



**US Army Corps
of Engineers®**
Portland District

WESTPORT/WAHKIAKUM FERRY SEDIMENT QUALITY EVALUATION REPORT



Sampled July 12, 2005

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EPA	Environmental Protection Agency
USACE	U.S. Army Corps of Engineers
ODEQ	Oregon Department of Environmental Quality
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
DMEF	Dredge Material Evaluation Framework
NES	Newly Exposed Surface
QA/QC	Quality Assurance/Quality Control
TOC	Total Organic Carbon
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
MRL	Method Reporting Limit
ND	non-detect
ppm	parts per million – mg/kg
ppb	parts per billion – ug/kg & ug/L
pptr	parts per trillion – ng/kg
RM	River mile
SL	Screening level
As	Arsenic
Cd	Cadmium
Ni	Nickel
Cu	Copper
Sb	Thallium
Cr	Chromium
Pb	Lead
Hg	Mercury
Ni	Nickel
Ag	Silver
Zn	Zinc



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Note: This Westport/Wahkiakum Ferry Crossing Sediment Quality Evaluation Report was reviewed by the Regional (sediment) Management Team (RMT) in accordance with the DMEF (1998). The RMT consists of Portland District Corps of Engineers, EPA Region 10, Oregon DEQ and Washington DOE personnel. All comments received have been incorporated into the report and was considered final at the end of the review period, November, 2005.



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ABSTRACT

The Westport Slough is located on the Oregon side of the Columbia River at approximately river mile (RM) 43.5. The River and Harbor Act of August 26, 1937 authorized a 28-ft. deep by 200-ft wide, 3500-ft. long channel. The existing project provides for a channel 9 feet deep, 200 feet wide and 1900 feet long. The Westport Ferry proceeds down the slough channel then across the Columbia River to connect Westport to the south side of Puget Island on the Washington side of the Columbia River. Shoaling across the mouth of Westport slough and on the Puget Island end of the channel will require maintenance dredging for navigational purposes.

There are no known sources of contamination in the area upstream. Georgia Pacific (formerly James River paper mill) is located at Wauna 2.0 miles downstream; 1998 sediment was tested for Dioxin/Furans, with none detected in any samples at low laboratory detection levels.

On July 12, 2005 a total of five (5) surface grab sediment samples were submitted for physical and chemical analyses. The combined averages indicate the material is 85.0% sand, 15% silt and clay, with 0.8% volatile solids. The chemical analyses indicated only low levels of some metals in any of the samples, with all levels well below their respective DMEF screening levels (SLs), with low laboratory method detection levels (MDLs) reported. No pesticides, PCBs or PAHs were detected in any of the samples, also, with low MDLs.

All material is determined to be suitable for unconfined in-water placement without further characterization.

INTRODUCTION

This sampling event characterized the sediment of shoaling within the ferry crossing channel on the Columbia River at RM 43.5. Shoaling typically forms nearshore on both the Oregon and Washington sides of the crossing. In 1998 the material was homogeneous, averaged 75% sand and 25% fines (Oregon side only), with no known source of contamination or history of contaminated sediment shoaling. Current hydrographic surveys indicate shoaling depth is <3 feet.

Sampling and Analysis Objectives

- To characterize sediments in accordance with the regional dredge material testing manual protocols, the Dredge Material Evaluation Framework for the Lower Columbia River Management Area (DMEF), as well as, the Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or upland Confined Disposal Facilities – Testing manual (Upland Testing Manual).
- Collect, handle and analyze representative sediment from Westport/Wahkiakum Ferry Channel crossing in accordance with protocols and Quality Assurance/Quality Control (QA/QC) requirements.



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- Analyze for full suite of physical and chemical parameters as outlined in the DMEF (1998) Tier II a & b. DMEF – Table 8.1 contains the list of analytes and methods of analysis.

PREVIOUS STUDIES

In 1990, 1994, 1996 and 1998 samples were taken prior to dredging shoals in the Westport/Wahkiakum Ferry Crossing.

In the 1998 sampling event 4 samples were taken by gravity core. Two (2) attempts recovered no sediment, with subsequent recovery ranges of 5", 14", 21" & 44"; these samples were all collected on the Oregon side of the crossing channel, as no shoaling was present on the Washington side. There are no known sources of contamination in the area upstream. Georgia Pacific (formerly James River paper mill) is located at Wauna 2.0 miles downstream. In 1998 select samples were analyzed for Dioxin/Furans testing, with no detections present. The physical averages for 1998 indicate the material was 75.0% sand, 25% silt and clay, with 2.7% volatile solids.

Material from all previous sampling events has been approved for unconfined in-water placement, without further characterization.

CURRENT SAMPLING EVENT/DISCUSSION

A hydrographic survey was conducted to determine the depth of the potential dredging prism and sample target stations within the Westport/Wahkiakum Ferry Channel crossing (see Figure 2). Surface grab samples were planned for this event due to poor penetration and recovery on most attempts during the 1998 sampling event (see Previous Studies section above) and because shoaling depth was <3-feet of shoaling material (1-2 feet max depth) within the authorized crossing channel dredging prism.

On July 12, 2005 a total of five (5) surface grab sediment samples, using a modified Gray O'Hara boxcore sampler, were submitted for physical analyses including total volatile solids and were, also, analyzed for metals (9 inorganic), total organic carbon, pesticides and polychlorinated biphenyls (PCBs), phenols, phthalates, miscellaneous extractables and polynuclear aromatic hydrocarbon (PAHs).

Physical analysis of the samples revealed that the sediment samples collected at the shoaling near Puget Island contained less fine-grained material (0.5 %) than the samples taken from the shoaling near the Westport end of the of the ferry crossing channel (24.8 %). The combined averages indicate the material to be 85.0% sand, 15% silt and clay, with 0.8% volatile solids.

The chemical analyses indicated only low levels of some metals (Cu, Pb, Ni & Zn) in the samples collected, with all levels well below their respective DMEF screening levels (SLs) and low laboratory method detection levels (MDLs) reported. No pesticides, PCBs or PAHs were detected in any of the samples, also, with low laboratory MDLs reported.



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All material is determined to be suitable for unconfined in-water placement without further characterization.

Table 1, documents the sampling station location coordinates, recorded using a hand held Lowrance GlobalMap 100 GPS unit. Table 2, identifies the sampling team and their areas of responsibility in this project.

Table 1: Westport/Wahkiakum Ferry Sampling Station Coordinates

(NAD 83, Oregon State Plane North)

071205WP-BC-01	46°08'47.4" 123°23'01.7"	071205WP-BC-04	46°09'10.4" 123°22'42.0"
071205WP-BC-02	46°08'45.8" 123°23'03.5"	071205WP-BC-05	46°09'09.3" 123°22'39.1"
071205WP-BC-03	46°08'45.6" 123°23'03.0"		

Table 2, Planning & Sampling Team with Responsibilities

Task/Responsibility	CENWP Tim Sherman	CENWP Wendy Briner	CENWP Mark Siipola	A/E Boat Operator
Overall Project Management	X			
Sampling Plan Development	X			
Agency Coordination	X		X	
Positioning/Log Record	X	X		X
Sediment Sampling	X	X	X	
Physical Analysis	X			
Chemical Analysis	X			
Final Report	X			
Technical Review			X	
Boat & Operator				X

RESULTS

Physical and Volatile Solids (ASTM methods)



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A total of five (5) stations were sampled, with data presented in Table 3. Physical analysis of the samples revealed that the sediment samples collected at the shoaling near Puget Island contained less fine-grained material (0.5 %) than the samples taken from the shoaling near the Westport end of the of the ferry crossing channel (24.8 %) (see Figure 3, note *Corbicula* clams in sediment). The combined averages indicate the material to be 85.0% sand, 15% silt and clay, with 0.8% volatile solids. Mean grain-size for all sediment samples is 0.2054mm (0.0948mm-0.3554mm range). The sediment on the Puget Island Washington side of the crossing is classified as poorly graded sand; the Westport Oregon side of the crossing as silty sand.

Metals (EPA method 6010/7471), Total Organic Carbon (EPA method 9060)

A total of five (5) stations were sampled, with data presented in Table 4. The TOC ranged from 8100 to 2400 mg/kg in the samples.

Low levels of Cu, Pb, Ni & Zn were detected in all samples, but no levels approached their respective DMEF SL. All laboratory MDLs are well below DMEF SL values.

Pesticides/PCBs (EPA method 8080), Phenols, Phthalates and Miscellaneous Extractables (EPA method 8270)

A total of five (5) stations were sampled, with data presented in Table 5. No pesticides (including DDT), PCB aroclors, phenols, phthalates or miscellaneous extractables listed in the DMEF were detected in any of the samples. All laboratory detection levels are well below DMEF SL values.

Polynuclear Aromatic Hydrocarbons (EPA method 8270C)

A total of five (5) stations were sampled, with data presented in Table 6. No samples contained any of the “low molecular weight” or “high molecular weight” PAHs. All laboratory detection levels are well below DMEF SL values.

CONCLUSION

This sampling event characterized the sediment within the federally authorized Westport/Wahkiakum Ferry crossing channel, between Westport Oregon and Puget Island Washington, to determine contamination levels (if any) and physical characteristics that exist within the sediment to be dredged and determine it's suitability for in-water placement.

The Westport Slough is located on the Oregon side of the Columbia River at approximately river mile 43.5. The River and Harbor Act of August 26, 1937 authorized a 28-ft. deep by 200-ft wide, 3500-ft. long channel. The existing project provides for a channel 9 feet deep, 200 feet wide and 1900 feet long. The Wahkiakum Ferry proceeds down the slough channel then across the Columbia River to connect Westport to the south side of Puget Island on the Washington side of the Columbia River. Shoaling across the mouth of Westport slough and on the Puget Island end of the channel will require maintenance dredging for navigational purposes. There are no



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known sources of contamination in the areas upstream. Historical data collected in 1990, 1994, 1996 and 1998 have shown all material to be suitable for unconfined in-water placement.

This evaluation was conducted following procedures set forth in the Upland Testing Manual Ocean Testing Manual and Inland Testing Manual, developed jointly by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency to assess dredged material. Guidelines used are those developed to implement the Clean Water Act. These national guidelines and associated local screening levels are those adopted for use in the regional Dredge Material Evaluation Framework (DMEF), November 1998.

On July 12, 2005 there were 5 stations sampled within the shoal areas of the ferry crossing channel and were all submitted for physical and chemical analyses. Two (2) stations are located near Puget Island, with an additional 3 stations located near the mouth of Westport Slough. Physical analysis of the samples revealed that the sediment collected at the shoaling near Puget Island, contained 0.5 % fine-grained material, with 99.6 % sand, while sediment taken from the shoaling near the Westport end of the ferry crossing channel contained 24.8 % fine-grained material, with 75.2% sand. The combined averages indicate the material to be 85.0% sand, 15% silt and clay, with 0.8% volatile solids. Mean grain-size for all sediment samples is 0.2054mm (0.0948mm-0.3554mm range). The sediment on the Puget Island, Washington side of the crossing, is classified as poorly graded sand; Westport, the Oregon side of the crossing, as silty sand.

The chemical analyses indicated only low levels of some metals in any of the samples, with no other chemicals of concern detected, in any samples, at MDLs well below their respective DMEF screening levels.

All material is determined to be suitable for unconfined in-water placement without further characterization.



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REFERENCES

1. U.S. Army Corps of Engineers, Portland District and Seattle District; U.S. Environmental Protection Agency, Region 10; Oregon Department of Environmental Quality; Washington State Department of Natural Resources and Department of Ecology. 1998 Final. Dredge Material Evaluation Framework for the Lower Columbia River Management Area.
2. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. February 1998. Evaluation of Dredged Material Proposed for Discharge in Inland and Near Coastal Waters - Testing Manual (referred to as the "Inland Testing Manual").
3. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency. February 1991. Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual (referred to as the OTM or the "Green Book").
4. U.S. Army Corps of Engineers. January 2003. Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities - Testing Manual (referred to as the "Upland Testing Manual").
5. Clean Water Act, 40 CFR 230 (b)(1).
6. Siipola, M., U.S. Army Corps of Engineers, Portland District. Nov 1990. St. Helens, Oregon Cross Channel Sediment Quality Evaluation, 1989.
7. Army Corps of Engineers, Portland District. Aug 1990. Results of Westport Slough Sediment Quality Evaluation.
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Table 3: Physical Analysis and Volatile Solids

Sample I.D.	Grain Size (mm)	Percent (%)			
	Mean	Gravel	Sand	Silt/Clay	Volatile Solids
071205WP-BC-01	0.1035	0.0	79.4	20.6	1.1
071205WP-BC-02	0.1335	0.0	73.6	26.4	1.2
071205WP-BC-03	0.0948	0.0	72.5	27.5	1.0
Average for samples from shoaling near Westport Slough	0.1106	0.0	75.2	24.8	1.1
071205WP-BC-04	0.3240	0.0	99.4	0.4	0.4
071205WP-BC-05	0.3554	0.0	99.8	0.6	0.2
Average for samples from shoaling near Puget Island	0.3397	0.0	99.6	0.5	0.3
Combined averages	<u>0.2054</u>	<u>0.0</u>	<u>85.0</u>	<u>15.0</u>	<u>0.8</u>



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Table 4: Inorganic Metals and TOC (mg/kg)

Sample I.D.	As	Cd	Sb	Cu	Pb	Ni	Ag	Zn	Hg	TOC
071205WP-BC-01	<2.02	<0.148	<0.81	13.0	4.47	10.2	<0.202	53.1	<0.0425	8100
071205WP-BC-02	<2.15	<0.158	<0.86	13.8	4.87	11.0	<0.216	60.1	<0.0512	7400
071205WP-BC-03	<2.00	<0.147	<0.80	12.9	3.95	9.53	<0.200	47.7	<0.0427	6400
071205WP-BC-04	<1.88	<0.138	<0.75	7.65	2.00	9.15	<0.189	35.5	<0.0439	5500
071205WP-BC-05	<1.94	<0.143	<0.78	8.13	2.25	9.40	<0.195	35.3	<0.0427	2400
DMEF 1998 Screening level	57	5.1	150	390	450	140	6.1	410	0.41	NA
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).										



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Table 5: Pesticides, PCBs (ug/kg)

Sample I.D.	Pesticides			PCBs Aroclors								
	4,4'- DDD	4,4'- DDE	4,4'- DDT	1016	1221	1232	1242	1248	1254	1260	1262	1268
071205WP-BC-01	<0.057	<0.082	<0.032	<7.8	<5.5	<8.6	<4.6	<4.3	<4.2	<6.0	<4.6	<7.8
071205WP-BC-02	<0.064	<0.093	<0.036	<8.5	<6.0	<9.4	<5.0	<4.7	<4.6	<6.5	<5.1	<7.5
071205WP-BC-03	<0.058	<0.084	<0.033	<7.9	<5.6	<8.8	<4.6	<4.4	<4.3	<6.1	<4.7	<7.0
071205WP-BC-04	<0.056	<0.080	<0.031	<7.0	<4.9	<7.7	<4.1	<3.9	<3.8	<5.3	<4.1	<6.1
071205WP-BC-05	<0.055	<0.079	<0.078	<7.4	<5.2	<8.1	<4.3	<4.1	<4.0	<5.7	<4.4	<6.5
DMEF 1998 Screening levels	Total 6.9			Total 130								
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).												



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Table 6: PAHs - Low Molecular Weight (ug/kg)

Sample I.D.	Ace naphthene	Ace naphthylene	Anthra cene	Fluorene	2-Methyl naphthalene	Naphtha lene	Phen- anthrene	Total Low PAHs
071205WP-BC-01	<3	<3	<3	<3	<4	<3	<1	ND
071205WP-BC-02	<3	<3	<3	<3	<5	<3	<2	ND
071205WP-BC-03	<3	<3	<3	<3	<4	<3	<1	ND
071205WP-BC-04	<3	<3	<3	<3	<4	<3	<1	ND
071205WP-BC-05	<3	<3	<3	<3	<4	<3	<1	ND
DMEF 1998 Screening levels	500	560	960	540	670	2100	1500	5200

Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).



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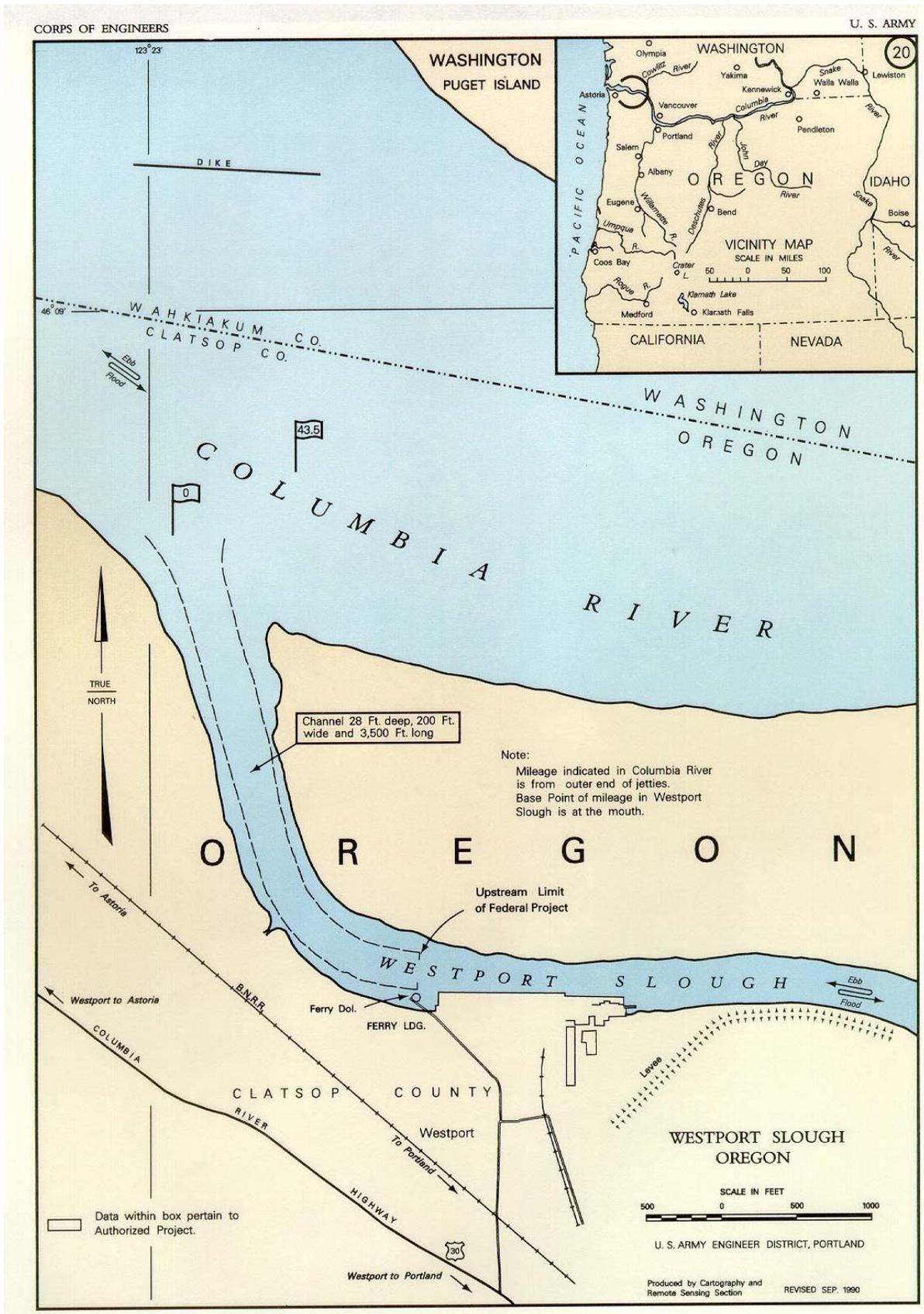
Table 6 (cont'd): PAHs - High Molecular Weight (ug/kg)

Sample I.D.	Benzo(a)-anthracene	Benzo-fluoranthenes	Benzo-(g,h,i)-perylene	Chrysene	Pyrene	Benzo(a)-pyrene	Indeno-(1,2,3-cd)-pyrene	Dibenzo (a,h)anthracene	Fluoranthene	Total High PAHs
071205WP-BC-01	<2	<11	<5	<3	<2	<4	<7	<6	<4	ND
071205WP-BC-02	<2	<12	<5	<3	<2	<4	<8	<7	<4	ND
071205WP-BC-03	<2	<11	<5	<3	<2	<4	<7	<6	<4	ND
071205WP-BC-04	<2	<11	<5	<3	<2	<3	<7	<6	<3	ND
071205WP-BC-05	<2	<11	<5	<3	<2	<3	<7	<6	<3	ND
DMEF 1998 Screening levels	1300	3200	670	1400	2600	1600	600	230	1700	12000
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).										

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Figure 1: Westport/Wahkiakum Ferry Vicinity Map



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Figure 2: Westport/Wahkiakum Ferry Sampling Station Map

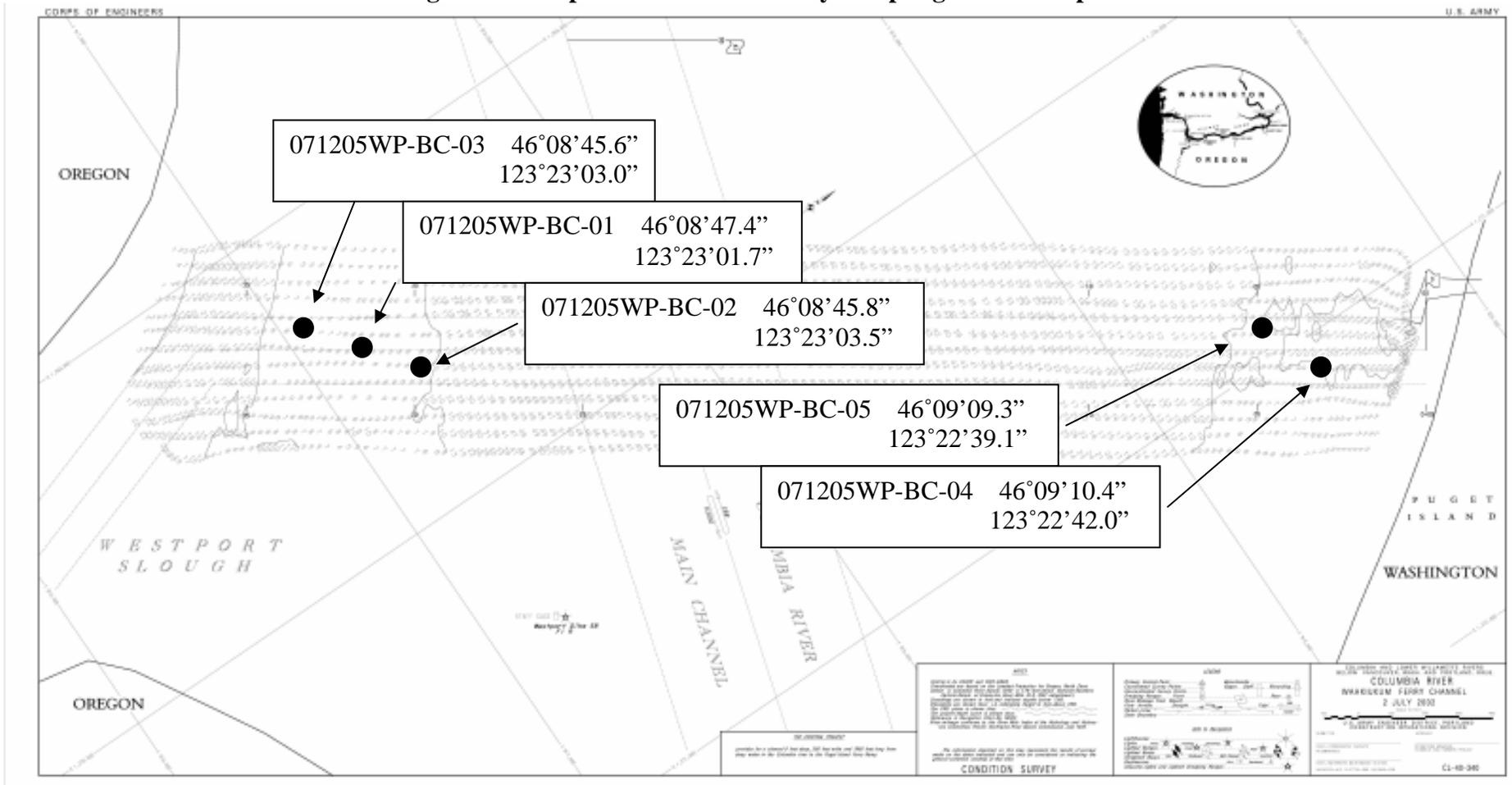


Figure 3: Sediment Sample 071205WP-BC-02



Figure 4: Sampling Team

