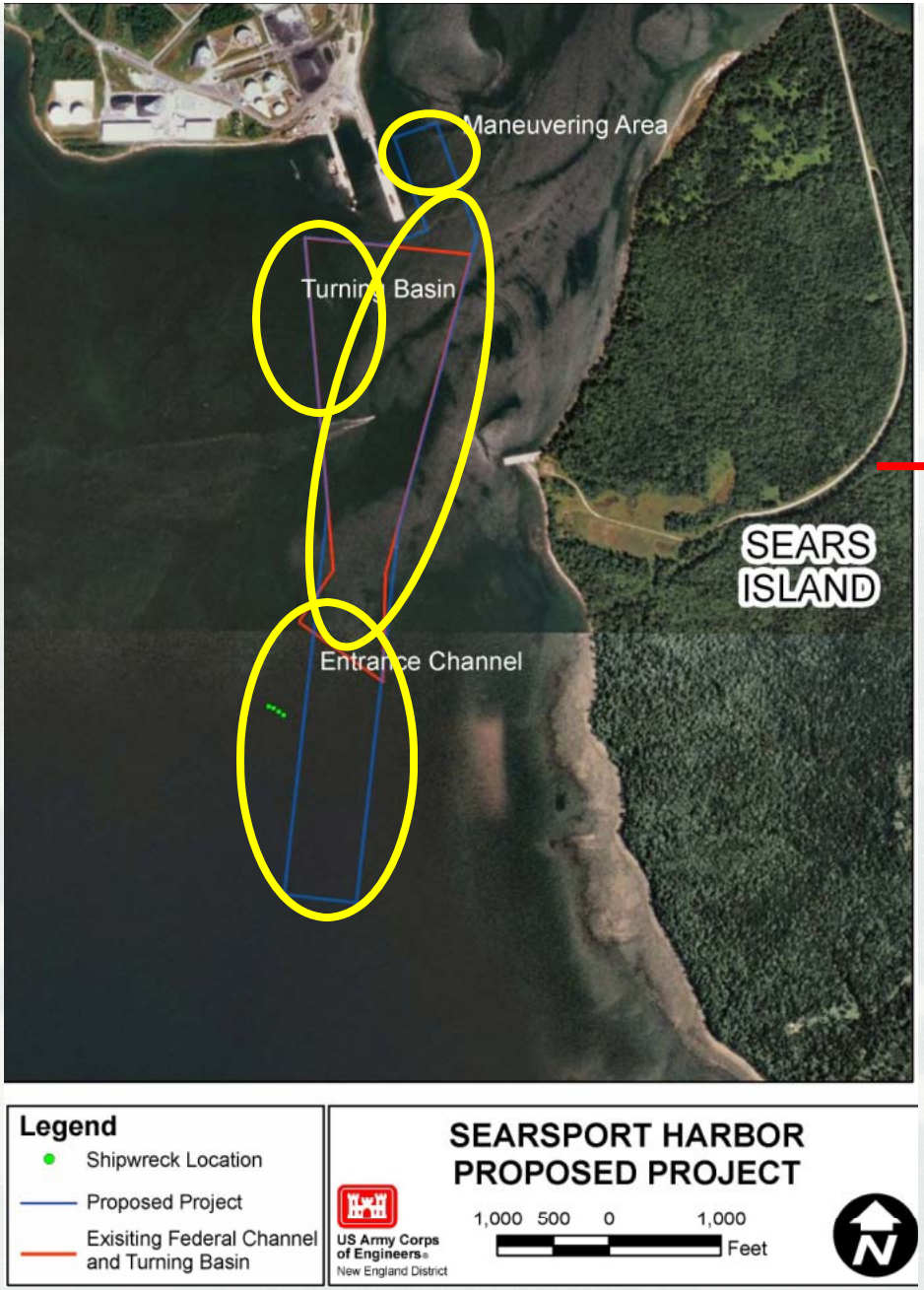
Present day channel condition with proposed deepening



Geology-Sampling Design Background Information

Collection of cores for laboratory chemistry analyses

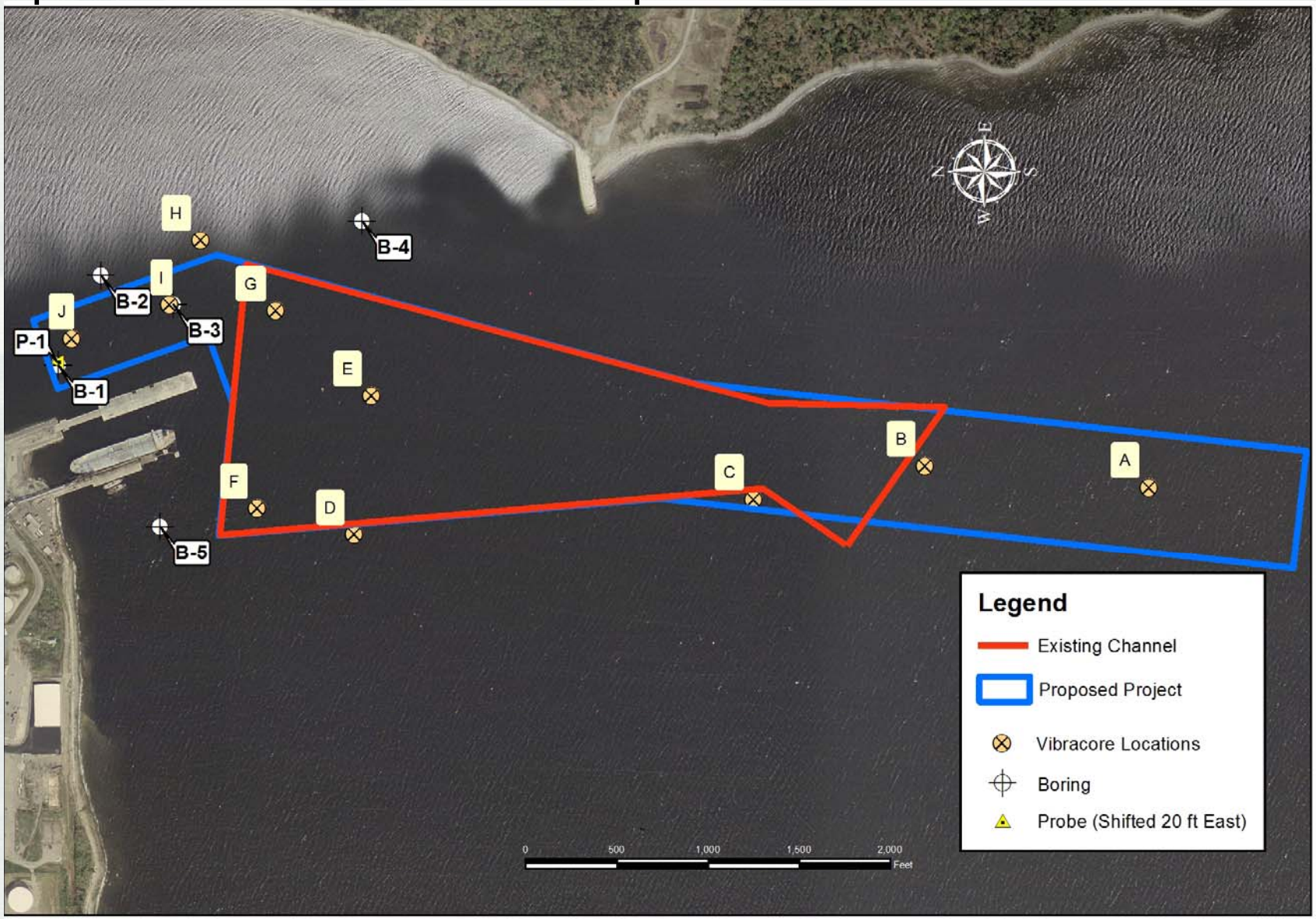




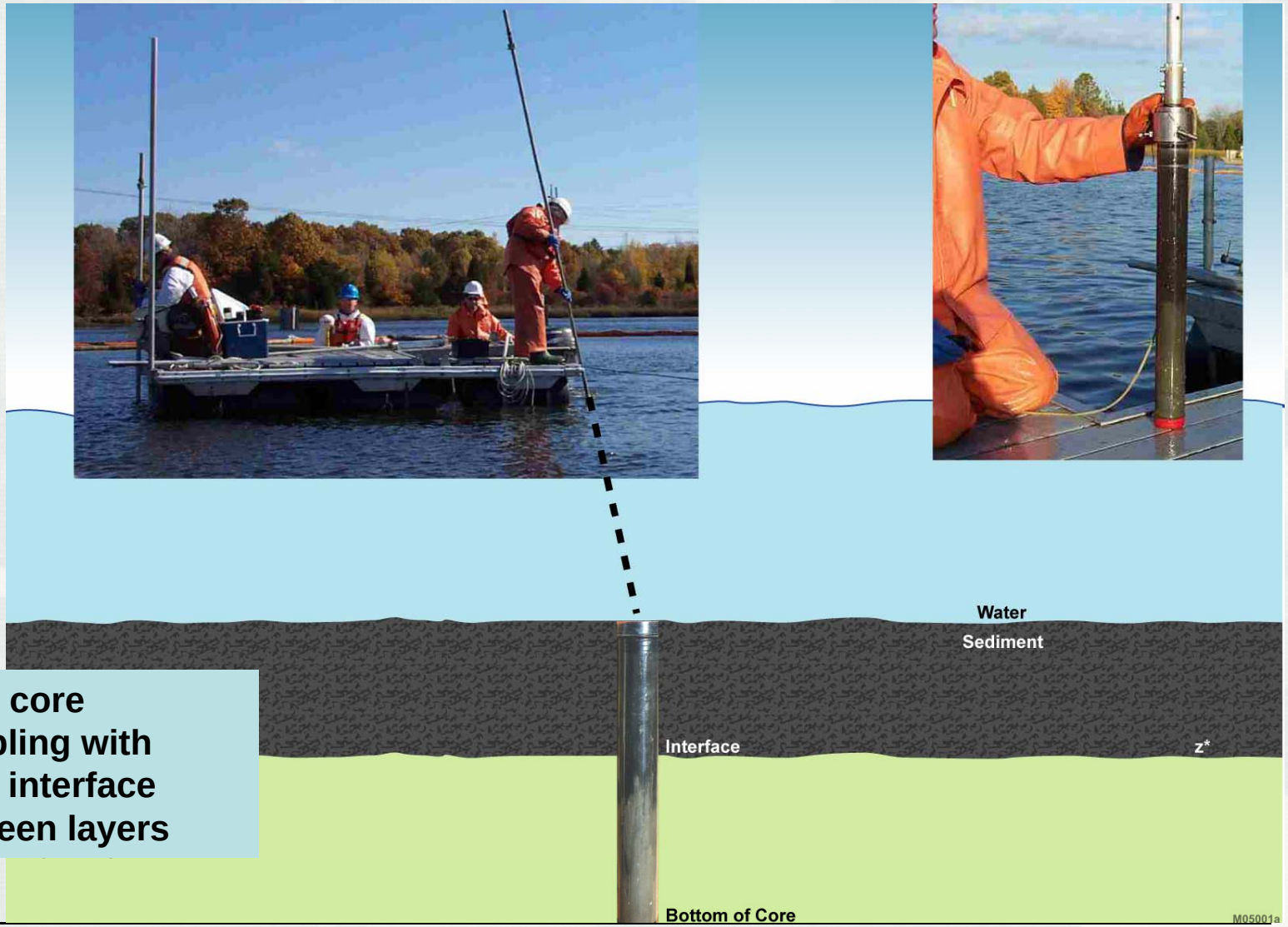
Step 2 – make a plan for sediment sampling

- define the list of chemicals samples will be analyzed for
- define any distinct areas of the project for separate samples
- select how deep the samples will be collected from
- coring locations selected in each of the general areas

Step 3 – Collect sediment samples



Step 3 – Collect sediment samples at the dredge site and the potential disposal sites

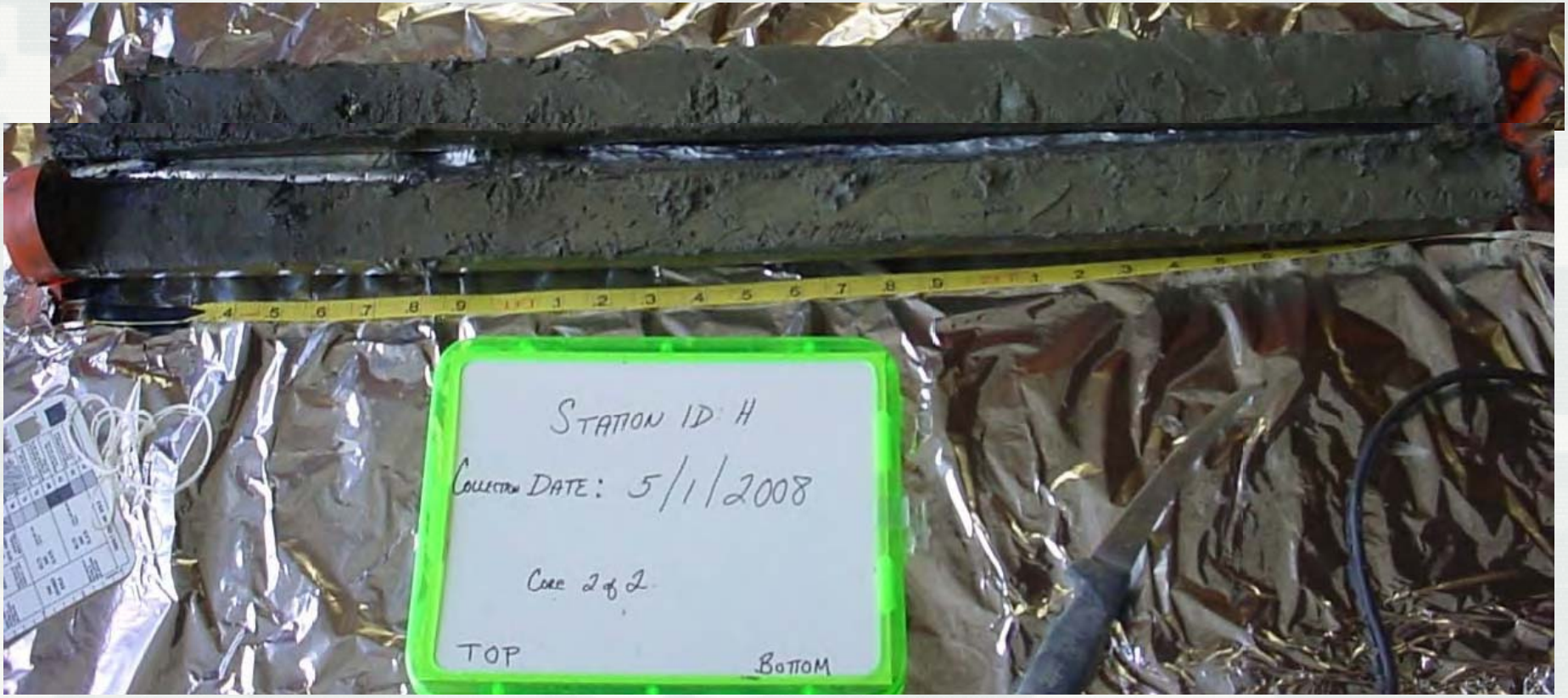


push core sampling with clear interface between layers

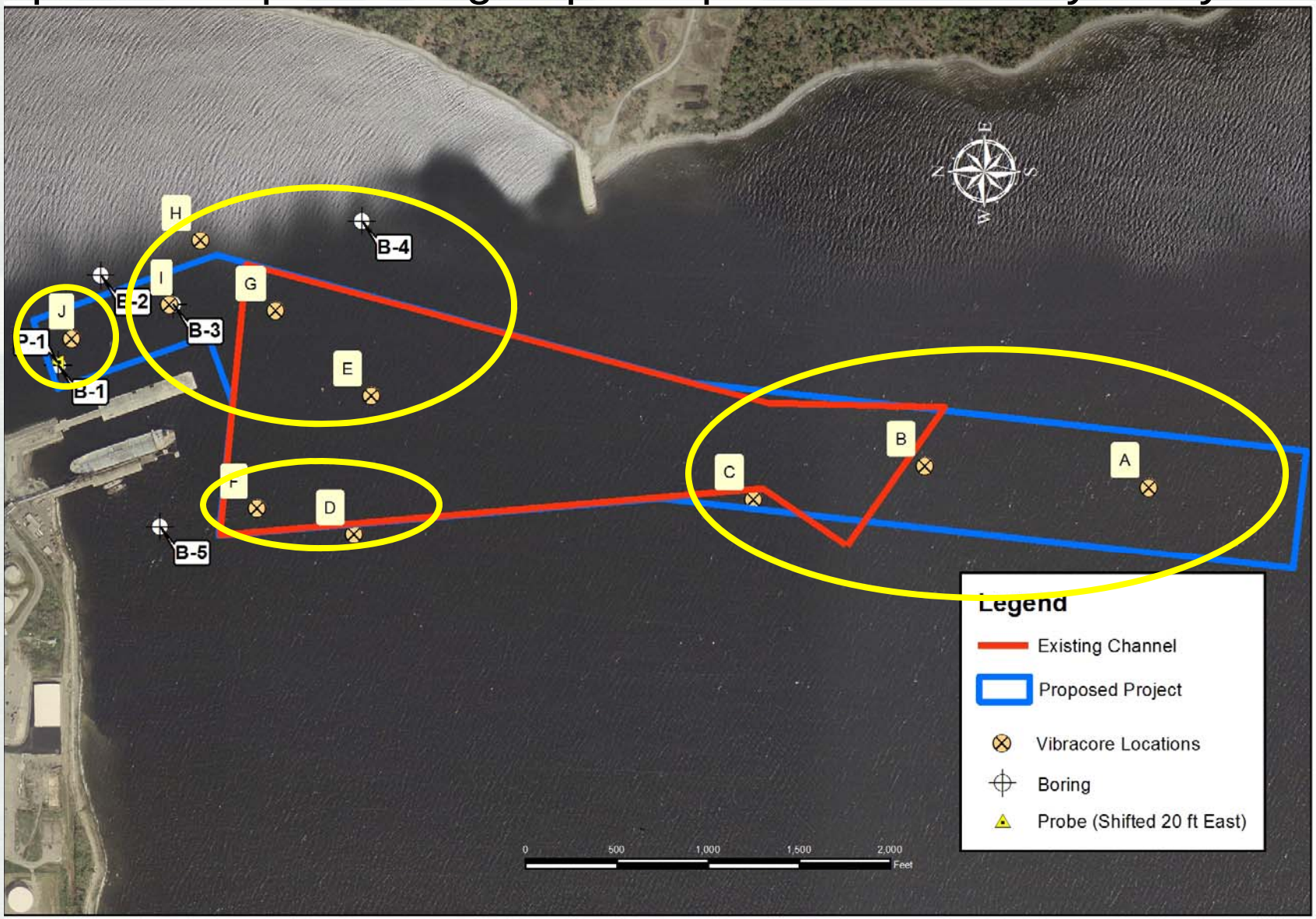
Step 3 – Collect sediment samples at the dredge site and the potential disposal sites

Step 4 – process the cores

- cut the core liner and split the cores
- inspect/log the cores and subsample for physical analyses



Step 5 – Composite or group samples for chemistry analysis



Step 5 – Submit samples to lab for analyses

BATTELLE MARINE SCIENCES LABORATORIES
Jill Brandenberger, Project Manager
1529 West Sequim Bay Rd.
Sequim, Washington 98382
(360) 681-4564

USACE NED - Searsport Harbor
Metals in Sediment
Samples Received on 05/15/08
(concentrations in ug/g, dry weight)

Sponsor ID	MSL Code	Site Description	Collection Date	Percent Moisture	As	Cd	Cr	Cu	Ni
				Instrument:	*ICP-MS*	*ICP-MS*	*ICP-OES*	*ICP-OES*	*ICP-OES*
				CAS Number:	7440-38-2	7440-43-9	7440-47-3	7440-50-8	7440-02-0
				Achieved MDL	**0.18**	**0.0044**	**0.020**	**0.058**	**0.023**
				RLs (3.18 x MDL)	0.5	0.01	0.07	0.2	0.07
HAC-012	2891-3	Reference Sediment BBDS	05/02/08	62.4	13.5	0.0860	87.4	19.6	37.6
HAC-013	2891-4	Reference Sediment BBDS	05/02/08	60.6	14.2	0.0933	87.1	18.8	36.8
HAC-014	2891-5	Reference Sediment BBDS	05/02/08	62.7	14.3	0.0887	87.0	19.5	37.7
HAC-015	2891-6	Reference Sediment IDS	05/02/08	64.0	12.5	0.0723	82.0	17.5	36.9
HAC-016	2891-7	Reference Sediment IDS	05/02/08	62.4	12.5	0.0747	85.4	17.9	36.8
HAC-017	2891-8	Reference Sediment IDS	05/02/08	62.1	12.4	0.0784	84.3	17.7	36.3
HAC-017	2891-8 DUP	Reference Sediment IDS	05/02/08	62.1	13.0	0.0720	84.9	17.8	36.9
HAC-019	2891-9	Sediment from Station A,B,C	04/30/08	52.7	15.8	0.0913	81.8	17.0	36.9
HAC-020	2891-10	Sediment from Station D,F	04/30/08	57.5	18.0	0.172	75.7	16.2	34.0
HAC-021	2891-11	Sediment from Station E,G,H,I	04/30/08	42.5	14.9	0.118	63.3	15.8	30.5
HAC-022	2891-12	Sediment from Station J	05/01/08	30.2	17.0	0.159	47.4	8.76	19.8
Procedural Blank									
MB	Blank 053008				0.0277 J	0.01 U	0.07 U	0.2 U	0.07 U
MB	Method Blank R1				--	--	--	--	--
MB	Method Blank R2				--	--	--	--	--
MB	Method Blank R3				--	--	--	--	--
Laboratory Control Sample (Blank Spike)									
LCS	LCS 053008/ LCS (Hg)				27.1	26.4	25.6	25.4	24.4
MB	Blank 053008/Method Blank (Hg)				0.0277 J	0.01 U	0.07 U	0.2 U	0.07 U
	Spike Concentration				25	25	25	25	25
	Percent Recovery				**108%**	**106%**	**102%**	**101%**	**98%**
MATRIX SPIKE RESULTS									
MS	2891-10 MS				67.4	2.14	124	65.5	78.7
MSD	2891-10 MSD				64.4	1.99	119	62.1	76.4
HAC-020	2891-10	Sediment from Station D,F	04/30/08	57.5	18.0	0.172	75.7	16.2	34.0
	Spike Concentration, MS				47.2	1.98	47.2	47.2	47.2
	Spike Concentration, MSD				44.9	1.82	44.9	44.9	44.9
	Percent Recovery, MS				**105%**	**99%**	**102%**	**105%**	**95%**
	Percent Recovery, MSD				**103%**	**100%**	**96%**	**102%**	**94%**
	RPD				**1%**	**1%**	**6%**	**2%**	**0%**

Searsport Harbor, Analytical Chemistry, Sediments and Rinsate Blanks

CERTIFICATION STATEMENT AND DATA RELEASE

Battelle Marine Sciences Laboratory is releasing the following data set:

SEARSPORT HARBOR SEDIMENT CHEMISTRY

METALS IN SEDIMENT AND RINSATE BLANK

We certify that the data contained within this data set is authentic:

Jill M. Brandenberger — Date 6/20/2008
MSL Metals Chemistry Project Manager

Janet Cloutier — Date 6/20/08
MSL QA Officer

Searsport Harbor, Analytical Chemistry, Sediments and Rinsate Blanks — Page 2 of 21

Step 6 – Compare the lab measured chemistry concentrations with existing standards to determine if the material is suitable or if additional testing is required

BATTELLE MARINE SCIENCES LABORATORIES
Jill Brandenberger, Project Manager
1529 West Sequim Bay Rd.
Sequim, Washington 98382
(360) 681-4564

USACE NED - Searsport Harbor
Metals in Sediment
Samples Received on 05/15/08
(concentrations in ug/g, dry weight)

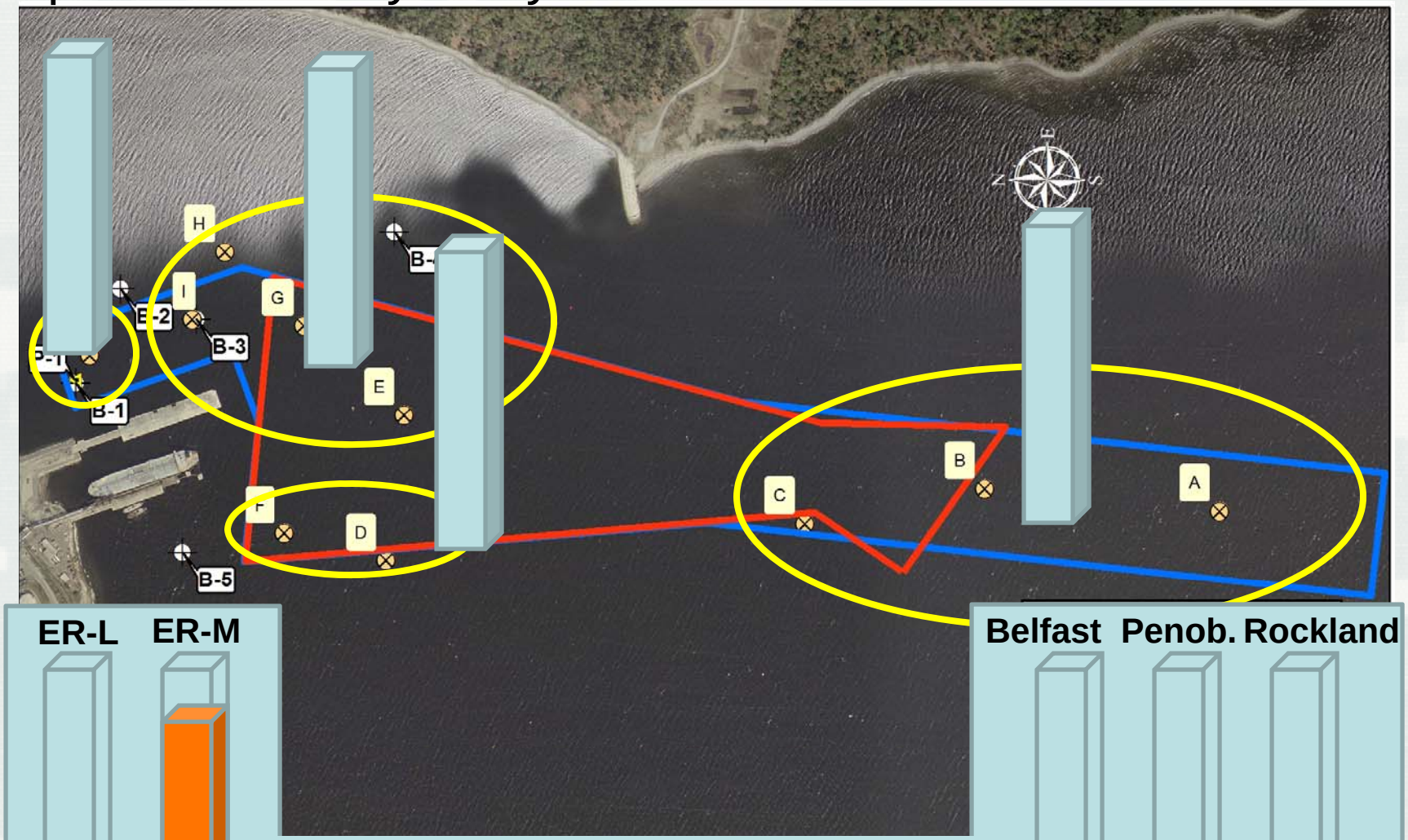
Sponsor ID	MSL Code	Site Description	Collection Date	Percent Moisture	As	Cd	Cr	Cu	Ni	Pb	Zn	Hg
				Instrument:	*ICP-MS*	*ICP-MS*	*ICP-OES*	*ICP-OES*	*ICP-OES*	*ICP-OES*	*ICP-OES*	*TD-CVAAS*
				CAS Number:	7440-38-2	7440-43-9	7440-47-3	7440-50-8	7440-02-0	7439-92-1	7440-66-6	7439-97-6
				Achieved MDL	**0.18**	**0.0044**	**0.020**	**0.058**	**0.023**	**0.25**	**0.21**	**0.0020**
				RLs (3.18 x MDL)	0.5	0.01	0.07	0.2	0.07	0.7	0.7	0.007
HAC-012	2891-3	Reference Sediment BBDS	05/02/08	62.4	13.5	0.0860	87.4	19.6	37.6	26.4	114	0.278
HAC-013	2891-4	Reference Sediment BBDS	05/02/08	60.6	14.2	0.0933	87.1	18.8	36.8	26.8	111	0.289
HAC-014	2891-5	Reference Sediment BBDS	05/02/08	62.7	14.3	0.0887	87.0	19.5	37.7	26.6	114	0.261
HAC-015	2891-6	Reference Sediment IDS	05/02/08	64.0	12.5	0.0723	82.0	17.5	36.9	22.5	106	0.136
HAC-016	2891-7	Reference Sediment IDS	05/02/08	62.4	12.5	0.0747	85.4	17.9	36.8	22.5	109	0.150
HAC-017	2891-8	Reference Sediment IDS	05/02/08	62.1	12.4	0.0784	84.3	17.7	36.3	23.3	107	0.150
HAC-017	2891-8 DUP	Reference Sediment IDS	05/02/08	62.1	13.0	0.0720	84.9	17.8	36.9	23.7	108	0.156
HAC-019	2891-9	Sediment from Station A,B,C	04/30/08	52.7	15.8	0.0913	81.8	17.0	36.9	18.3	97.7	0.129
HAC-020	2891-10	Sediment from Station D,F	04/30/08	57.5	18.0	0.172	75.7	16.2	34.0	15.7	89.0	0.110
HAC-021	2891-11	Sediment from Station E,G,H,I	04/30/08	42.5	14.9	0.118	63.3	15.8	30.5	11.4	65.0	0.0440
HAC-022	2891-12	Sediment from Station J	05/01/08	30.2	17.0	0.159	47.4	8.76	19.8	10.1	48.4	0.0420
Procedural Blank												
MB	Blank 053008				0.0277 J	0.01 U	0.07 U	0.2 U	0.07 U	0.7 U	0.7 U	--
MB	Method Blank R1				--	--	--	--	--	--	--	0.007 U
MB	Method Blank R2				--	--	--	--	--	--	--	0.007 U
MB	Method Blank R3				--	--	--	--	--	--	--	0.007 U
Laboratory Control Sample (Blank Spike)												
LCS	LCS 053008/ LCS (Hg)				27.1	26.4	25.6	25.4	24.4	25.7	26.5	0.279
MB	Blank 053008/Method Blank (Hg)				0.0277 J	0.01 U	0.07 U	0.2 U	0.07 U	0.7 U	0.7 U	0.007 U
	Spike Concentration				25	25	25	25	25	25	25	0.281
	Percent Recovery				**108%**	**106%**	**102%**	**101%**	**98%**	**103%**	**106%**	**99%**
MATRIX SPIKE RESULTS												
MS	2891-10 MS				67.4	2.14	124	65.5	78.7	60.5	185	0.664
MSD	2891-10 MSD				64.4	1.99	119	62.1	76.4	57.4	177	0.594
HAC-020	2891-10	Sediment from Station D,F	04/30/08	57.5	18.0	0.172	75.7	16.2	34.0	15.7	89.0	0.110
	Spike Concentration, MS				47.2	1.98	47.2	47.2	47.2	47.2	94.3	0.552
	Spike Concentration, MSD				44.9	1.82	44.9	44.9	44.9	44.9	89.8	0.482
	Percent Recovery, MS				**105%**	**99%**	**102%**	**105%**	**95%**	**95%**	**102%**	**100%**
	Percent Recovery, MSD				**103%**	**100%**	**96%**	**102%**	**94%**	**93%**	**98%**	**100%**
	RPD				**1%**	**1%**	**6%**	**2%**	**0%**	**2%**	**4%**	**0%**

Page 1 of 2

Searsport Harbor, Analytical Chemistry, Sediments and Rinsate Blanks

Page 3 of 21

Step 5 – Chemistry analysis results

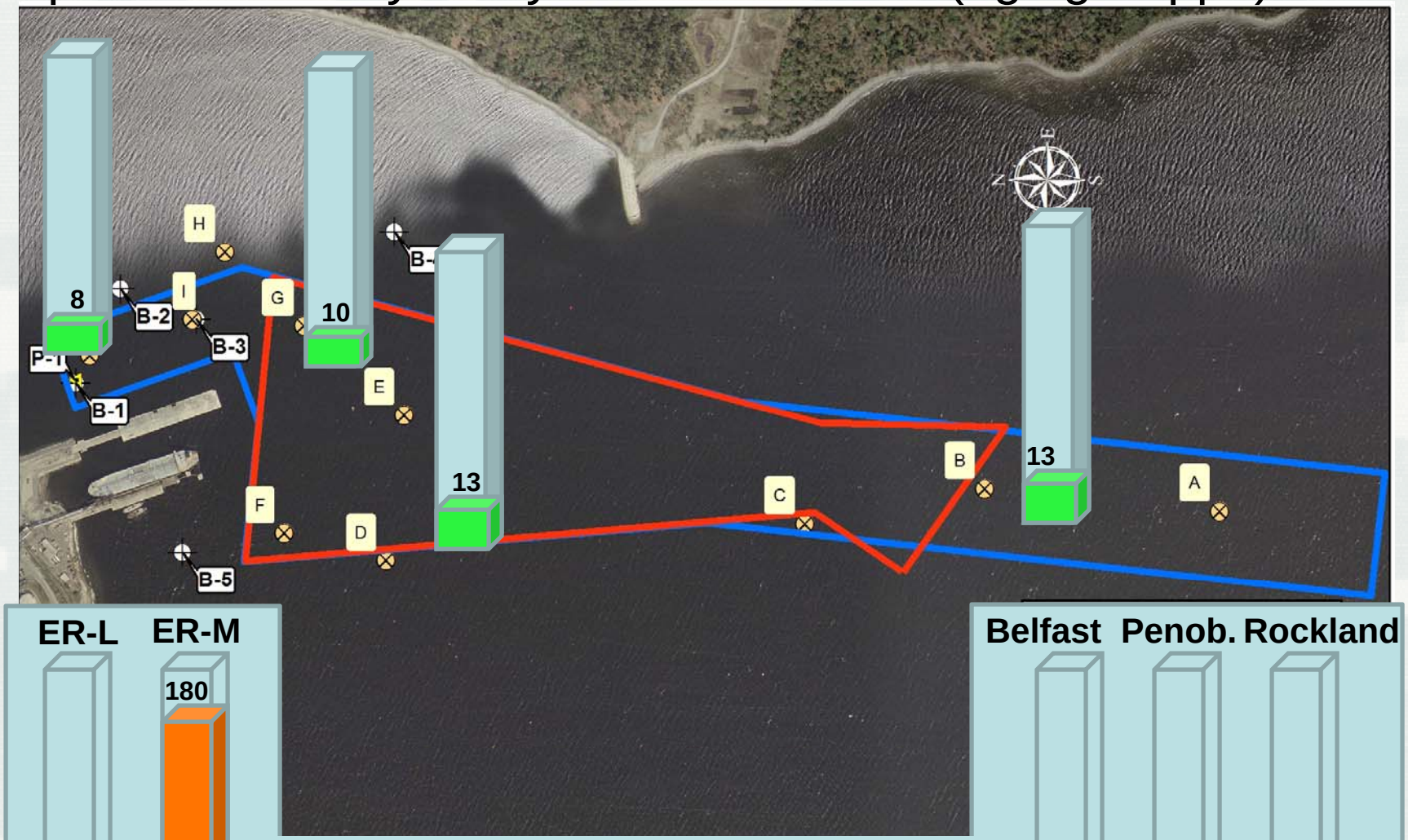


-Effects range-low and effects range-median from Long *et al.* 1995
-Data are actual values, scale bars are approximate

disposal sites

®

Step 5 – Chemistry analysis results PCBs (ug/kg or ppb)

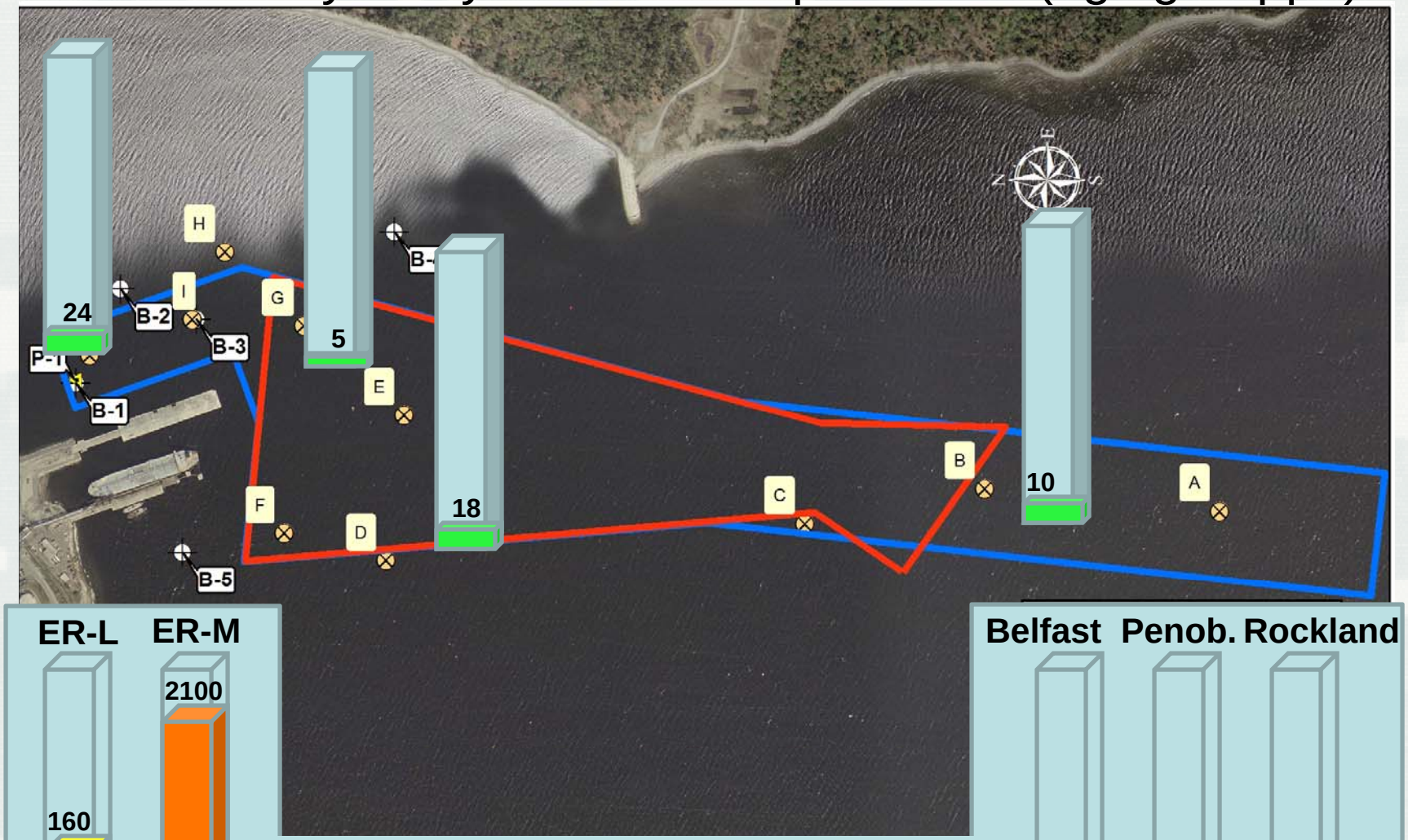


-Effects range-low and effects range-median from Long *et al.* 1995
-Data are actual values, scale bars are approximate

disposal sites

®

Step 5 – Chemistry analysis results naphthalene (ug/kg or ppb)

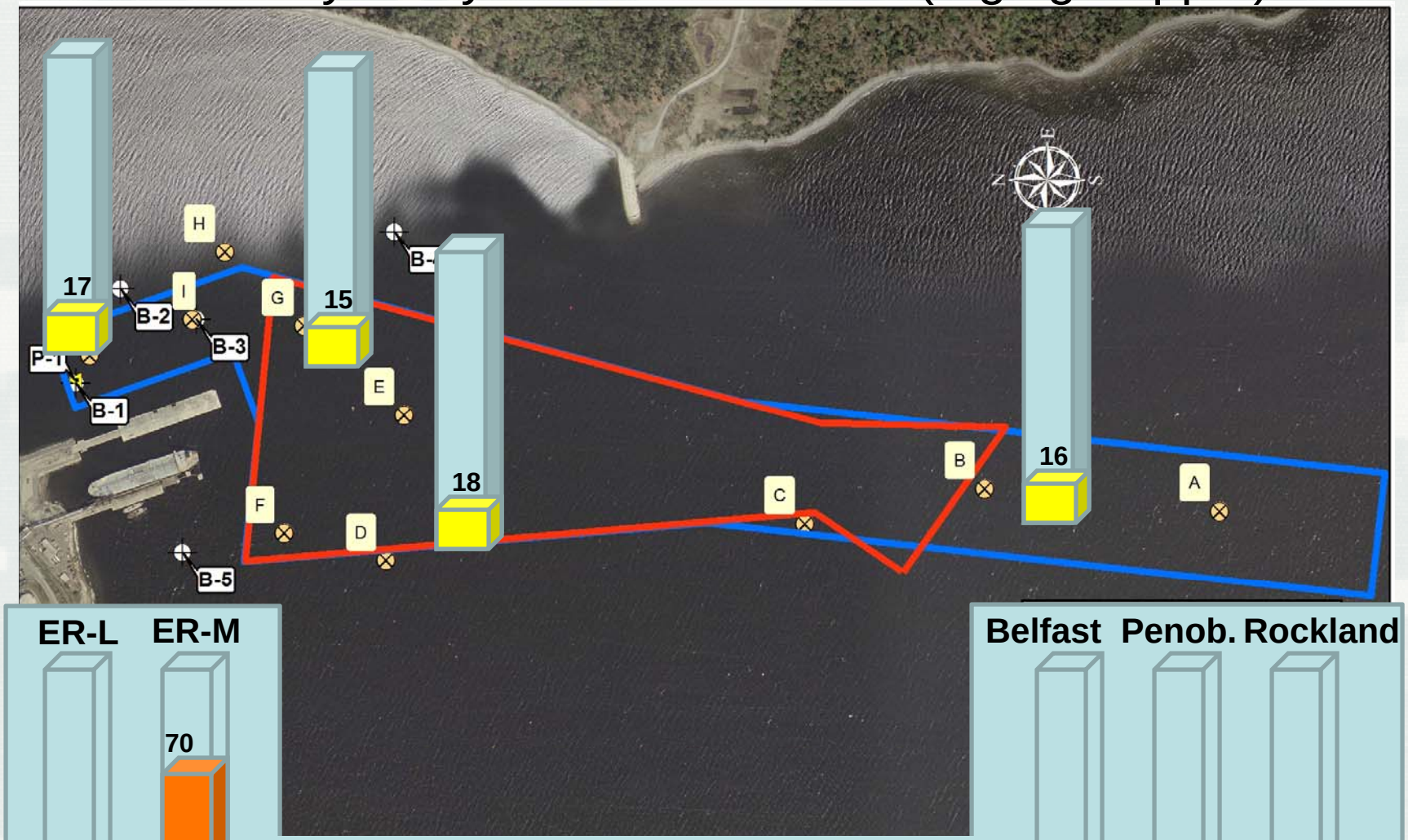


-Effects range-low and effects range-median from Long *et al.* 1995

-Data are actual values, scale bars are approximate

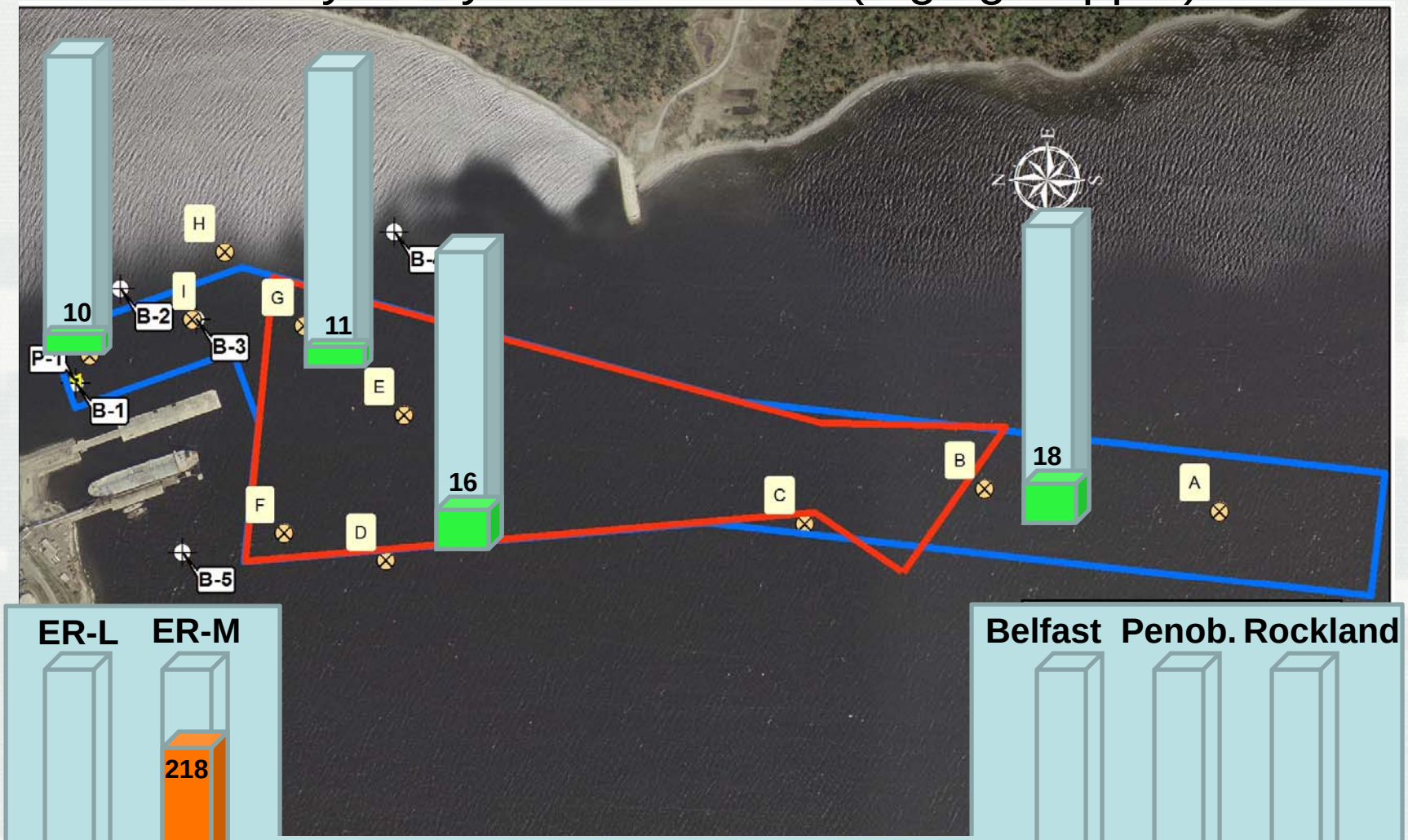
disposal sites

Step 5 – Chemistry analysis results arsenic (mg/kg or ppm)



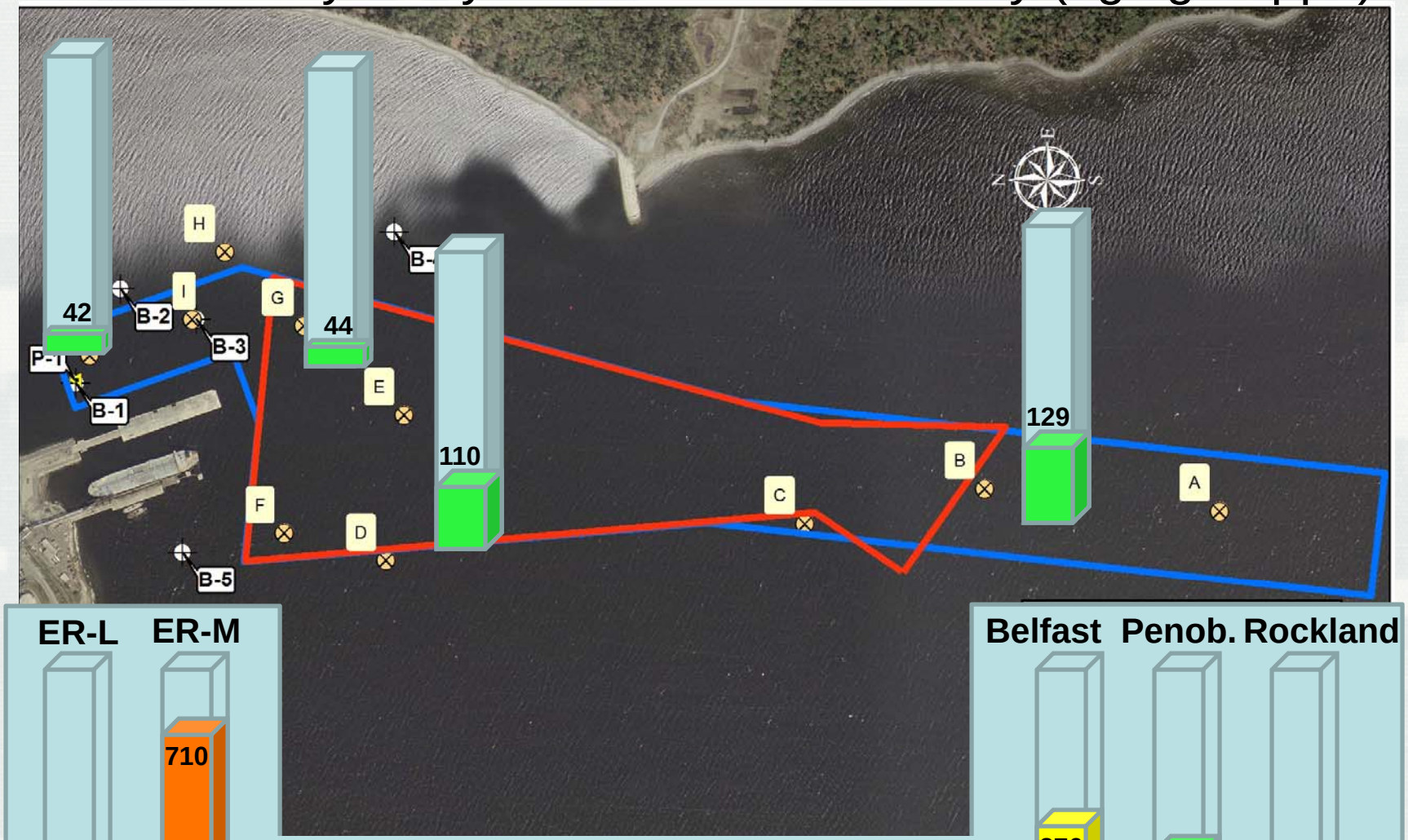
-Effects range-low and effects range-median from Long *et al.* 1995
-Data are actual values, scale bars are approximate

Step 5 – Chemistry analysis results lead (mg/kg or ppm)



-Effects range-low and effects range-median from Long *et al.* 1995
-Data are actual values, scale bars are approximate

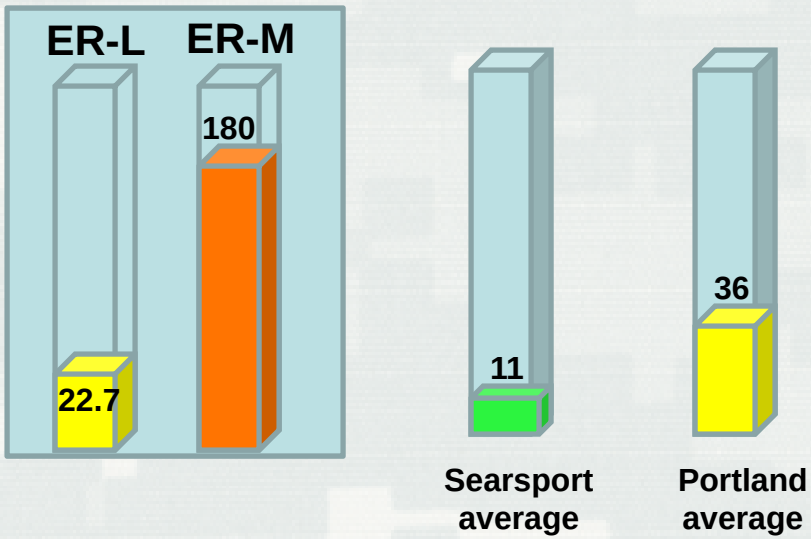
Step 5 – Chemistry analysis results total mercury (ug/kg or ppb)



-Effects range-low and effects range-median from Long *et al.* 1995
-Data are actual values, scale bars are approximate

Comparison of Searsport chemistry results with other Maine harbors dredged within the past ~15 years

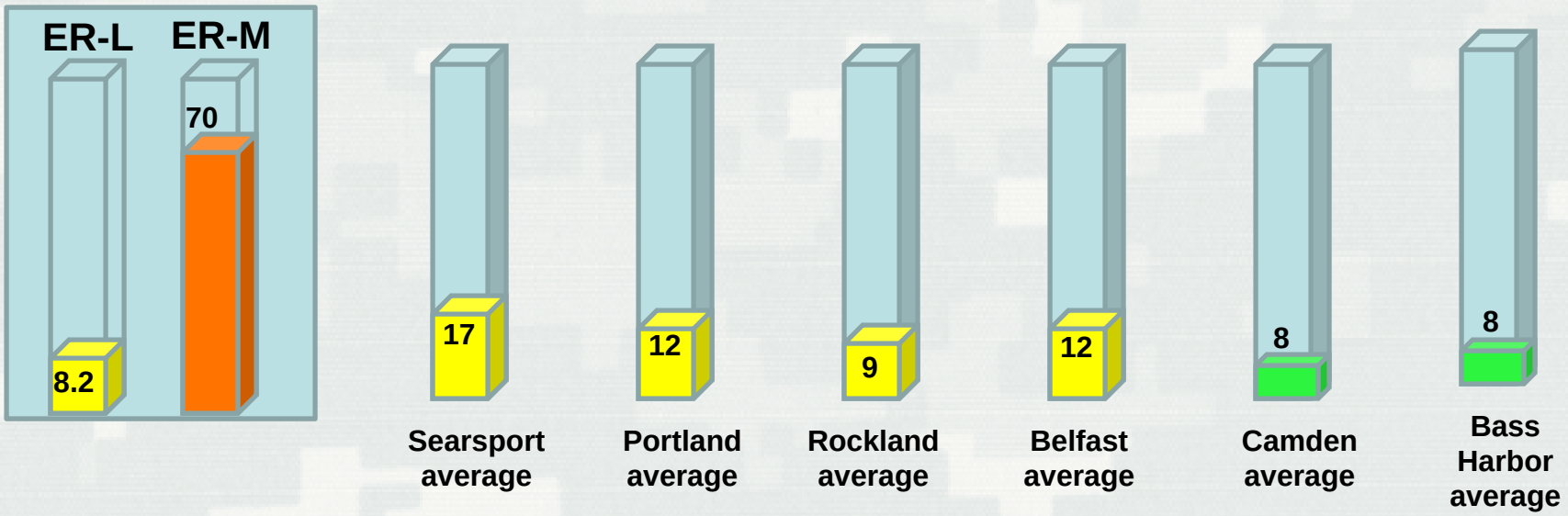
PCBs (ug/kg or ppb)



-Effects range-low and effects range-median from Long *et al.* 1995
-Data are averages of concentrations presented in project Environmental Assessments, scale bars are approximate

Comparison of Searsport chemistry results with other Maine harbors dredged within the past ~15 years

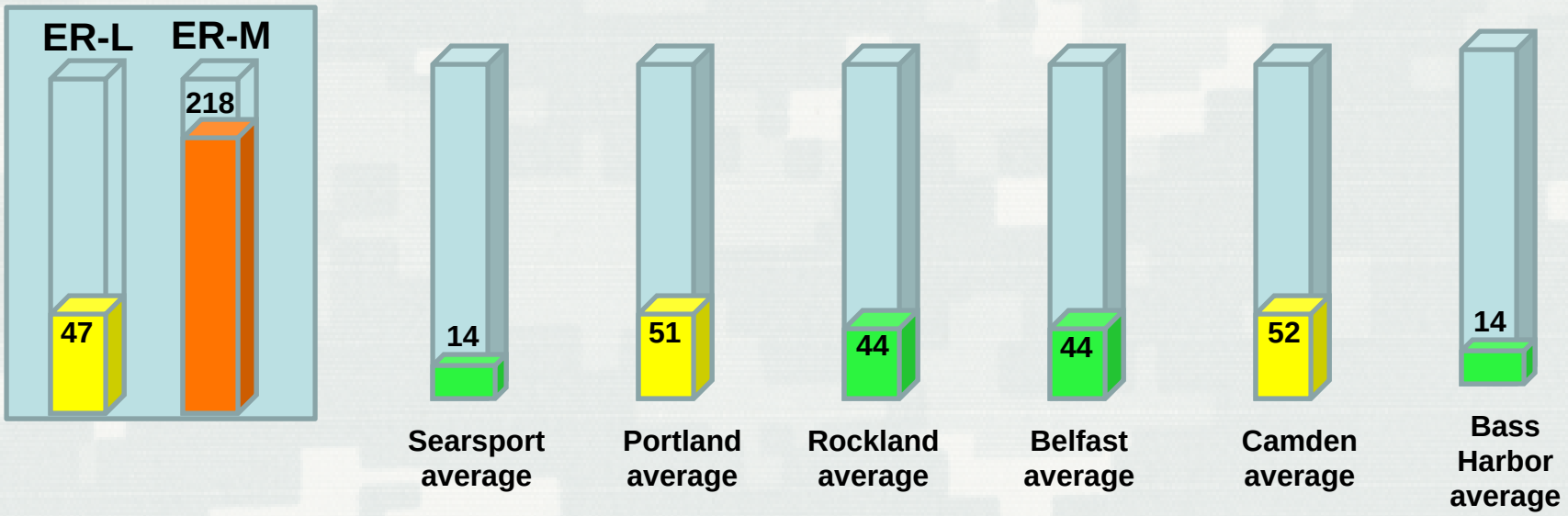
Arsenic (mg/kg or ppm)



-Effects range-low and effects range-median from Long *et al.* 1995
-Data are averages of concentrations presented in project Environmental Assessments, scale bars are approximate

Comparison of Searsport chemistry results with other Maine harbors dredged within the past ~15 years

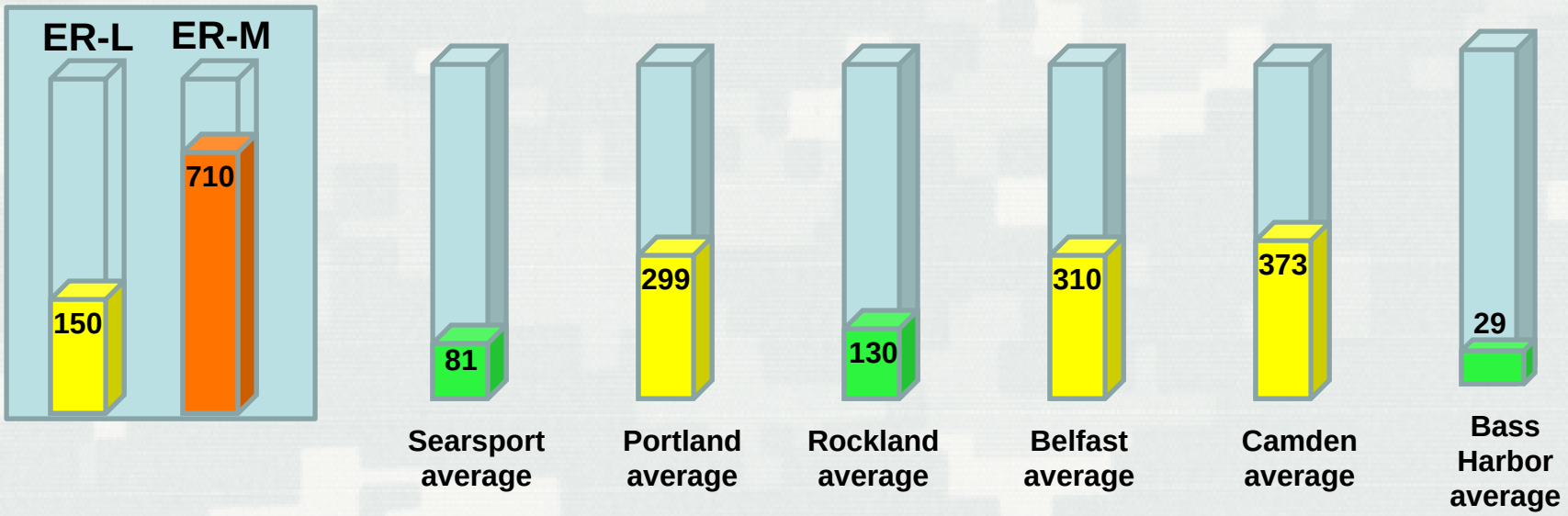
Lead (mg/kg or ppm)



-Effects range-low and effects range-median from Long *et al.* 1995
-Data are averages of concentrations presented in project Environmental Assessments, scale bars are approximate

Comparison of Searsport chemistry results with other Maine harbors dredged within the past ~15 years

Total Mercury (ug/kg or ppb)



-Effects range-low and effects range-median from Long *et al.* 1995
-Data are averages of concentrations presented in project Environmental Assessments, scale bars are approximate

How does the Searsport chemistry results compare with the overall Penobscot Bay mercury study?

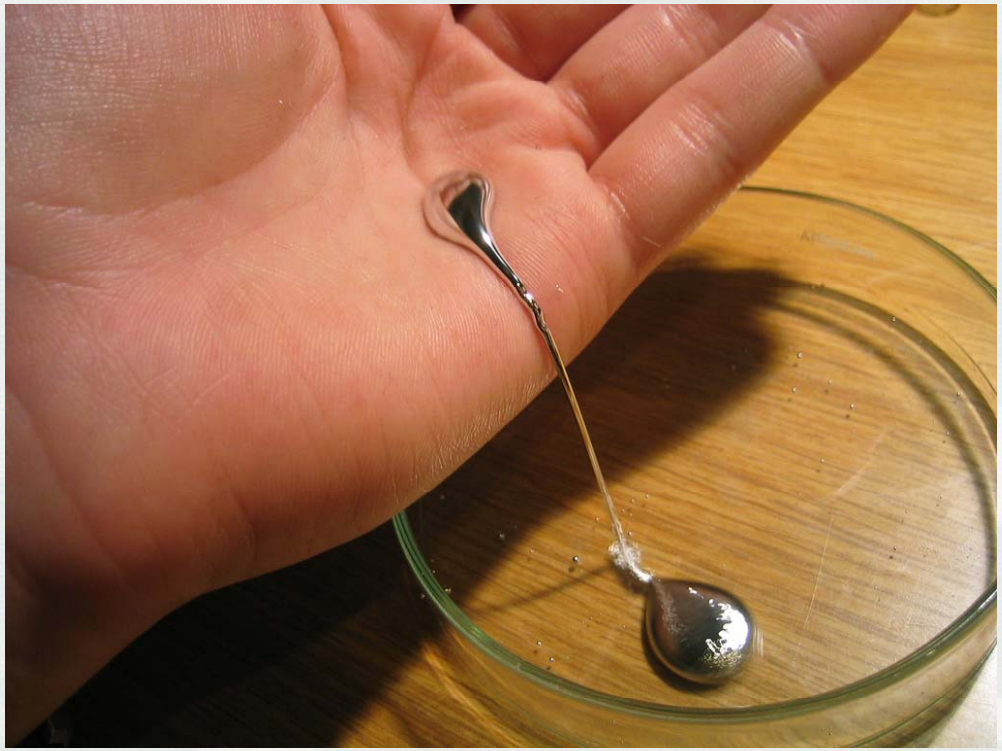
Court ordered study:

- covered the Penobscot River and the entire bay
- multiple stations sampled
- multiple media sampled
- multiple forms of mercury analyzed

Source: Figure 6 from Phase I Penobscot River Mercury Study, 2008

Background on Mercury

- naturally occurring element (only metal that is liquid at room temperature)
- the organic form methyl mercury is a neurotoxin that can bioaccumulate



Source: LearnNC.org

- undergoes complex cycling in natural systems with increased potential for methyl mercury formation in marsh systems

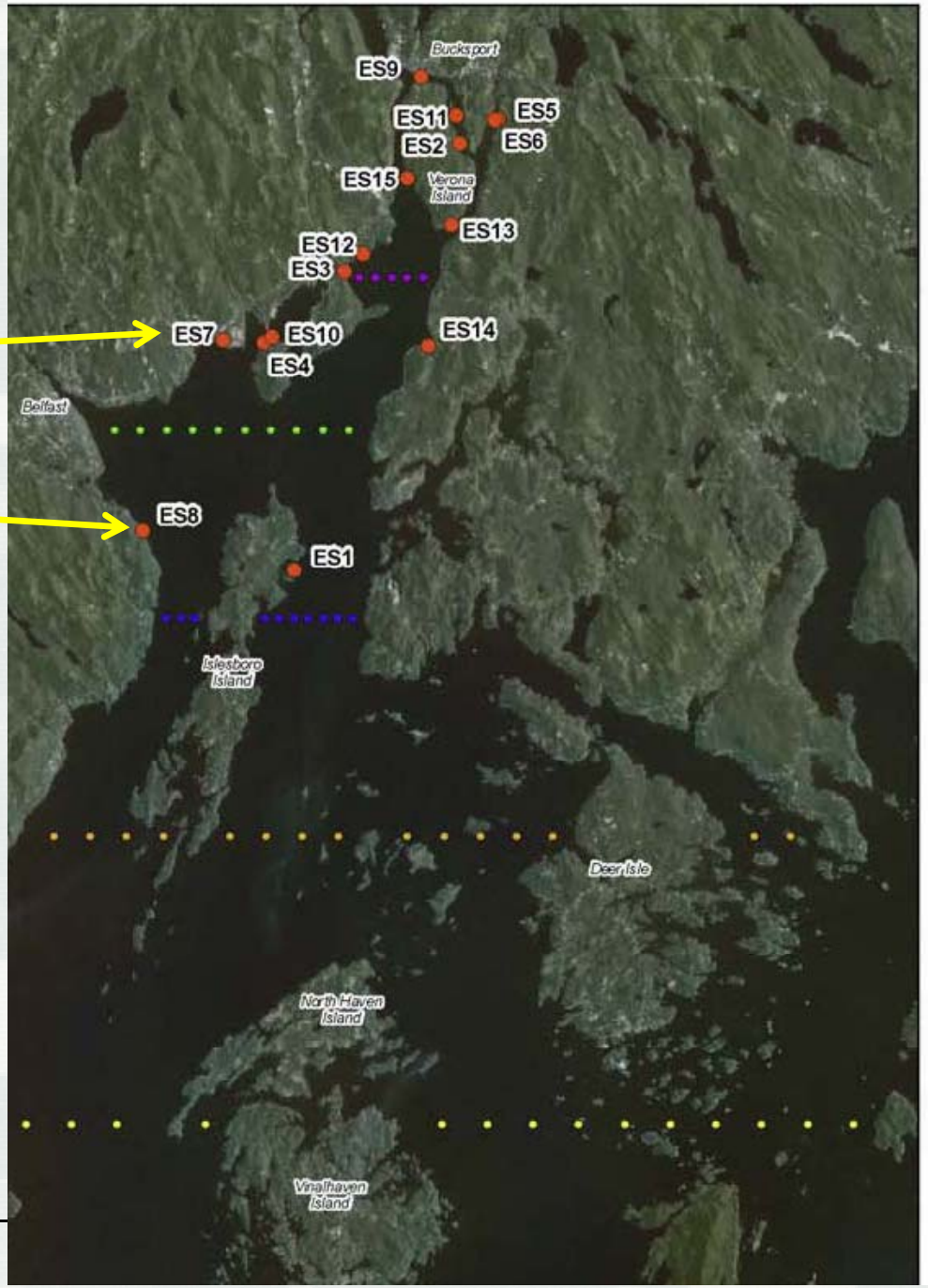
Estuary Aquatic Sampling Stations from Penobscot River Study

ES7 adjacent to port

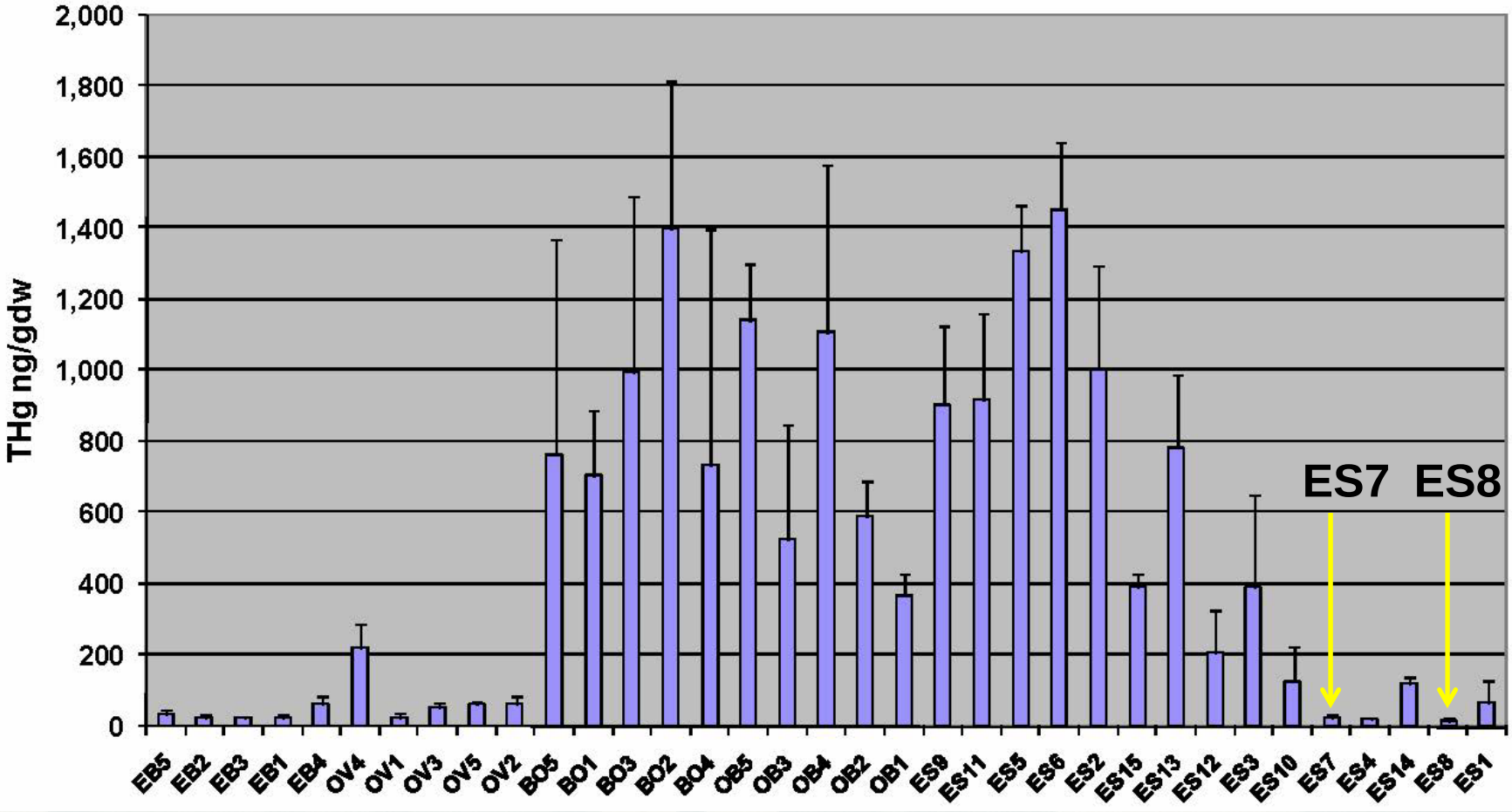
ES8 west of proposed disposal site

Study analyzed for both total mercury and methyl mercury

Source: Figure 6 from Phase I Penobscot River Mercury Study, 2008



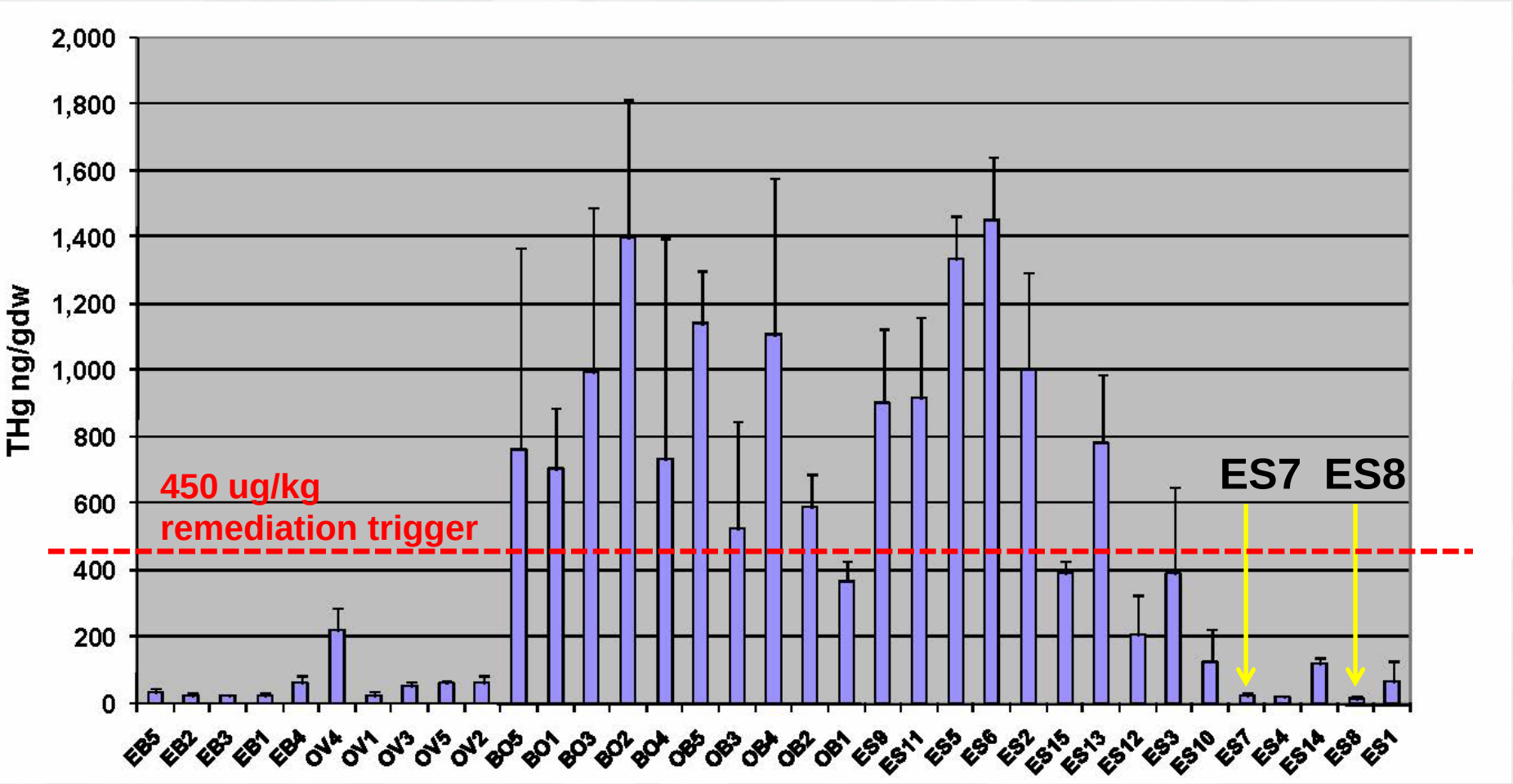
Total Mercury in Sediments Averaged from Four Sampling Rounds



Stations (from north to south)

Figure 20 from Phase I Penobscot River Mercury Study, 2008

Study recommended an action limit of 450 ug/kg total mercury in sediment as a trigger for remediation

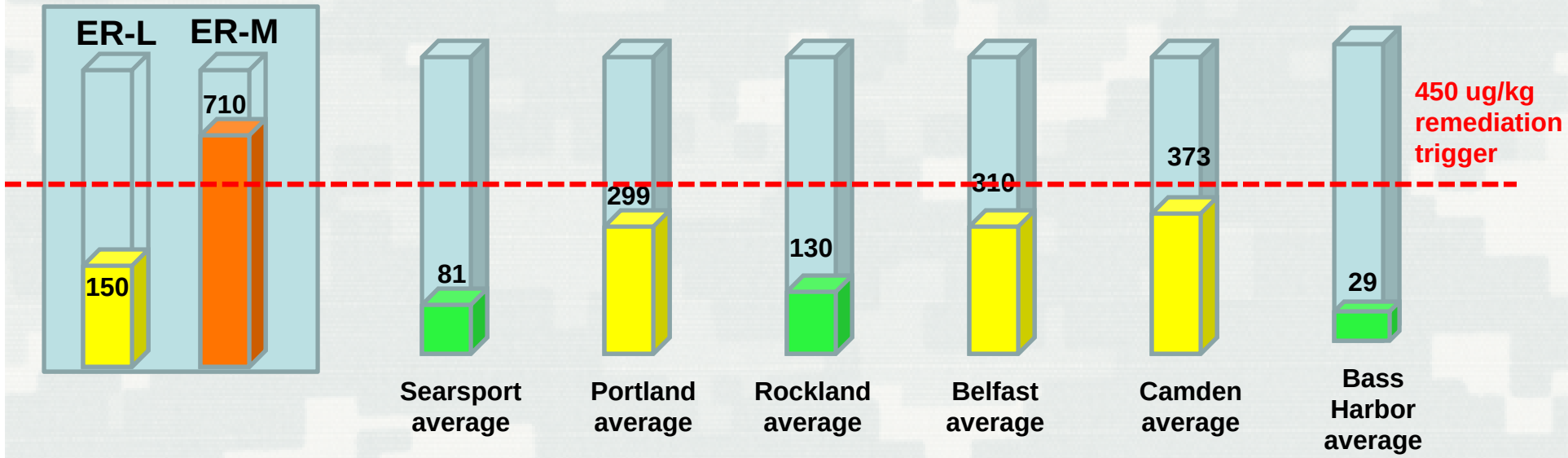


Stations (from north to south)

Figure 20 from Phase I Penobscot River Mercury Study, 2008

Comparison of Searsport chemistry results with other Maine harbors dredged within the past ~15 years

Total Mercury (ug/kg or ppb)



-Effects range-low and effects range-median from Long *et al.* 1995
-Data are averages of concentrations presented in project Environmental Assessments, scale bars are approximate

Step 7 – Submit results to EPA → Based on the results, the material was deemed suitable by the EPA for placement at an in-water dredged material disposal site

BATTELLE MARINE SCIENCES LABORATORIES
Jill Brandenberger, Project Manager
1529 West Sequim Bay Rd.
Sequim, Washington 98382
(360) 681-4564

USACE NED - Searsport Harbor
Metals in Sediment
Samples Received on 05/15/08
(concentrations in ug/g, dry weight)

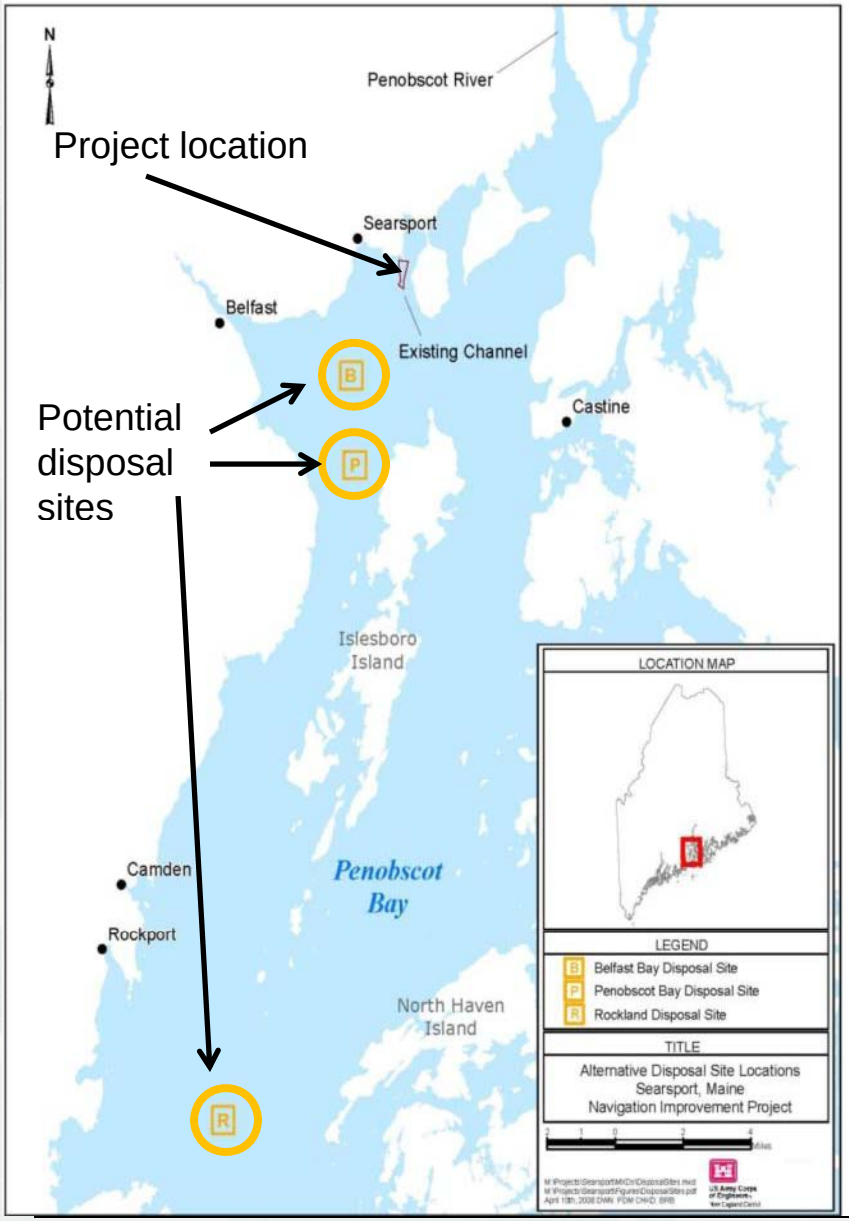
Sponsor ID	MSL Code	Site Description	Collection Date	Percent Moisture	As	Cd	Cr	Cu	Ni	Pb	Zn	Hg
				Instrument:	*ICP-MS*	*ICP-MS*	*ICP-OES*	*ICP-OES*	*ICP-OES*	*ICP-OES*	*ICP-OES*	*TD-CVAAS*
				CAS Number:	7440-38-2	7440-43-9	7440-47-3	7440-50-8	7440-02-0	7439-92-1	7440-66-6	7439-97-6
				Achieved MDL	**0.18**	**0.0044**	**0.020**	**0.058**	**0.023**	**0.25**	**0.21**	**0.0020**
				RLs (3.18 x MDL)	0.5	0.01	0.07	0.2	0.07	0.7	0.7	0.007
HAC-012	2891-3	Reference Sediment BBDS	05/02/08	62.4	13.5	0.0860	87.4	19.6	37.6	26.4	114	0.278
HAC-013	2891-4	Reference Sediment BBDS	05/02/08	60.6	14.2	0.0933	87.1	18.8	36.8	26.8	111	0.289
HAC-014	2891-5	Reference Sediment BBDS	05/02/08	62.7	14.3	0.0887	87.0	19.5	37.7	26.6	114	0.261
HAC-015	2891-6	Reference Sediment IDS	05/02/08	64.0	12.5	0.0723	82.0	17.5	36.9	22.5	106	0.136
HAC-016	2891-7	Reference Sediment IDS	05/02/08	62.4	12.5	0.0747	85.4	17.9	36.8	22.5	109	0.150
HAC-017	2891-8	Reference Sediment IDS	05/02/08	62.1	12.4	0.0784	84.3	17.7	36.3	23.3	107	0.150
HAC-017	2891-8 DUP	Reference Sediment IDS	05/02/08	62.1	13.0	0.0720	84.9	17.8	36.9	23.7	108	0.156
HAC-019	2891-9	Sediment from Station A,B,C	04/30/08	52.7	15.8	0.0913	81.8	17.0	36.9	18.3	97.7	0.129
HAC-020	2891-10	Sediment from Station D,F	04/30/08	57.5	18.0	0.172	75.7	16.2	34.0	15.7	89.0	0.110
HAC-021	2891-11	Sediment from Station E,G,H,I	04/30/08	42.5	14.9	0.118	63.3	15.8	30.5	11.4	65.0	0.0440
HAC-022	2891-12	Sediment from Station J	05/01/08	30.2	17.0	0.159	47.4	8.76	19.8	10.1	48.4	0.0420
Procedural Blank												
MB	Blank 053008				0.0277 J	0.01 U	0.07 U	0.2 U	0.07 U	0.7 U	0.7 U	--
MB	Method Blank R1				--	--	--	--	--	--	--	0.007 U
MB	Method Blank R2				--	--	--	--	--	--	--	0.007 U
MB	Method Blank R3				--	--	--	--	--	--	--	0.007 U
Laboratory Control Sample (Blank Spike)												
LCS	LCS 053008/ LCS (Hg)				27.1	26.4	25.6	25.4	24.4	25.7	26.5	0.279
MB	Blank 053008/Method Blank (Hg)				0.0277 J	0.01 U	0.07 U	0.2 U	0.07 U	0.7 U	0.7 U	0.007 U
	Spike Concentration				25	25	25	25	25	25	25	0.281
	Percent Recovery				**108%**	**106%**	**102%**	**101%**	**98%**	**103%**	**106%**	**99%**
MATRIX SPIKE RESULTS												
MS	2891-10 MS				67.4	2.14	124	65.5	78.7	60.5	185	0.664
MSD	2891-10 MSD				64.4	1.99	119	62.1	76.4	57.4	177	0.594
HAC-020	2891-10	Sediment from Station D,F	04/30/08	57.5	18.0	0.172	75.7	16.2	34.0	15.7	89.0	0.110
	Spike Concentration, MS				47.2	1.98	47.2	47.2	47.2	47.2	94.3	0.552
	Spike Concentration, MSD				44.9	1.82	44.9	44.9	44.9	44.9	89.8	0.482
	Percent Recovery, MS				**105%**	**99%**	**102%**	**105%**	**95%**	**95%**	**102%**	**100%**
	Percent Recovery, MSD				**103%**	**100%**	**96%**	**102%**	**94%**	**93%**	**98%**	**100%**
	RPD				**1%**	**1%**	**6%**	**2%**	**0%**	**2%**	**4%**	**0%**

Page 1 of 2

Searsport Harbor, Analytical Chemistry, Sediments and Rinsate Blanks

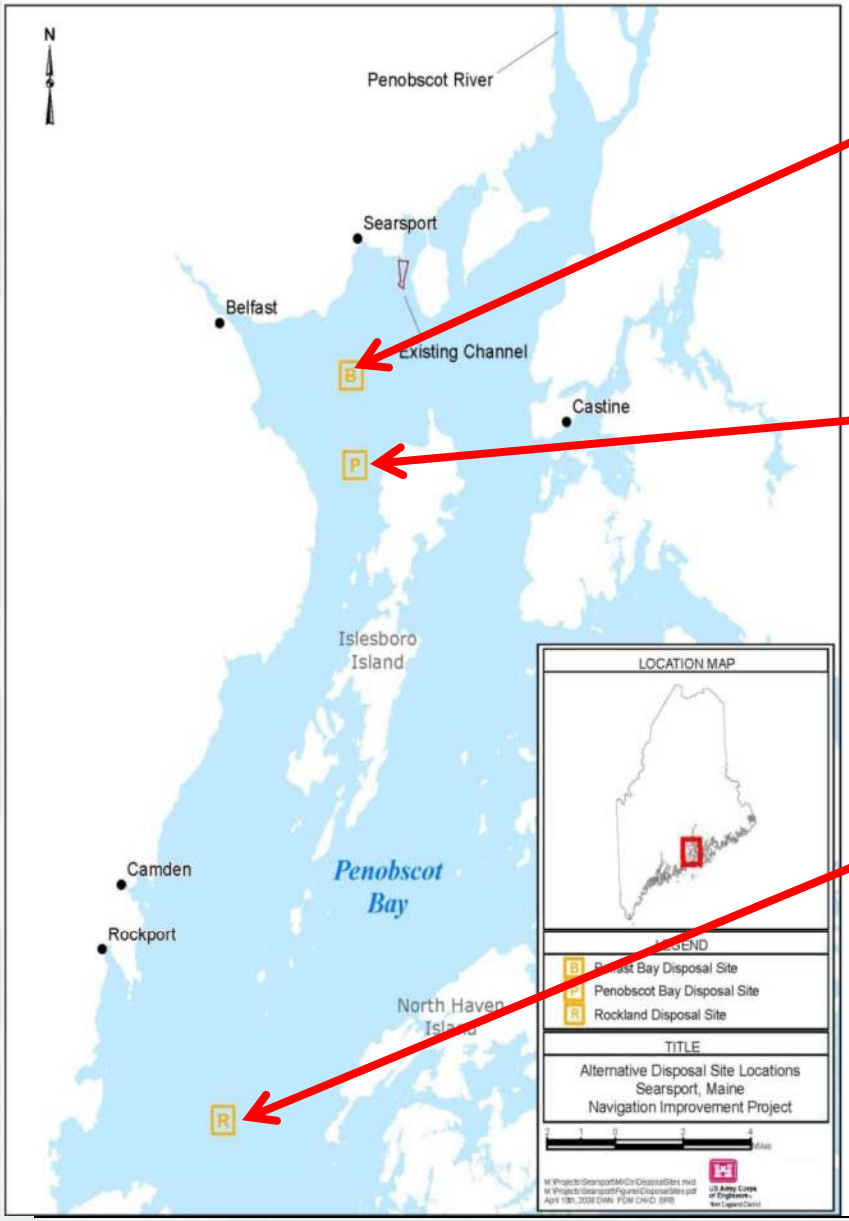
Page 3 of 21

Selection of a Potential Disposal Site



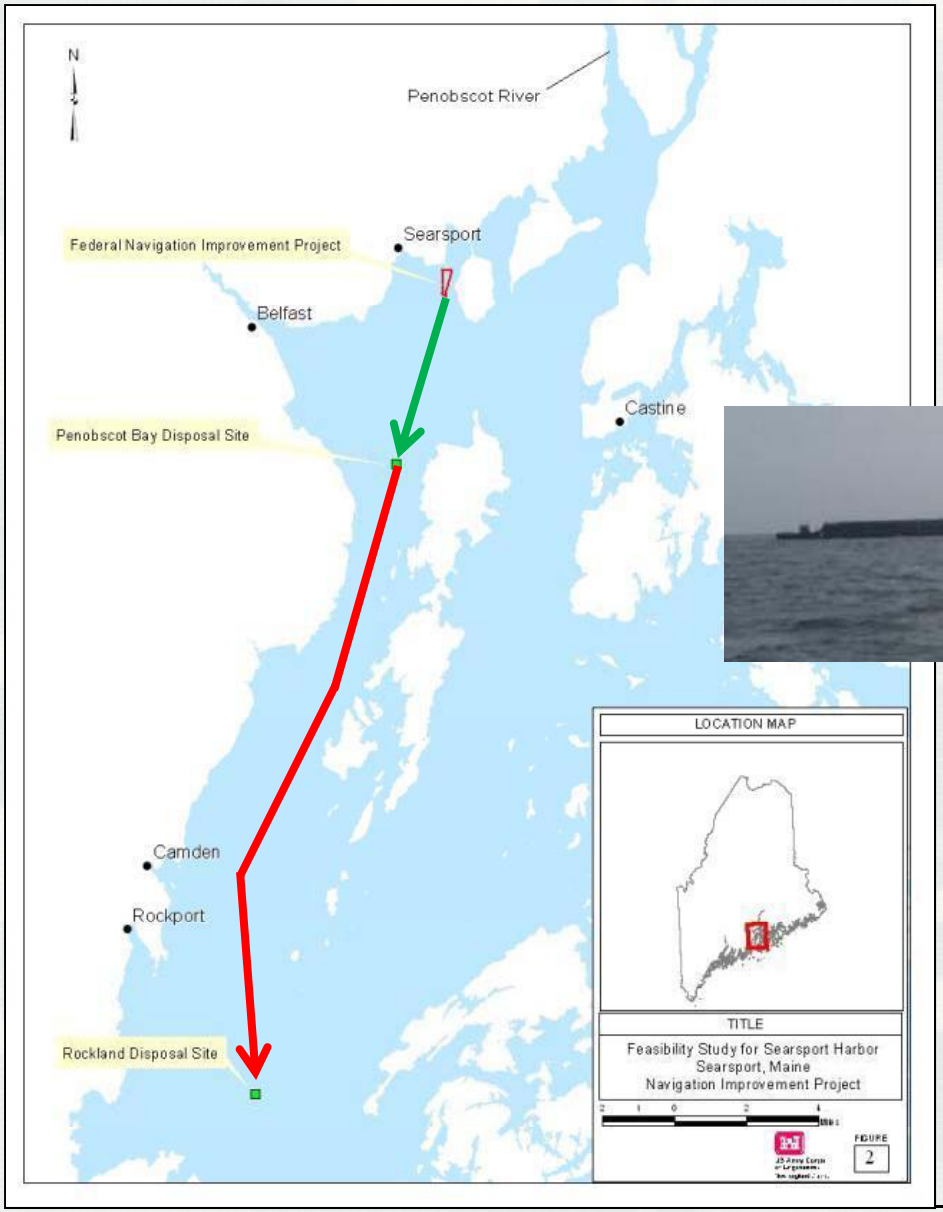
- Previously used for dredged material disposal?
- Capacity of the site
- Proximity to sensitive resources
- Distance from project location
- Other logistical issues

Studies Supporting the Selection of the Disposal Site



- Belfast Bay (Steels Ledge) site - marked on charts (historical); evaluated in 2000, 2007-08 but no detailed record of use
- Penobscot site – nearby area marked on charts (historical)
  - initial sampling in 2007-08
  - bathymetry, imaging, benthic sampling in 2013
- Rockland – established regional site with use dating back to 1973

Concerns with Use of the Rockland Disposal Site

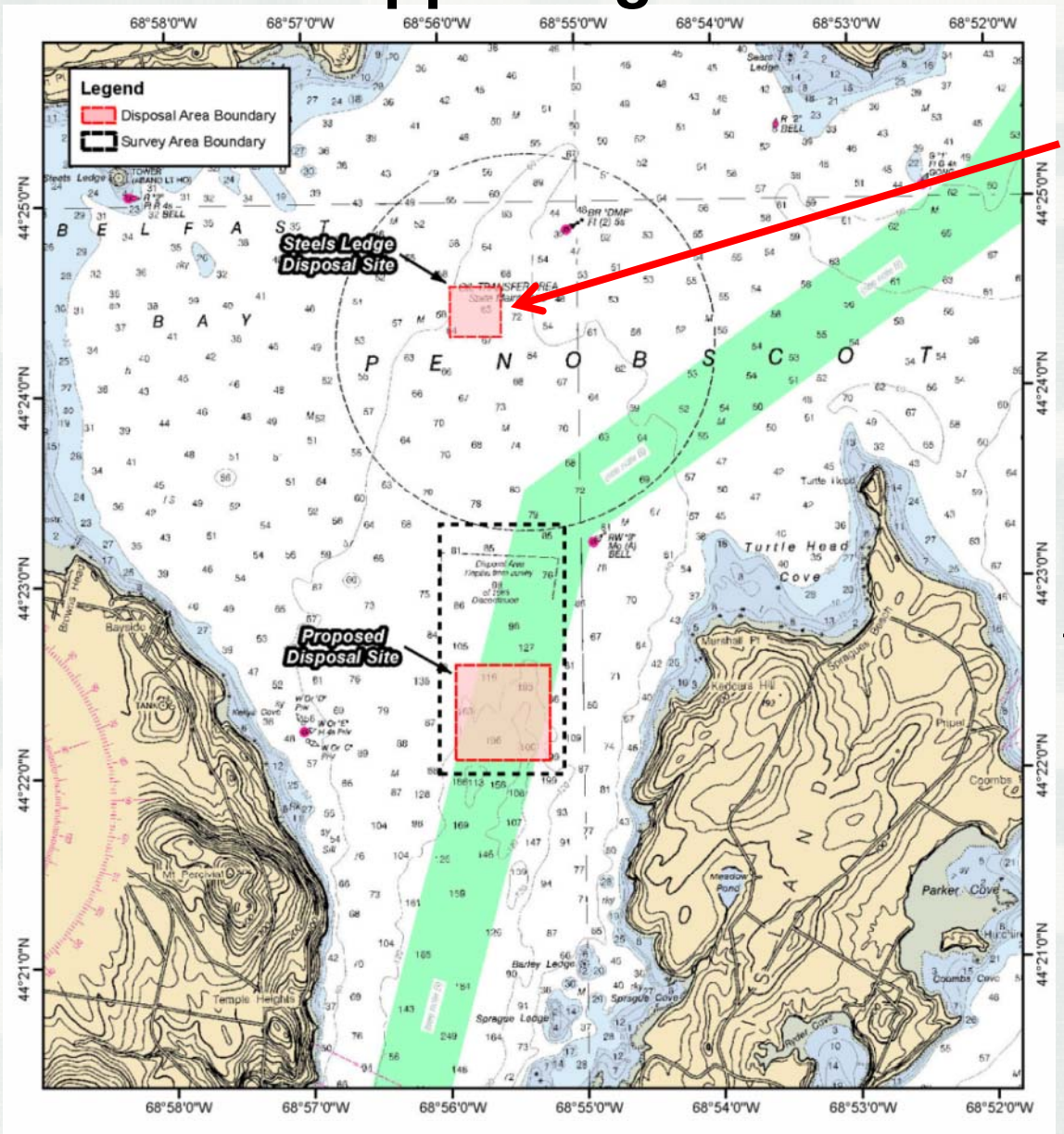


Extended haul distance to disposal site

- approximately 38 miles additional haul for each scow round trip

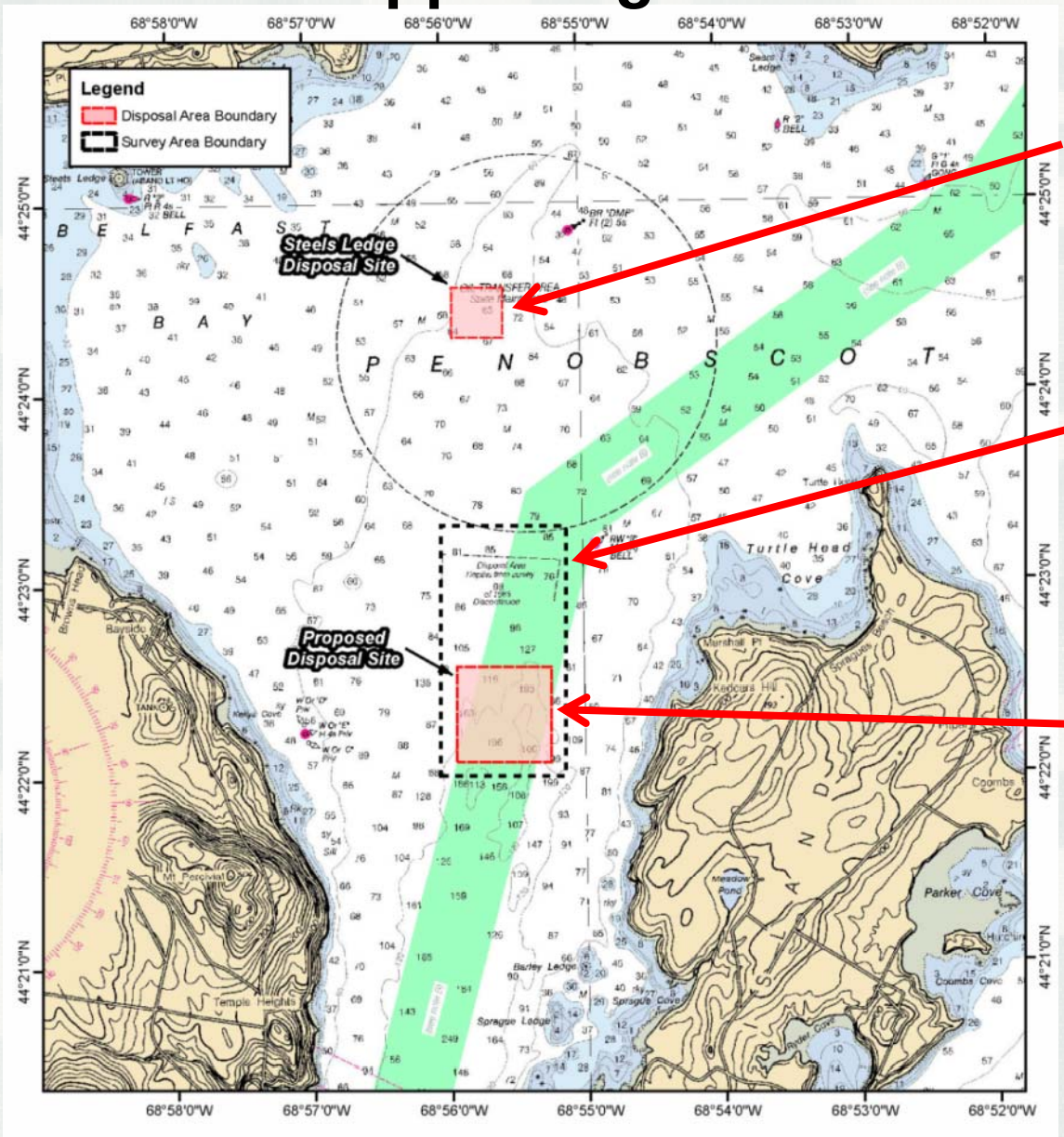
- additional 63 days of tug-scow traffic on the bay
- additional 260,000 gallons of diesel fuel usage

Studies Supporting the Selection of the Disposal Site



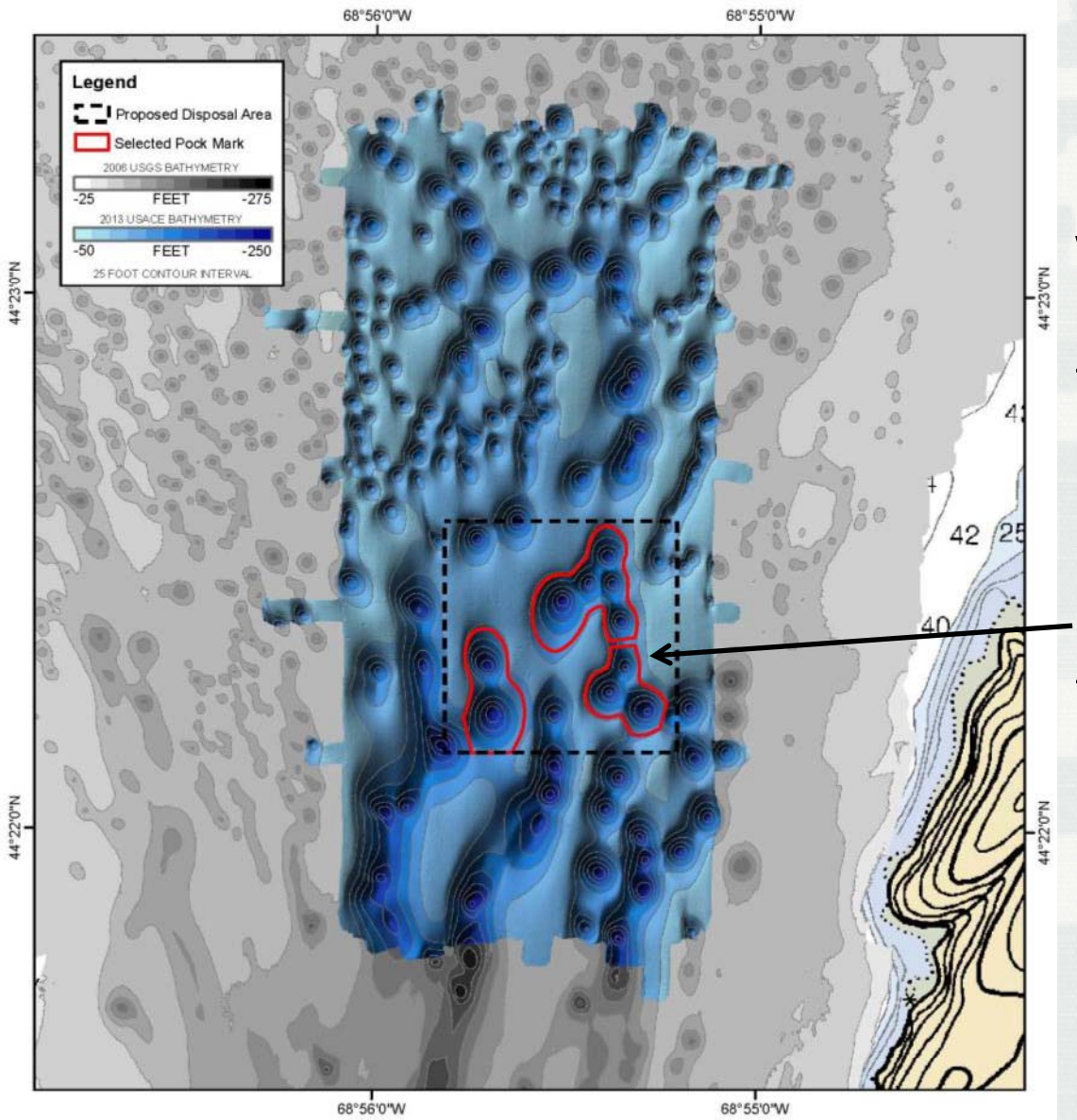
- Belfast Bay (Steels Ledge) site – averages ~60 ft deep
- Limited pockmarks on the bottom
- Size (550 x 550 yds) and depth mean that most of the site would need to be used for placement of material

Studies Supporting the Selection of the Disposal Site



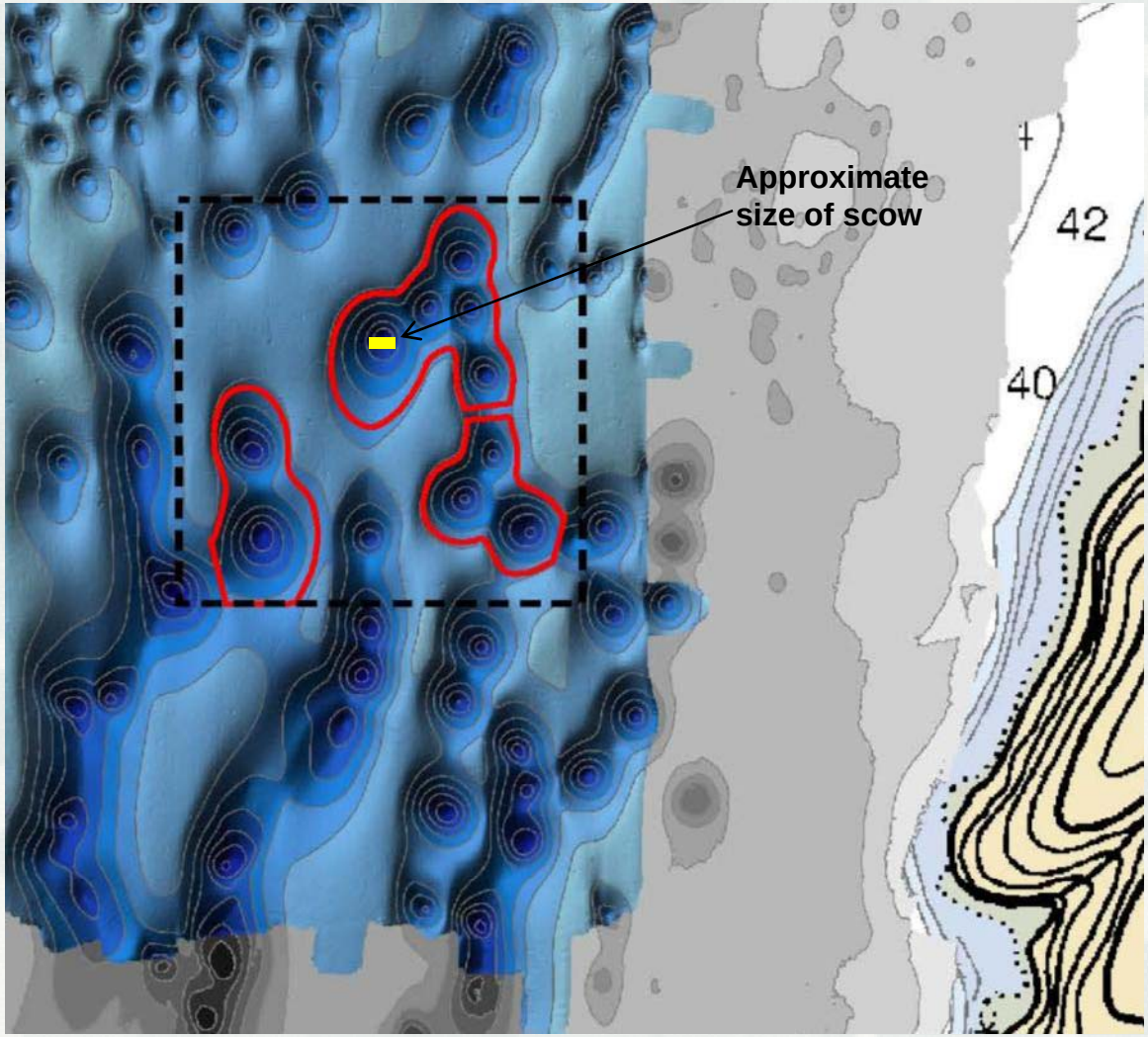
- Belfast Bay (Steels Ledge) site – averages ~60 ft deep
- 2013 survey area expanded to include charted historic disposal area
- Penobscot Bay site - depths of 100-200 ft

Studies Supporting the Selection of the Disposal Site



- bathymetry revealed pits with relatively steep sides and extending well below the surrounding seafloor
- uniform fine-grained sediments
- clusters of deep pits within the site appear ideal for limiting the footprint of the placed dredged material

Studies Supporting the Selection of the Disposal Site



- one or two of the pit clusters could provide sufficient capacity for all the material from the project
- disposal would be targeted to cover less than ¼ of the site

Limiting Impacts to Water Quality and Biota

- strict seasonal windows on when the work can be performed
- electronic tracking of every scow during loading, transport, disposal, and return
- water column monitoring at the startup of the project and for any major change in operations
- periodic bathymetry to track placement at the site
- long term monitoring to track the recovery of the biological community at the disposal site

Concerns Addressed When Selecting a Disposal Site

- Can the material be accurately placed at the site and will it remain there?
- Will there be an unacceptable release of material to the water column during disposal?
- Will the disposed material cause an unacceptable impact to the benthic community?
- Other site-specific concerns? (e.g. mercury, lobster)

Information

USACE Draft Feasibility Study and Environmental Assessment

http://www.nae.usace.army.mil/missions/ProjectsTopics/Searsport.aspx

USACE Disposal Area Monitoring System (DAMOS) reports
http://www.nae.usace.army.mil/Missions/DisposalAreaMonitoringSystem(DAMOS).aspx

Maine DEP email

channeldredge.dep@maine.gov