CENWS-OD-TS-NR-DMMO

MEMORANDUM FOR: RECORD June 4, 2014

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF FEDERAL OPERATION AND MAINTENANCE DREDGED MATERIAL FROM THE HYLEBOS WATERWAY, TACOMA, PIERCE COUNTY, WASHINGTON, EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR UNCONFINED OPEN-WATER DISPOSAL AT THE COMMENCEMENT BAY NONDISPERSIVE SITE.

1. Introduction. This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) regarding the suitability of 47,437 cubic yards (cy) of dredged material from the Hylebos Waterway federal navigation channel for disposal at the Commencement Bay nondispersive open-water site.

   The Hylebos Waterway, including the federal navigation channel, is within the Commencement Bay Nearshore/Tideflats Superfund site. The DMMP characterization of proposed dredged material for this project was conducted in consultation with EPA Superfund.

2. Background. As stipulated by Congress in the Rivers and Harbors Acts of 1925 and 1930, the Seattle District, Corps of Engineers (Corps) is authorized to conduct maintenance dredging of the Hylebos Waterway Federal Navigation Project in Tacoma, Washington (see Figure 1 for a project and vicinity map). The authorized depth of the channel is minus 30-feet (mean lower low water, MLLW) with a 2-foot allowable overdepth (to minus 32-feet, MLLW). The authorized dimension for the channel bottom width is 200 feet, except where the width is increased to 250 feet at the bend below East 11th Street, to 300 feet at the Lincoln Avenue bend, and to 510 feet and 770 feet, respectively, at the channel widening above Lincoln Avenue and the turning basin at the head of the waterway.

   Bathymetric surveys of the Hylebos Waterway were conducted by the Corps of Engineers in June 2012 and March 2013. In coordination with the Port of Tacoma and Puget Sound Pilots, USACE identified five areas of shoaling in the waterway that needed to be dredged to provide adequate water depth for navigation. This suitability determination covers those five shoaling areas (Figure 1).

   The federal navigation channel in the Hylebos Waterway had not previously been characterized under the Dredged Material Management Program, but ample data existed from sediment characterization work carried out under the EPA Superfund program and Corps of Engineers regulatory program to guide the DMMP sampling and testing summarized in this suitability determination.

3. Project Summary. Table 1 includes project summary and tracking information.

Table 1. Project Summary

Project ranking	High
Proposed dredging volume	47,437 cubic yards
Proposed dredging depth	-32 feet MLLW (including overdepth)
Draft SAP received	September 13, 2013
Draft SAP returned for revisions	October 24, 2013[1]
Revised SAP received	October 31, 2013
Revised SAP approved	November 1, 2013
Sampling dates	November 4-13, 2013
Draft data report received	April 4, 2014
Comments provided on draft report	April 22, 2014
Final data report received	May 21, 2014
DMMO tracking number	HYLEB-A-350-13
EIM Study ID	HYLEB13
Recency Determination	November 2016

[1]delayed by a government shutdown at the beginning of fiscal year 2014

4. Project Ranking and Sampling Requirements. The Hylebos Waterway is ranked as "high" concern for potential contamination (DMMP, 2013) and is heterogeneous in nature. In the Dredged Material Management Program, "surface" material (i.e. the top 4 feet) is treated differently from "subsurface" material (deeper than 4 feet) for the purpose of calculating the number of dredged material management units (DMMUs) and samples needed. However, for this project there was relatively little material deeper than 4 feet and the material that was deeper than 4 feet could not be dredged separately. Therefore, all sediment in the five shoals was considered to be surface sediment.

   The number of samples and DMMUs were calculated using the following guidelines:
   - Maximum volume of sediment represented by each field sample = 4,000 cubic yards
   - Maximum volume of sediment represented by each DMMU = 4,000 cubic yards

   The shoals were divided into a total of 15 DMMUs, each represented by a composite of sediment samples from three to four locations. See Table 2 for the dredged material volume represented by each DMMU and Figures 2 through 5 for the DMMU boundaries.

5. Sampling. Field sampling took place November 4-13, 2013 using a vibracore sampler. A number of difficulties were encountered during sampling (Herrera, 2014), resulting in the relocation of numerous sampling stations from the targets established in the sampling and analysis plan. Figures 2 through 5 show both target and actual sampling locations. Tables 3 and 4 include information for the samples collected.

The sampling plan called for collection of sediment from mudline to -32 ft MLLW at each sampling location to represent the dredged material. Two-foot long z-samples were to be collected from each location from -32 to -34 MLLW. As can be seen in Table 4, there were only minor deviations from the sampling plan.

6. Chemical Analysis. Table 5 provides a cross-reference between DMMU/z-sample IDs and lab sample IDs. It also indicates which analyses were conducted for each DMMU and z-sample.

   Table 6 presents the sediment conventional and chemistry results for the DMMUs and z-samples. A number of chemicals of concern were detected above DMMP guidelines values in the dredged material samples. These included exceedances of the PCB screening level (SL) in seven of the DMMUs and the tributyltin (TBT) bioaccumulation trigger (BT) in six DMMUs. Other chemicals exceeding DMMP guideline values included hexachlorobutadiene (3 DMMUs>SL) and dieldrin (1 DMMU>SL). There were also numerous non-detects above guideline values.

   Dioxin concentrations were elevated throughout the waterway, with all DMMUs exceeding both the DMMP volume-weighted limit of 4 ng/kg toxic equivalents (TEQ; u = ½ estimated detection limit) and the bioaccumulation trigger of 10 ng/kg TEQ. Concentrations in the dredged material ranged from 13 to 1,160 ng/kg TEQ, with the highest concentrations found in Shoal D.

   In response to the Essential Fish Habitat conservation recommendations that accompanied the National Marine Fisheries Service's biological opinion on the effects of dredged material disposal on listed rockfish species (DMMO, 2011), the Corps agreed to conduct limited analysis of polybrominated diphenyl ethers (PBDEs) for federal dredging projects. For the Hylebos O&M project, three DMMUs were analyzed for PBDEs. Results from this analysis are included in Table 7. PCB congeners were analyzed on these same three DMMUs and are also reported in Table 7.

   All chemistry data were validated by Herrera and EcoChem. EcoChem provided EPA Stage 4 validation for all congener analyses, including dioxins/furans, PCBs and PBDEs. Herrera provided Stage 4 validation for the remaining organics and Stage 3 validation for metals and conventional parameters. Only minor QA/QC issues were reported. Data qualifiers assigned by Herrera and EcoChem can be found in the columns labeled "VQ" in Tables 6 and 7.

7. Bioassays. No bioassays were conducted.

8. Sediment Exposed by Dredging. Sediment exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) (Ecology, 2013) or the State's antidegradation standard (DMMP, 2008a). For the Hylebos Waterway characterization, the Corps of Engineers elected to conduct concurrent chemical testing of all the z-samples. The results indicated that several of the z-samples exceeded SQS, or had higher concentrations for certain chemicals of concern than the dredged material samples and exceeded the DMMP SL or BT. This was the case for B1-Z (2,4-dimethylphenol); B3-Z (total PCB Aroclors); C1-Z (pyrene); C2-Z (hexachlorobenzene, hexachlorobutadiene; total PCB Aroclors); D1-Z (mercury;

total PCB Aroclors); D2-Z (TBT; total PCB Aroclors); D3-Z (TBT; total PCB Aroclors); and D4-Z (total PCB Aroclors).

A major consideration for the DMMP agencies in evaluating antidegradation was dioxins/furans. Elevated concentrations of dioxins/furans were found in the z-samples; in many cases the concentration in the z-samples was higher than that found in the dredged material. There is no SQS for dioxins/furans, but all z-samples exceeded the DMMP bioaccumulation trigger of 10 ng/kg TEQ. Those z-samples for which the dioxin/furan concentration exceeded that in the overlying dredged material included B3-Z, C2-Z, D1-Z, D2-Z, D3-Z and D4-Z.

9. Suitability Determination. This memorandum documents the evaluation of the suitability of sediment proposed for dredging from the federal navigation project in the Hylebos Waterway for open-water disposal. Deviations from the approved sampling and analysis plan, including relocation of sampling stations and differences between target and actual sampling depths, were not deemed serious enough to have significantly impacted the overall results. The data gathered were determined to be sufficient and acceptable for regulatory decision-making under the DMMP program.

   Based on the results of the previously described testing, the DMMP agencies concluded that all 47,437 cubic yards of sediment characterized for this project are unsuitable for open-water disposal. Further, due mainly to the high dioxin/furan concentrations found in the z-samples, the project does not meet the State's antidegradation standard. The Corps of Engineers has no plans to dredge the unsuitable material; therefore, full antidegradation evaluation and recommendations for addressing sediment to be exposed by dredging are unnecessary. However, any dredging project proposed in the future for the shoaled areas characterized and documented in this memo will need to give serious attention to the increasing contamination with depth in some areas. In addition, the difficult sampling conditions encountered during this sediment characterization effort should be taken into consideration when selecting coring equipment for future sampling events. This is especially true in the vicinity of the 11th Street bridge (B1 and C1), as well as D2, D3 and E2.

10. References.

DMMO, 2011. *Response Letter from Seattle District to the National Marine Fisheries Service Regarding the Endangered Species Act Section 7 Formal Consultation for the Continued Use of Puget Sound Dredged Disposal Analysis Program Dredged Material Disposal Sites, Puget Sound, Washington (HUCs, 1711200306 Lower Dungeness River, 171100200403 Ennis/Tumwater Creek, 171100020204 Anacortes, 171100020104 Lower Whatcom Creek, 17100110202 Lower Snohomish River, 171100130399 Lower Green River, 171100140599 Lower Puyallup River, 171100190503 Anderson Island). NMFS Consultation Number: 2010/04249.* Prepared by the Seattle District Dredged Material Management Office, January 2011.

DMMP, 2013. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, July 2013.

DMMP, 2008a. *Quality of Post-Dredge Sediment Surfaces (Updated).* A Clarification Paper Prepared by David Fox (USACE), Erika Hoffman (EPA) and Tom Gries (Ecology) for the Dredged Material Management Program, June 2008.

Ecology, 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, Revised February 2013.

Herrera, 2013. *Hylebos Waterway Federal Navigation Channel Dredged Material Characterization, Tacoma, Washington – Sampling and Analysis Plan*. Prepared by Herrera and NewFields for the U.S. Army Corps of Engineers, Seattle District, October 31, 2013.

Herrera, 2014. *Hylebos Waterway Federal Navigation Channel Dredged Material Characterization, Tacoma, Washington – Data Report*. Prepared by Herrera and NewFields for the U.S. Army Corps of Engineers, Seattle District, May 19, 2014.

12. Agency Signatures.

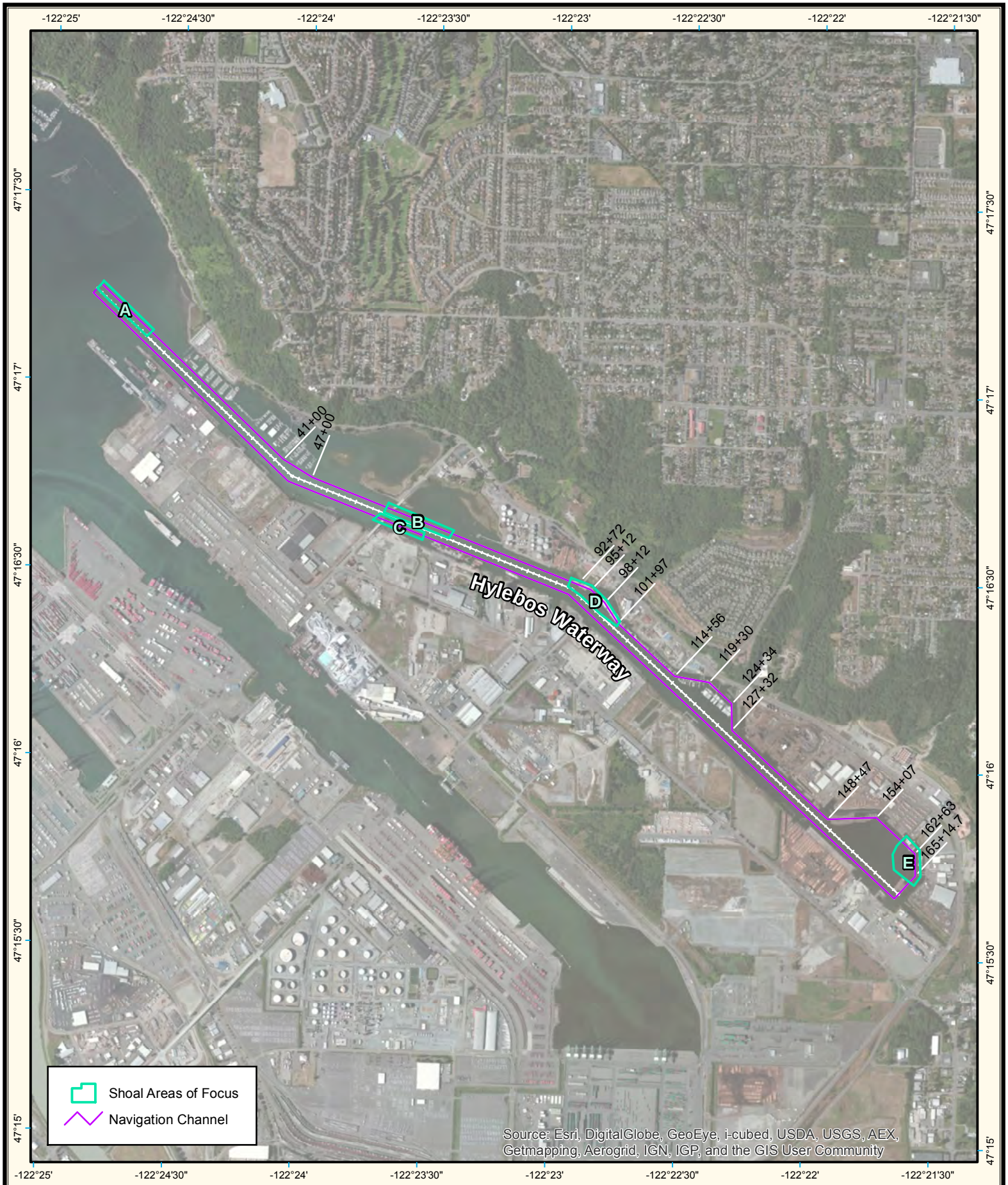
The signed document is on file in the Dredged Material Management Office.

Concur:

_____	_____
Date	David Fox, P.E. - Seattle District Corps of Engineers
_____	_____
Date	Justine Barton - Environmental Protection Agency
_____	_____
Date	Laura Inouye, Ph.D. - Washington Department of Ecology
_____	_____
Date	Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Jonathan Williams, EPA Superfund
John Hicks, CENWS-OD-TS-NV
John Pell, CENWS-OD-TS-NV
May Carrell, CENWS-PM-PP
Kristen Kerns, CENWS-EN-TS-ET
Deborah Johnston, CENWS-EN-ET-ET



N

Figure 1. Hylebos Waterway and Shoal Areas

0 1,000 2,000 4,000 Feet

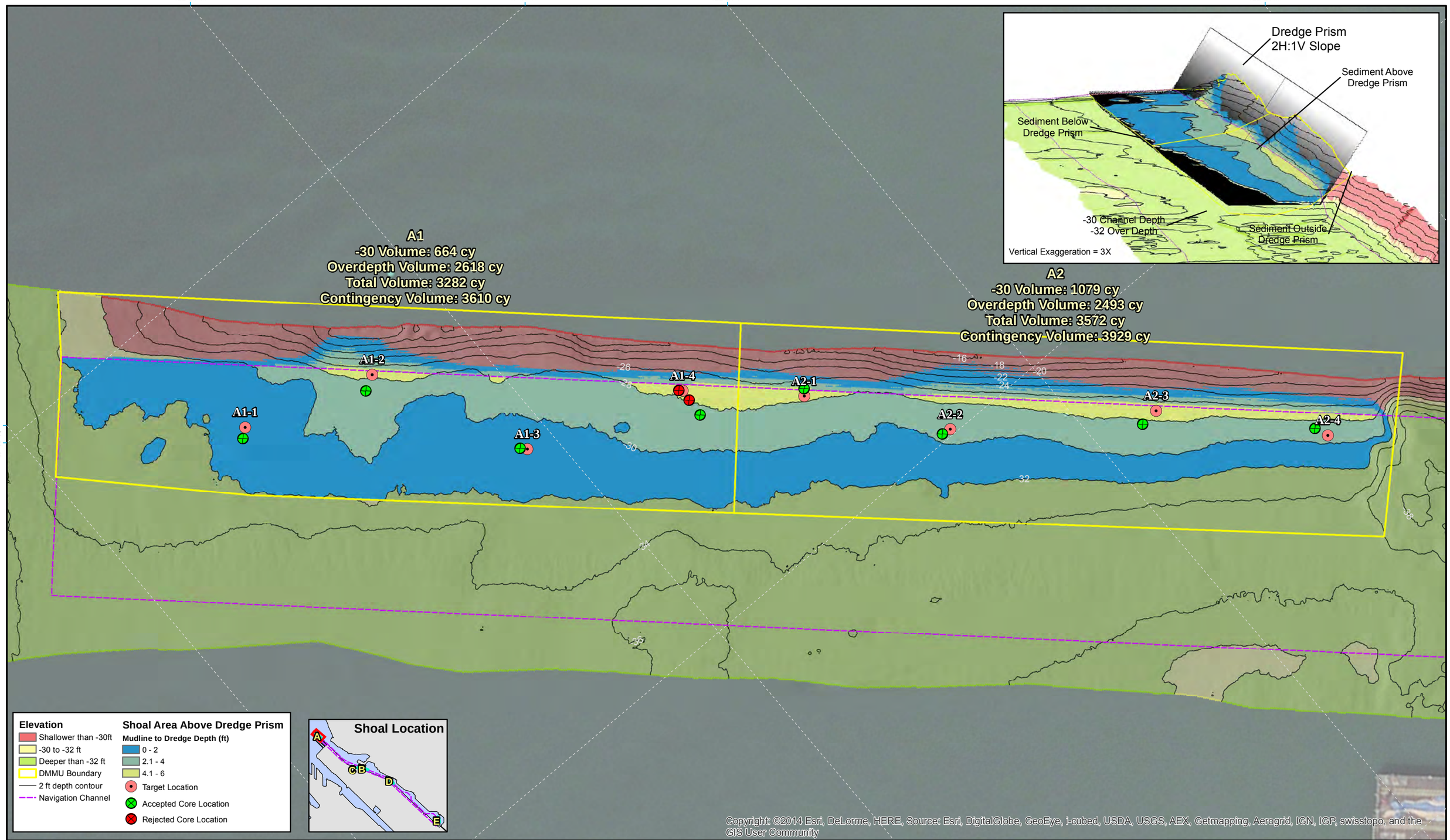


Figure 2. Shoal A Target and Actual Sampling Locations

N

0 100 200 400 Feet

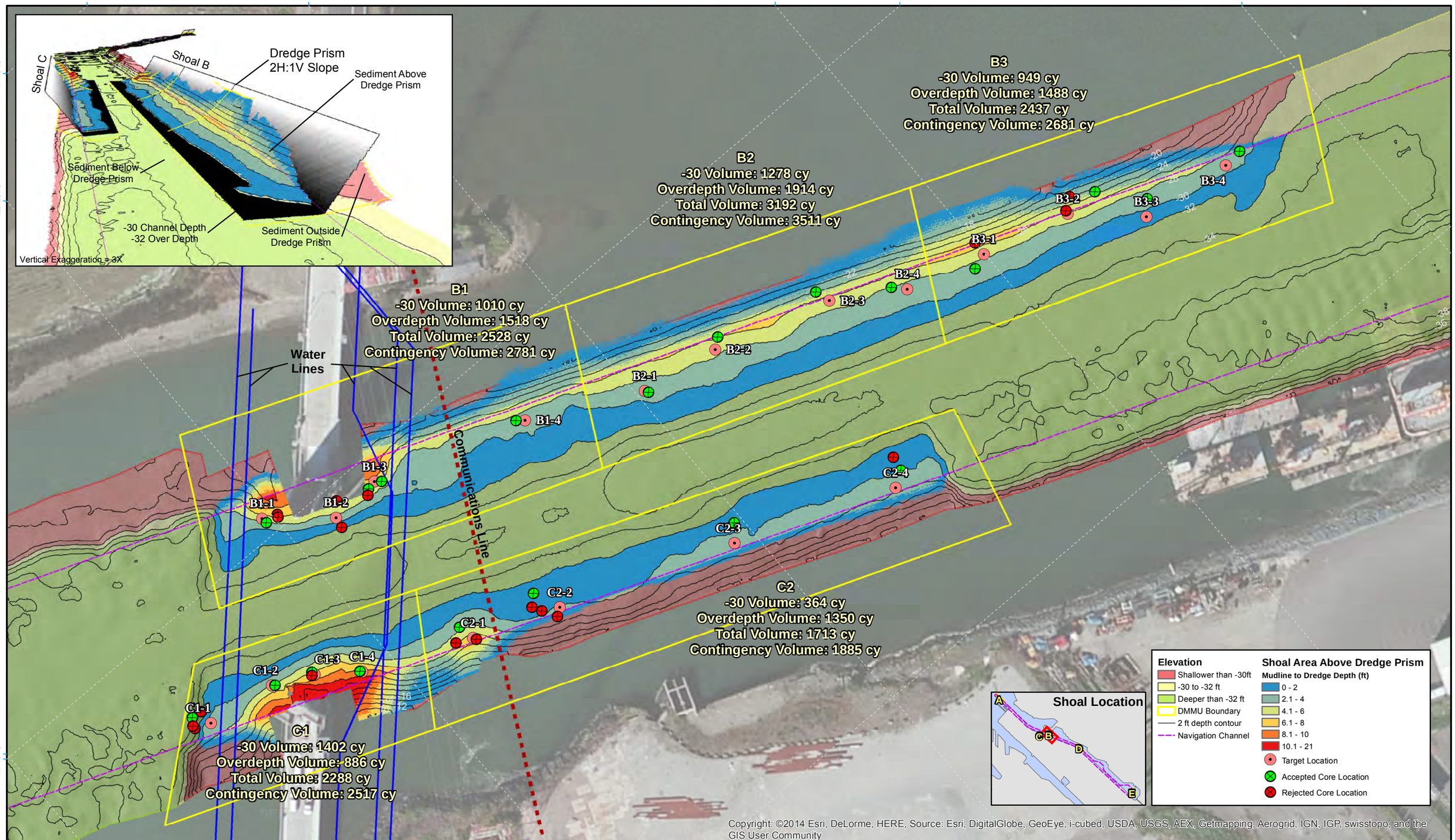


Figure 3. Shoals B and C Target and Actual Sampling Locations

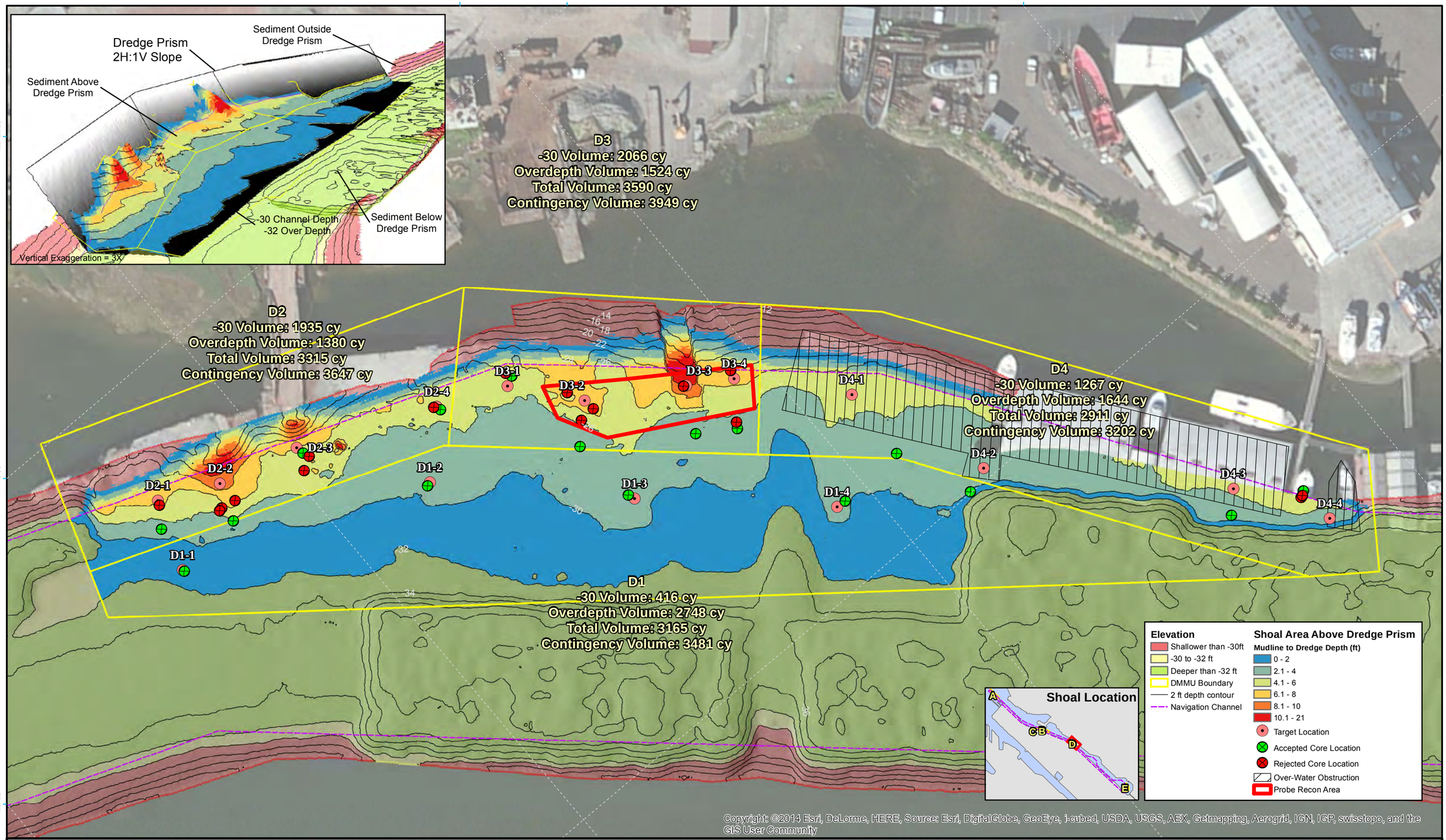


Figure 4. Shoal D Target and Actual Sampling Locations

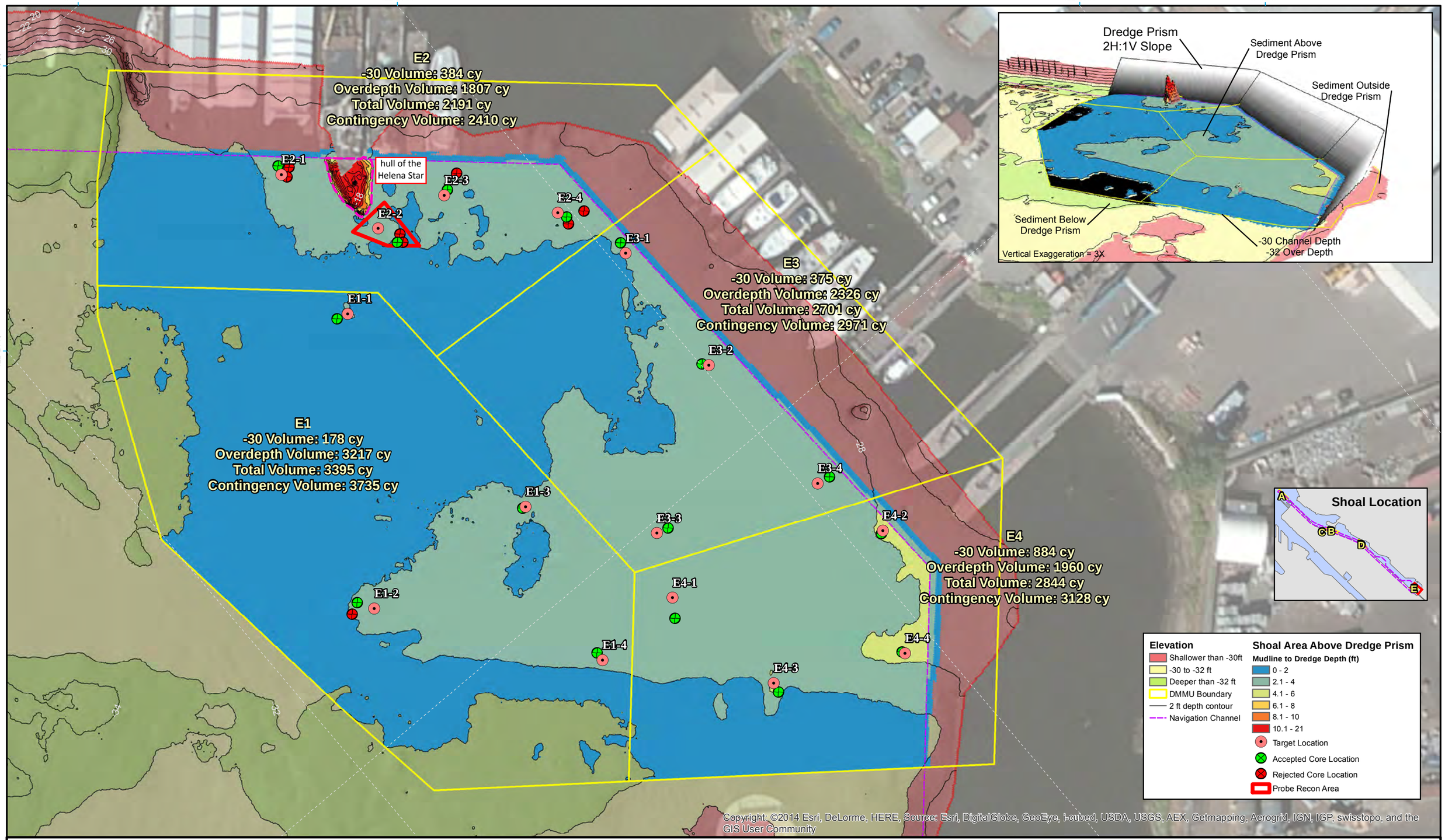


Figure 5. Shoal E Target and Actual Sampling Locations

Table 2. DMMU Volumes and Samples

Shoal	DMMU	Volume to -30 ft MLLW (cy)	Overdepth Volume -30 to -32 ft (cy)	Total Volume With Overdepth (cy)	Total Volume Including 10% contingency (cy)	Number of core samples
A	A1	664	2,618	3,282	3,610	4
	A2	1,079	2,493	3,572	3,929	4
B	B1	1,010	1,518	2,528	2,781	4
	B2	1,278	1,914	3,192	3,511	4
	B3	949	1,488	2,437	2,681	4
C	C1	1,402	886	2,288	2,517	4
	C2	364	1,350	1,713	1,885	3
D	D1	416	2,748	3,165	3,481	4
	D2	1,935	1,380	3,315	3,647	4
	D3	2,066	1,524	3,590	3,949	4
	D4	1,267	1,644	2,911	3,202	4
E	E1	178	3,217	3,395	3,735	4
	E2	384	1,807	2,191	2,410	4
	E3	375	2,326	2,701	2,971	4
	E4	884	1,960	2,844	3,128	4
	Total:	**14,251**	**28,873**	**43,124**	**47,437**	**59**

Table 3. Sample Location Information

DMMU	Sample Station	NAD83		State Plane WA-S (NAD83)		Measured Water Depth (ft)	Referenced to MLLW	
		Latitude	Longitude	Northing (ft)	Easting (ft)		Tide-Corrected Mudline Elevation (ft)	Tidal Height (ft)
A1	A1-1	47.2871574	-122.4133074	718278.29	1165610.06	42.2	-30.7	11.5
	A1-2	47.2870592	-122.4128853	718239.94	1165713.92	36.4	-25.5	10.9
	A1-3	47.2867294	-122.4126118	718118.04	1165778.88	40.9	-30.6	10.3
	A1-4	47.2865211	-122.4120743	718038.86	1165910.40	37	-28.6	8.4
A2	A2-1	47.2864128	-122.4117491	717997.39	1165990.12	38.2	-27.1	11.1
	A2-2	47.2861283	-122.4114899	717892.11	1166051.91	39.84	-29.8	10.1
	A2-3	47.2858484	-122.4109509	717786.80	1166183.17	37.4	-28.6	8.8
	A2-4	47.2855853	-122.4105145	717688.22	1166289.13	39.1	-31.2	7.9
B1	B1-1	47.2778138	-122.3944802	714758.44	1170199.48	37.5	-30.8	6.7
	B1-2	47.2777073	-122.3940903	714717.28	1170295.30	40	-29.9	10.1
	B1-3	47.2777004	-122.3940322	714714.42	1170309.66	38.81	-30.6	8.3
	B1-4	47.2775944	-122.3934801	714672.49	1170445.74	40.92	-30.2	10.7
B2	B2-1	47.2774245	-122.3930142	714607.77	1170559.88	40.1	-27.1	13.0
	B2-2	47.2774181	-122.3926692	714603.38	1170645.43	40.6	-27.8	12.9
	B2-3	47.2773418	-122.3922644	714573.15	1170745.21	38.7	-26.4	12.3
	B2-4	47.2772218	-122.3920294	714527.97	1170802.48	40.6	-29.0	11.6
B3	B3-1	47.2771168	-122.3917315	714487.90	1170875.48	38.2	-29.4	8.8
	B3-2	47.2770683	-122.3911822	714466.96	1171011.37	34.9	-27.4	7.5
	B3-3	47.2769642	-122.3910438	714428.19	1171044.82	38	-30.6	7.4
	B3-4	47.2769022	-122.3906504	714403.24	1171141.90	37.9	-30.7	7.2
C1	C1-1	47.2775457	-122.3951893	714664.90	1170021.17	39.8	-30.2	9.6
	C1-2	47.2774697	-122.3948623	714635.26	1170101.64	39.5	-28.3	11.2
	C1-3	47.2774330	-122.3947195	714621.01	1170136.75	37.2	-26.0	11.2
	C1-4	47.2773526	-122.3945745	714590.83	1170172.03	37.2	-27.2	10.0
C2	C2-1	47.2772719	-122.3941673	714558.99	1170272.38	40	-29.0	11.0
	C2-2	47.2772138	-122.3938613	714535.99	1170347.80	40.2	-31.2	9.0
	C2-3	47.2770147	-122.3930872	714458.75	1170538.16	38.9	-30.2	8.7
	C2-4	47.2768355	-122.3924592	714389.67	1170692.44	38.1	-30.0	8.1
D1	D1-1	47.2745931	-122.3824108	713512.31	1173166.54	35.8	-31.4	4.4
	D1-2	47.2743920	-122.3816341	713434.39	1173357.56	34.8	-29.6	5.2
	D1-3	47.2740915	-122.3811584	713322.01	1173472.99	34.7	-28.8	5.9
	D1-4	47.2737750	-122.3806368	713203.51	1173599.70	36.8	-30.2	6.6
D2	D2-1	47.2746958	-122.3823799	713549.59	1173175.10	39.1	-27.9	11.2
	D2-2	47.2746084	-122.3821858	713516.56	1173222.51	42	-29.7	12.4
	D2-3	47.2746236	-122.381873	713520.27	1173300.29	38.2	-26.1	12.1
	D2-4	47.2745009	-122.3814442	713472.98	1173405.62	38.3	-27.8	10.5
D3	D3-1	47.2744566	-122.3811985	713455.36	1173466.22	39	-26.8	12.2
	D3-2	47.2742413	-122.3811776	713376.73	1173469.54	41	-29.4	11.6
	D3-3	47.2740994	-122.3808655	713323.13	1173545.76	40.4	-29.7	10.8
	D3-4	47.2740497	-122.3807512	713304.35	1173573.69	39.1	-29.5	9.6
D4	D4-1	47.2737816	-122.3804113	713204.56	1173655.72	35.4	-29.1	6.3
	D4-2	47.2736134	-122.3803084	713142.62	1173679.79	36.5	-29.7	6.8
	D4-3	47.2732041	-122.3797145	712989.86	1173823.63	36.7	-29.4	7.3
	D4-4	47.2731439	-122.3794869	712966.56	1173879.59	36	-28.0	8.0
E1	E1-1	47.2631518	-122.3603834	709210.62	1178534.73	38	-30.4	7.6
	E1-2	47.2627351	-122.3608305	709061.27	1178420.16	39.2	-30.1	9.1
	E1-3	47.2626721	-122.3603311	709035.36	1178543.58	40	-30.1	9.9
	E1-4	47.2623846	-122.3604293	708931.12	1178516.73	39.7	-29.0	10.7
E2	E2-1	47.2634328	-122.3602403	709312.23	1178572.68	37.58	-29.9	7.7
	E2-2	47.2631876	-122.3601293	709222.17	1178598.10	38.67	-28.9	9.8
	E2-3	47.2632017	-122.3599363	709226.17	1178646.13	39.04	-28.2	10.8
	E2-4	47.2630240	-122.3597411	709160.25	1178693.06	41.14	-29.2	11.9
E3	E3-1	47.2629253	-122.3596761	709123.87	1178708.36	41.8	-29.4	12.4
	E3-2	47.2626621	-122.3597189	709028.13	1178695.47	42.2	-29.8	12.4
	E3-3	47.2624745	-122.3600694	708961.80	1178606.84	41.9	-29.4	12.5
	E3-4	47.2623563	-122.3596529	708916.25	1178709.21	40.6	-28.3	12.3
E4	E4-1	47.2623415	-122.3602103	708914.11	1178570.73	34.5	-28.8	5.7
	E4-2	47.2622169	-122.3596452	708865.39	1178709.93	34.7	-28.1	6.6
	E4-3	47.2621181	-122.3601268	708832.15	1178589.54	37.7	-30.3	7.4
	E4-4	47.2620289	-122.3598062	708797.75	1178668.35	36.1	-28.0	8.1

NAD83 = North American Datum of 1983
MLLW = mean lower low water

Table 4. Sample Compositing Information

DMMU	Sample Station	Sampler Penetration (ft)	Sediment Recovery (ft)	Percent Recovery	Tide-Corrected Mudline Elevation (ft)	DMMU Bottom Elevation (ft)		Z-Layer Bottom Elevation (ft)		Elevation of Contact with Native Material (ft MLLW)	Depth of Contact with Native Material Below Mudline (ft)	Notes from Core Logs Regarding Native Material
						Referenced to MLLW[1]	Below Mudline	Referenced to MLLW[2]	Below Mudline			
A1	A1-1	5.5	4.5	81.8	-30.7	-32.0	1.3	-34.0	3.3	deeper than -36.2	>5.5	no native material reached
	A1-2	7.5	6.9	92.0	-25.5	-32.0	6.5	-33.0	7.5	-32.0	6.5	very distinct transition
	A1-3	5.5	4.6	83.6	-30.6	-32.0	1.4	-34.0	3.4	-34.8	4.2	clear transition
	A1-4	6.1	4.7	77.0	-28.6	-32.0	3.4	-34.0	5.4	-32.2	3.6	clear transition
A2	A2-1	7.4	5.6	75.7	-27.1	-32.0	4.9	-34.0	6.9	deeper than -34.5	>7.4	no native material reached
	A2-2	6.9	6.1	88.4	-29.8	-32.0	2.2	-34.0	4.2	-33.2	3.4	very different texture than overlying
	A2-3	7.3	6.7	91.8	-28.6	-32.0	3.4	-34.0	5.4	deeper than -35.9	>7.3	no native material reached
	A2-4	6.8	5.2	76.5	-31.2	-32.1	0.9	-34.0	2.8	-34.8	3.6	no comment
B1	B1-1	7.0	6.3	90.0	-30.8	-32.0	1.2	-34.0	3.2	-32.8	2.0	no comment
	B1-2	5.5	4.6	83.6	-29.9	-32.0	2.1	-34.0	4.1	-32.3	2.4	no comment
	B1-3	7.4	6.3	85.1	-30.6	-32.2	1.6	-34.2	3.6	-34.0	3.4	no comment
	B1-4	4.5	3.5	77.8	-30.2	-32.0	1.8	-34.0	3.8	deeper than -34.7	>4.5	no native material reached
B2	B2-1	7.0	5.2	74.3	-27.1	-32.0	4.9	-34.0	6.9	-32.2	5.1	no comment
	B2-2	6.5	5.5	84.6	-27.8	-31.7	3.9	-33.5	5.7	-31.6	3.8	no comment
	B2-3	8.4	7.2	85.7	-26.4	-32.0	5.6	-34.0	7.6	-31.2	4.8	no comment
	B2-4	6.5	6.1	93.8	-29.0	-32.0	3.0	-34.0	5.0	deeper than -35.5	>6.5	native material not defined
B3	B3-1	6.0	5.1	85.0	-29.4	-32.0	2.6	-34.0	4.6	-34.3	4.9	no comment
	B3-2	7.3	6.8	93.2	-27.4	-32.0	4.6	-34.0	6.6	-31.4	4	no comment
	B3-3	3.5	2.7	77.1	-30.6	-32.0	1.4	-34.0	3.4	deeper than -34.1	>3.5	no native material identified
	B3-4	6.8	6.1	89.7	-30.7	-32.0	1.3	-34.0	3.3	deeper than -37.5	>6.8	no native material identified
C1	C1-1	5.2	4.1	78.8	-30.2	-32.0	1.8	-34.0	3.8	-34.0	3.8	no comment
	C1-2	7.7	6.4	83.1	-28.3	-32.0	3.7	-34.0	5.7	-32.6	4.3	no comment
	C1-3	8.3	6.4	77.1	-26.0	-32.0	6.0	-34.0	8.0	-34.3	8.3	possible native material in core
	C1-4	10.0	9.4	94.0	-27.2	-32.0	4.8	-34.0	6.8	-35.2	8	no comment
C2	C2-1	7.3	5.9	80.8	-29.0	-32.0	3.0	-34.0	5.0	-35.7	6.7	possible native transition
	C2-2	5.3	4.8	90.6	-31.2	-32.0	0.8	-34.0	2.8	-34.5	3.3	clear transition
	C2-3	5.4	4.7	87.0	-30.2	-32.0	1.8	-34.0	3.8	-34.2	4	clear transition
	C2-4	4.8	4.2	87.5	-30.0	-32.0	2.0	-34.0	4.0	-32.5	2.5	clear transition
D1	D1-1	5.4	4.8	88.9	-31.4	-32.0	0.6	-34.0	2.6	deeper than -36.8	>5.4	native transition not identified
	D1-2	7.4	6.3	85.1	-29.6	-32.0	2.4	-34.1	4.5	-34.6	5	sharp transition
	D1-3	6.4	5.3	82.8	-28.8	-32.0	3.2	-33.9	5.1	-33.4	4.6	no comment
	D1-4	7.1	6.4	90.1	-30.2	-32.0	1.8	-34.0	3.8	-34.1	3.9	sharp transition
D2	D2-1	6.2	5.5	88.7	-27.9	-32.0	4.1	-34.0	6.1	-32.4	4.5	no comment
	D2-2	6.5	5.1	78.5	-29.7	-32.0	2.3	-34.0	4.3	-34.8	5.1	no comment
	D2-3	7.0	6.4	91.4	-26.1	-32.1	6.0	-33.1	7.0	-32.8	6.7	no comment
	D2-4	7.3	6.1	83.6	-27.8	-32.0	4.2	-34.0	6.2	-35.1	>7.3	native transition not identified
D3	D3-1	7.3	6.9	94.5	-26.8	-32.0	5.2	-34.0	7.2	-33.9	7.1	no comment
	D3-2	6.4	5.5	85.9	-29.4	-32.0	2.6	-34.0	4.6	-34.4	5	no comment
	D3-3	7.4	6.5	87.8	-29.7	-32.0	2.3	-34.0	4.3	-33.8	4.1	no comment
	D3-4	7.5	6.1	81.3	-29.5	-32.0	2.5	-34.0	4.5	-35.1	5.6	possible native material in core
D4	D4-1	6.0	4.5	75.0	-29.1	-32.0	2.9	-34.0	4.9	-33.6	4.5	distinct transition
	D4-2	4.5	3.7	82.2	-29.7	-32.0	2.3	-34.0	4.3	-33.6	3.9	possible native transition
	D4-3	4.4	4.1	93.2	-29.4	-32.0	2.6	-34.0	4.6	-33.1	3.7	no comment
	D4-4	6.2	5.3	85.5	-28.0	-32.0	4.0	-34.0	6.0	deeper than -34.2	>6.2	no native material reached
E1	E1-1	5.8	4.5	77.6	-30.4	-32.0	1.6	-34.0	3.6	-33.3	2.9	clear transition
	E1-2	5.4	4.2	77.8	-30.1	-32.0	1.9	-34.0	3.9	-31.6	1.5	no comment
	E1-3	5.4	4.6	85.2	-30.1	-32.0	1.9	-34.0	3.9	-33.0	2.9	no comment
	E1-4	5.1	4.4	86.3	-29.0	-32.0	3.0	-33.9	4.9	-32.3	3.3	no comment
E2	E2-1	4.7	3.7	78.7	-29.9	-32.0	2.1	-34.0	4.1	-33.3	3.4	distinct color/texture transition
	E2-2	6.0	4.7	78.3	-28.9	-32.0	3.1	-34.0	5.1	-33.4	4.5	no comment
	E2-3	6.0	4.8	80.0	-28.2	-32.0	3.8	-34.0	5.8	-31.3	3.1	no comment
	E2-4	4.2	3.5	83.3	-29.2	-32.0	2.8	-33.4	4.2	deeper than -33.4	>4.2	no native material reached
E3	E3-1	6.9	5.5	79.7	-29.4	-32.0	2.6	-34.0	4.6	-33.2	3.8	no comment
	E3-2	7.2	6.4	88.9	-29.8	-32.0	2.2	-34.0	4.2	-33.2	3.4	no comment
	E3-3	7.3	5.9	80.8	-29.4	-32.0	2.6	-34.0	4.6	-32.7	3.3	no comment
	E3-4	6.2	4.7	75.8	-28.3	-32.0	3.7	-34.0	5.7	-32.0	3.7	no comment
E4	E4-1	7.4	5.8	78.4	-28.8	-32.0	3.2	-34.0	5.2	-33.2	4.4	possible native transition
	E4-2	7.5	6.7	89.3	-28.1	-31.7	3.6	-34.0	5.9	-32.1	4	possible native transition
	E4-3	6.0	4.9	81.7	-30.3	-32.0	1.7	-34.0	3.7	-33.5	3.2	possible native transition
	E4-4	7.4	6.7	90.5	-28.0	-32.0	4.0	-34.0	6.0	-32.4	4.4	no comment

[1]Samples representing the DMMUs were collected from mudline to the elevations in this column; the target elevation was -32 ft MLLW.

[2]Samples representing the z-layer were collected from the bottom elevation of the DMMUs to the elevations in this column; the target layer was -32 to -34 ft MLLW.

Table 5. Samples Collected for Characterization

Suitability Determination ID	Report ID	Laboratory ID	Conventionals	Grain Size	Metals	SVOCs	VOCs	PCB Aroclors	Pesticides	Porewater Tributyltin	Dioxins/ Furans	PCB Congeners	PBDEs	Archive	Biological Testing
Laboratory:	ALS														PGES
DMMUs															
A1	HW13-A1-S	K1312107-001; L1391198-1 (PBDEs)	√	√	√	√	√	√	√	√	√	√	√	A	A
A2	HW13-A2-S	K1312107-003	√	√	√	√	√	√	√	√	√			A	A
B1	HW13-B1-S	K1312107-005	√	√	√	√	√	√	√	√	√			A	A
B2	HW13-B2-S	K1312107-016	√	√	√	√	√	√	√	√	√			A	A
B3	HW13-B3-S	K1312107-014	√	√	√	√	√	√	√	√	√			A	A
C1	HW13-C1-S	K1312107-052	√	√	√	√	√	√	√	√	√			A	A
C2	HW13-C2-S	K1312107-035	√	√	√	√	√	√	√	√	√			A	A
D1	HW13-D1-S	K1312107-042; L1391198-3 (PBDEs)	√	√	√	√	√	√	√	√	√	√	√		A
D2	HW13-D2-S	K1312107-040	√	√	√	√	√	√	√	√	√			A	A
D3	HW13-D3-S	K1312107-038	√	√	√	√	√	√	√	√	√			A	A
D4	HW13-D4-S	K1312107-012	√	√	√	√	√	√	√	√	√			A	A
E1	HW13-E1-S	K1312107-033; L1391198-2 (PBDEs)	√	√	√	√	√	√	√	√	√	√	√	A	A
E2	HW13-E2-S	K1312106-001	√	√	√	√	√	√	√	√	√			A	A
E3	HW13-E3-S	K1312107-018	√	√	√	√	√	√	√	√	√			A	A
E4	HW13-E4-S	K1312107-031	√	√	√	√	√	√	√	√	√			A	A
Z-Layer Composites															
A1-Z	HW13-A1-Z	K1312107-002	√	√	√	√	√	√	√	√	√				A
A2-Z	HW13-A2-Z	K1312107-004	√	√	√	√	√	√	√	√	√				A
B1-Z	HW13-B1-Z	K1312107-006	√	√	√	√	√	√	√	√	√				A
B2-Z	HW13-B2-Z	K1312107-017	√	√	√	√	√	√	√	√	√				A
B3-Z	HW13-B3-Z	K1312107-015	√	√	√	√	√	√	√	√	√				A
C1-Z	HW13-C1-Z	K1312107-053	√	√	√	√	√	√	√	√	√				A
C2-Z	HW13-C2-Z	K1312107-036	√	√	√	√	√	√	√	√	√				A
D1-Z	HW13-D1-Z	K1312107-043	√	√	√	√	√	√	√	√	√				A
D2-Z	HW13-D2-Z	K1312107-041	√	√	√	√	√	√	√	√	√				A
D3-Z	HW13-D3-Z	K1312107-039	√	√	√	√	√	√	√	√	√				A
D4-Z	HW13-D4-Z	K1312107-013	√	√	√	√	√	√	√	√	√				A
E1-Z	HW13-E1-Z	K1312107-034	√	√	√	√	√	√	√	√	√				A
E2-Z	HW13-E2-Z	K1312106-002	√	√	√	√	√	√	√	√	√				A
E3-Z	HW13-E3-Z	K1312107-019	√	√	√	√	√	√	√	√	√				A
E4-Z	HW13-E4-Z	K1312107-032	√	√	√	√	√	√	√	√	√				A
QA/QC Samples															
X1[1]	HW13-X1-S	K1312107-037	√	√	√	√	√	√	√	√	√				

√ = Sample collected for analysis

A = Sample collected and archived

[1]X1 was a blind homogenate split of DMMU D3.

ALS = ALS Environmental (Kelso, Houston, Burlington)

PGES = Port Gamble Environmental Sciences

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			A1			A1-Z			A2			A2-Z			B1			B1-Z			B2			B2-Z			B3			B3-Z		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Conventionals																																		
Ammonia	mg N/kg dw	--	--	--	3.59			0.67	J		3.89			7.54			2.71			2.92			6.5			2.07			9.68			11.7		
Sulfide	mg/kg dw	--	--	--	17.5			44			500			79			183			123			1310			3.9			339			940		
Total Organic Carbon	% dw	--	--	--	1.94			2.28			2.13			1.55			1.43			1.89			2.71			1.34			2.58			1.90		
Total Volatile Solids	% dw	--	--	--	4.61			4.16			4.38			3.47			4.81			3.58			5.08			1.36			5.68			3.74		
Total Solids	% dw	--	--	--	62.0			65.8			65.3			68.2			64.2			65.0			58.1			78.7			59.2			63.0		
pH	pH units	--	--	--	8.02			8.23			8.02			8.20			8.15			8.22			7.58			8.37			7.38			8.52		
Grainsize																																		
Gravel	% dw	--	--	--	0.06			1.39			0.29			0.26			6.17			0.31			14.81			2.54			1.47			1.79		
Sand	% dw	--	--	--	20.57			72.67			42.02			52.86			57.13			33.86			33.03			69.11			46.59			46.21		
Total Fines	% dw	--	--	--	85.16			18.50			58.62			42.31			37.69			67.14			53.19			27.02			52.34			49.74		
Silt	% dw	--	--	--	52.58			14.61			40.18			30.83			23.65			45.08			33.61			20.20			33.07			33.00		
Clay	% dw	--	--	--	32.58			3.89			18.44			11.48			14.04			22.06			19.58			6.82			19.27			16.74		
Metals																																		
Antimony	mg/kg dw	150	--	200	1.0	J,N		0.6	J,N		1.4	J,N		0.7	J,N		1.0	J,N		1.9	J,N		3.6	N		0.8	J,N		2.0	J,N		4.1	N	
Arsenic	mg/kg dw	57	507.1	700	9.2			4.1			12.3			6.9			13.6			17.9			24.0			10.0			20.0			25.6		
Cadmium	mg/kg dw	5.1	11.3	14.0	0.14	J		0.17	U		0.19			0.08	J		0.07	J		0.15	J		0.26			0.05	J		0.08	J		0.15	J	
Chromium	mg/kg dw	260	260	--	21.1			16.0			20.3			17.5			20.3			19.6			25.8			15.8			24.2			22.0		
Copper	mg/kg dw	390	1027	1300	52.9			23.7			58.5			31.7			51.7			58.3			93.9			33.2			68.4			70.3		
Lead	mg/kg dw	450	975	1200	23.9			5.3			33.7			14.1			26.9			39.4			57.6			14.8			36.1			40.8		
Mercury	mg/kg dw	0.41	1.5	2.3	0.250			0.113			0.192			0.100			0.113			0.163			0.304			0.093			0.172			0.034		
Selenium	mg/kg dw	--	3	--	***3.6***	U		***3.5***	U		***3.5***	U		***3.9***	U		***3.5***	U		***3.4***	U		***3.4***	U		***3.2***	U		***3.8***	U		***3.4***	U	
Silver	mg/kg dw	6.1	6.1	8.4	0.3	J		0.7	U		0.5	J		0.8	U		0.3	J		0.3	J		0.5	J		0.6	U		0.3	J		0.3	J	
Zinc	mg/kg dw	410	2783	3800	55.9			26.9			61.2			34.2			63.5			67.3			100			30.3			78.4			82.6		
Organometallic Compounds																																		
Tributyltin (interstitial)	ug/l	--	0.15	--	0.072	U		0.052	U		0.071		J	0.072	U		0.051	J	J	***0.160***	U		**0.380**			0.110	U		0.140			0.092		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAH)																																		
Naphthalene	µg/kg dw	2100	--	2400	28			33			38			38			75			190			78	D		58			68	D		44		
Acenaphthylene	µg/kg dw	560	--	1300	13			8.1			18			12			28			13			43	JD		16			26	JD		71		
Acenaphthene	µg/kg dw	500	--	2000	9.2			11			12			9.8			27			52			32	JD		31			37	JD		14		
Fluorene	µg/kg dw	540	--	3600	13			13			19			14			29			45			42	JD		38			59	D		19		
Phenanthrene	µg/kg dw	1500	--	21000	73			95			120			73			100			130			190	D		210			240	D		100		
Anthracene	µg/kg dw	960	--	13000	39			25			52			32			76			85			110	D		80			99	D		88		
2-Methylnaphthalene	µg/kg dw	670	--	1900	18			34			22			22			28			33			43	JD		34			31	JD		22		
Total LPAH	µg/kg dw	5200	--	29000	193			219			281			201			363			548			538			467			560			358		
High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAH)																																		
Fluoranthene	µg/kg dw	1700	4600	30000	120			92			250			94			210			150			440	D		210			400	D		340		
Pyrene	µg/kg dw	2600	11980	16000	160			93			310			130			410			470			830	D		320			660	D		510		
Benzo(a)anthracene	µg/kg dw	1300	--	5100	60			37			78			42			120			61			190	D		87			180	D		150		
Chrysene	µg/kg dw	1400	--	21000	93			44			130			66			230			130			310	D		140			370	D		290		
Benzo(k)fluoranthene	µg/kg dw	--	--	--	42			20			49			29			110			23			160	D		42			130	D		97		
Benzo(b)fluoranthene	µg/kg dw	--	--	--	120			61			190			92			330			77			530	D		150			490	D		370		
Benzoflouranthenes	µg/kg dw	3200	--	9900	162			81			239			121			440			100			690			192			620			467		
Benzo(a)pyrene	µg/kg dw	1600	--	3600	79			45			110			64			220			51			260	D		93			220	D		190		
Indeno(1,2,3-cd)pyrene	µg/kg dw	600	--	4400	56			33			71			42			140			31			160	D		58			140	D		150		
Dibenzo(a,h)anthracene	µg/kg dw	230	--	1900	11			7.6	U		14			9.3			26			6.4	J		42	JD		12			35	JD		44		
Benzo(ghi)perylene	µg/kg dw	670	--	3200	52			29			67			45			130			32			190	D		66			150	D		150		
Total HPAH	µg/kg dw	12000	--	69000	793			454			1269			613			1926			1031			3112			1178			2775			2291		
Phenols																																		
Phenol	µg/kg dw	420	--	1200	10	J		3.5	J		22	J		22	U		24	U		6.9	J		130	U		19	U		38	JD		8.7	J	
2,4-Dimethylphenol[a]	µg/kg dw	29	--	210	6.3	U		6.3	U		6.3	U		6.3	U		6.3	U		**64**			***32***	U		6.3	U		***32***	U		6.3	U	
2-Methylphenol	µg/kg dw	63	--	77	8.0	U		7.6	U		7.7	U		7.5	U		7.8	U		19			43	U		7.5	U		42	U		8.0	U	
4-Methylphenol	µg/kg dw	670	--	3600	11			19			20			12			16			51			43	U		7.5	U		42	U		14		
Pentachlorophenol	µg/kg dw	400	504	690	80	U		76	U		77	U		73	U		78	U		77	U		***430***	U		64	U		***420***	U		80	U	

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			A1			A1-Z			A2			A2-Z			B1			B1-Z			B2			B2-Z			B3			B3-Z		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Phthalates																																		
Butylbenzylphthalate	µg/kg dw	63	--	970	8.0	U		7.6	U		7.7	U		7.3	U		7.8	U		7.7	U		43	U		6.4	U		42	U		8.0	U	
Di-N-Butylphthalate	µg/kg dw	1400	--	5100	16	U		16	U		7.6	J		15	U		16	U		16	U		86	U		13	U		84	U		16	U	
Di-N-Octyl Phthalate	µg/kg dw	6200	--	6200	8.0	U		7.6	U		7.7	U		7.3	U		7.8	U		7.7	U		43	U		6.4	U		42	U		8.0	U	
Diethylphthalate	µg/kg dw	200	--	1200	8.0	U		7.6	U		7.7	U		7.3	U		7.8	U		7.7	U		43	U		6.4	U		42	U		8.0	U	
Dimethylphthalate	µg/kg dw	71	--	1400	8.0	U		7.6	U		7.7	U		7.3	U		7.8	U		7.7	U		43	U		6.4	U		42	U		8.0	U	
Bis(2-Ethylhexyl) Phthalate	µg/kg dw	1300	--	8300	34	J		76	U		44	J		10	J		52	J		77	U		84	JD		10	J		76	JD		39	J	
Other Semivolatile Organic Compounds (SVOC)																																		
Benzoic Acid	µg/kg dw	650	--	760	400	U	UJ	400	U	UJ	400	U	UJ	400	U	UJ	400	U	UJ	400	U	UJ	***2000***	U	UJ	400	U	UJ	***2000***	U	UJ	400	U	UJ
Dibenzofuran	µg/kg dw	540	--	1700	12			15			17			12			30			50			35	JD		24			33	JD		16		
Benzyl Alcohol	µg/kg dw	57	--	870	5.2	J		6.7	J		16	U		15	U		16	U		16	U		***86***	U		13	U		***84***	U		16	U	
1,2-Dichlorobenzene	µg/kg dw	35	--	110	8	U		7.6	U		7.7	U		7.3	U		7.8	U		7.7	U		***43***	U		6.4	U		***42***	U		8.0	U	
1,4-Dichlorobenzene	µg/kg dw	110	--	120	3	J		7.6	U		6.2	J		10			3.2	J		7.7	U		43	U		6.4	U		42	U		8.0	U	
Hexachlorobenzene	µg/kg dw	22	168	230	6.5	J		7.6	U		14			7.7			7.8	U		7.7	U		***43***	U		4.7	J		***42***	U		8.8		
Hexachlorobutadiene	µg/kg dw	11	--	270	7.5	J		7.6	U		**16**			7.4			7.1	J		3.4	J		**19**	JD		5.0	J		***42***	U		11		
N-Nitrosodiphenylamine[a]	µg/kg dw	28	--	130	5.4	J		3.2	U		5.2	J		5.1	J		3.2	U		5.6	J		16	U		3.2	U		16	U		3.2	U	
1,2,4-Trichlorobenzene	µg/kg dw	31	--	64	3.0	J		7.6	U		8.0			6.8	J		7.8	U		7.7	U		***43***	U		6.4	U		***42***	U		3.9	J	
PCB Aroclors																																		
PCB-aroclor 1016	µg/kg dw	--	--	--	21	Ui		17	Ui		35	Ui		16	Ui		19	Ui		15	Ui		78	Ui		19	Ui		30	Ui		49	Ui	
PCB-aroclor 1221	µg/kg dw	--	--	--	46	Ui		38	Ui		66	Ui		31	Ui		42	Ui		32	Ui		250	Ui		140	Ui		180	Ui		220	Ui	
PCB-aroclor 1232	µg/kg dw	--	--	--	49	Ui		36	Ui		62	Ui		27	Ui		14	Ui		15	Ui		43	Ui		11	Ui		180	Ui		52	Ui	
PCB-aroclor 1242	µg/kg dw	--	--	--	31	Ui		14	Ui		25	Ui		12	Ui		9.5	Ui		10	Ui		21	Ui		6.4	Ui		9.8	Ui		14	Ui	
PCB-aroclor 1248	µg/kg dw	--	--	--	14	Ui		11	Ui		28	Ui		14	Ui		15	Ui		10	Ui		51	Ui		12	Ui		22	Ui		30	Ui	
PCB-aroclor 1254	µg/kg dw	--	--	--	20	Ui		22	Ui		43	Ui		14	Ui		25			15	P		180			25	Ui		45			120		
PCB-aroclor 1260	µg/kg dw	--	--	--	23	Ui		16	Ui		35	Ui		12	Ui		27			17			83			26			60			55		
PCB-aroclor 1262	µg/kg dw	--	--	--	15	Ui		11	Ui		25	Ui		8.5	Ui		7.8	U		10	U		8.7	U		6.4	U		8.5	U		7.9	U	
PCB-aroclor 1268	µg/kg dw	--	--	--	9.2	Ui		7.6	Ui		16	Ui		7.4	Ui		10	Ui		10	Ui		35	Ui		17	Ui		25	Ui		21	Ui	
Total PCBs (µg/kg dw)	µg/kg dw	130	--	3100	49	U		38	U		66	U		31	U		52			32			**263**			26			105			**175**		
Total PCBs (mg/kg OC)	mg/kg OC	--	38	--	2.5	U		1.7	U		3.1	U		2	U		3.6			1.7			9.7			1.9			4.1			9.2		
Pesticides																																		
Aldrin	µg/kg dw	9.5	--	--	0.32	J		0.14	J		0.31	J		0.74	Ui		0.78	Ui		0.77	U		0.87	Ui		0.64	Ui		0.85	Ui		0.79	Ui	
Dieldrin	µg/kg dw	1.9	--	1700	0.81	Ui		0.76	Ui		**2.3**	P		0.74	Ui		0.78	U		0.77	U		0.87	Ui		0.64	Ui		0.85	Ui		0.79	Ui	
Heptachlor	µg/kg dw	1.5	--	270	0.81	Ui		0.76	Ui		0.77	Ui		0.74	Ui		0.78	Ui		0.77	Ui		0.87	Ui		0.64	Ui		0.85	Ui		0.79	Ui	
4,4'-DDD	µg/kg dw	16	--	--	0.81	Ui		0.84	Ui		1.3	Ui		1.0	Ui		0.87	Ui		0.77	Ui		1.9	Ui		0.92	Ui		1.6	Ui		1.4	Ui	
4,4'-DDE	µg/kg dw	9	--	--	1.1	Ui		0.95	Ui		1.9	Ui		0.74	Ui		1.3	Ui		0.77	U		6.1	Ui		0.93	Ui		2.2	Ui		3.6	Ui	
4,4'-DDT	µg/kg dw	12	--	--	2.7	Ui		2.3	Ui		4.6	Ui		1.6	Ui		3.7	Ui		0.77	Ui		***14***	Ui		2.0	Ui		4.5	Ui		8.9	Ui	
Total DDTs	µg/kg dw	--	50	69	2.7	U		2.3	U		4.6	U		1.6	U		3.7	U		0.77	U		14	U		2.0	U		4.5	U		8.9	U	
cis-Chlordane	µg/kg dw	--	--	--	0.81	Ui		0.76	Ui		0.77	Ui		0.24	JP		0.78	Ui		0.77	U		0.93	Ui		0.64	Ui		0.85	Ui		0.79	Ui	
trans-Chlordane	µg/kg dw	--	--	--	7.8	Ui		3.9	Ui		7.7	Ui		4.7	Ui		6.6	Ui		2.1	Ui		20	Ui		5.7	Ui		11	Ui		12	Ui	
cis-Nonachlor	µg/kg dw	--	--	--	0.81	Ui		0.76	Ui		0.9	Ui		0.74	Ui		0.78	Ui		0.77	U		1.2	Ui		0.68	Ui		1.1	Ui		0.89	Ui	
trans-Nonachlor	µg/kg dw	--	--	--	0.81	U		0.76	U		0.77	U		0.74	U		0.78	U		0.77	U		0.87	Ui		0.68	U		1.2	Ui		1.3	Ui	
Oxychlordane	µg/kg dw	--	--	--	1.9	Ui		1.6			2.1	P		0.89			0.88	Ui		0.77	U		2.2	Ui		0.68	U		0.98	Ui		1.4	Ui	
Total chlordane	µg/kg dw	2.8	37	--	***7.8***	U		1.6			2.1	P		1.1			***6.6***	U		2.1	U		***20***	U		***5.7***	U		***11***	U		***12***	U	
Volatile Organic Compounds (VOC)																																		
Ethylbenzene	µg/kg dw	10		50	7.9	U		7.4	U		7.5	U		7.3	U		7.8	U		7.5	U		8.5	U		6.3	U		8.4	U		8.0	U	
Total Xylenes	µg/kg dw	40		160	16	U		15	U		15	U		15	U		16	U		15	U		17	U		13	U		17	U		16	U	
Tetrachloroethene	µg/kg dw	57		210	7.9	U		7.4	U		7.5	U		7.3	U		7.8	U		7.5	U		8.5	U		6.3	U		8.4	U		8.0	U	
Trichloroethene	µg/kg dw	160		1600	7.9	U		7.4	U		7.5	U		7.3	U		7.8	U		7.5	U		8.5	U		6.3	U		8.4	U		8.0	U	

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			A1			A1-Z			A2			A2-Z			B1			B1-Z			B2			B2-Z			B3			B3-Z		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Dioxin/Furan Congeners																																		
2,3,7,8-TCDD	ng/kg	--	--	--	0.761	JK	U	0.673	JK	U	1.12	K	U	0.547	J		0.418	J		0.743	U		1.33	K	U	0.630	U		0.619	J		1.05	K	U
1,2,3,7,8-PeCDD	ng/kg	--	--	--	2.53	JK	U	1.31	JK	U	3.62	JK	U	0.832	JK	U	1.51	JK	U	0.467	JK	U	2.24	JK	U	3.15	U		1.61	JK	U	1.19	JK	U
1,2,3,4,7,8-HxCDD	ng/kg	--	--	--	3.87	JK	U	1.88	J		5.13	K	U	1.62	JK	U	2.21	JK	U	0.759	JK	U	7.42	K	U	2.13	JK	U	3.87	J		4.14	K	U
1,2,3,6,7,8-HxCDD	ng/kg	--	--	--	23.7	K	U	13.1	K	U	35.9	K	U	8.25	K	U	16	K	U	6.5	K	U	38.8	K	U	7.37	K	U	33	K	U	25	K	U
1,2,3,7,8,9-HxCDD	ng/kg	--	--	--	9.20	K	U	5.13	K	U	13.8			2.83	J		6.34			2.25	J		16.7			3.15	U		12.6			8.15	K	U
1,2,3,4,6,7,8-HpCDD	ng/kg	--	--	--	272			127			319			59.6			215			49.0			416			43.5			350			278		
OCDD	ng/kg	--	--	--	3240			1280			3250			504			2120			413			4130			281			2840			2670		
2,3,7,8-TCDF	ng/kg	--	--	--	37.8			21.5			56.5			19.1			53.2			26.4			243			39.0			109			181		
1,2,3,7,8-PeCDF	ng/kg	--	--	--	35.5			21.9			58.8			19			58			35.8			357			50.6			131			265		
2,3,4,7,8-PeCDF	ng/kg	--	--	--	16.5			10.1			27.2			8.42			24.9			14.1			139			20			55.6			97.3		
1,2,3,4,7,8-HxCDF	ng/kg	--	--	--	67.6			43.4			116			35.2			112			55.0			718			91.6			240			507		
1,2,3,6,7,8-HxCDF	ng/kg	--	--	--	14.7			10.1			26.3			8.69			26.6			12.7			195			24.4			61.1			124		
1,2,3,7,8,9-HxCDF	ng/kg	--	--	--	1.03	JK	U	0.797	J		1.28	JK	U	0.785	JK	U	1.43	J		0.775	JK	U	5.16			0.993	J		3.04	J		3.91	U	
2,3,4,6,7,8-HxCDF	ng/kg	--	--	--	8.63			5.1			15.8			4.6			11			4.38			43.9	K	U	8.09			22.3			25.5	K	U
1,2,3,4,6,7,8-HpCDF	ng/kg	--	--	--	110			69.1			150			49.8			100			34.6			416			61.3			200			281		
1,2,3,4,7,8,9-HpCDF	ng/kg	--	--	--	24.1			14.3			43.8			10.8	K	U	34.5			13.8			211			21.6			72.4			140		
OCDF	ng/kg	--	--	--	438			326			688			206			470			112			1840			225			667			1230		
Total TCDD	ng/kg	--	--	--	51.1			48.0			51.4			29.6			12.3			10.7			50.2			19.8			53.8			29.9		
Total PeCDD	ng/kg	--	--	--	8.31			29.3			25.7			25.5			5.05			2.69	J		16.6			24.8			42.7			7.84		
Total HxCDD	ng/kg	--	--	--	107			64.7			168			34.8			91.7			29.6			229			91.9			207			139		
Total HpCDD	ng/kg	--	--	--	632			268			738			59.6			571			127			1200			43.5			1090			729		
Total TCDF	ng/kg	--	--	--	137			89.5			195			75.6			158			83.7			757			134			334			555		
Total PeCDF	ng/kg	--	--	--	210			158			384			53.7			246			138			1260			143			525			1020		
Total HxCDF	ng/kg	--	--	--	255			177			477			104			288			123			1550			177			573			987		
Total HpCDF	ng/kg	--	--	--	367			250			535			132			318			100			1380			164			577			954		
Total TEQ (U = 1/2)	ng/kg	4	10	--	27.6			16.5			43.6			13.0			36.6			17.5			188.7			27.9			76.2			131.0		
Total TEQ (U = 0)	ng/kg	4	10	--	24.1			14.6			39.1			12.0			35.0			16.5			182.4			25.3			73.7			126.5		

[a] 2,4-Dimethylphenol and N-nitrosodiphenylamine are reported to the method detection limit (MDL) for non-detected values.

Analyte detected above Screening Level (SL)

Analyte detected above Bioaccumulation Trigger (BT)

Non-detected result above SL or BT

BT = bioaccumulation trigger
DMMP = dredged material management program
dw = dry weight
LQ = laboratory qualifier
ML = maximum level
OC = organic carbon normalized
PCBs = polychlorinated biphenyls
SL = screening level
TEQ = toxic equivalent
VQ = validation qualifier

Qualifier Definitions:

- B = method blank contamination
- D = value reported from a dilution
- J = estimated value
- K = estimated maximum possible concentration
- N = spiked sample recovery not within control limits
- P = >25% detected result difference between GC columns
- U = nondetect at reporting limit
- Ui = nondetect at elevated reporting limit

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			C1			C1-Z			C2			C2-Z			D1			D1-Z			D2			D2-Z			D3			X1 (Dup)		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Conventionals																																		
Ammonia	mg N/kg dw	--	--	--	12.3			16.6			3.25			3.32			13.0			47.3			50.3			45.9			32.5			30.8		
Sulfide	mg/kg dw	--	--	--	68			0.9	J		22			42.1			177			670			2720			329			3400			4400		
Total Organic Carbon	% dw	--	--	--	2.04			2.22			3.82			6.92			2.47			2.86			3.57			1.82			3.58			3.59		
Total Volatile Solids	% dw	--	--	--	5.75			5.59			6.26			11.9			4.71			6.34			7.50			3.34			7.46			7.31		
Total Solids	% dw	--	--	--	60.9			66.0			62.6			61.0			57.9			53.5			50.6			68.4			47.4			47.5		
pH	pH units	--	--	--	8.61			8.48			7.98			8.26			7.59			8.76			8.27			8.88			8.34			8.39		
Grainsize																																		
Gravel	% dw	--	--	--	23.17			21.22			3.37			1.95			1.66			0.41			2.98			1.01			2.06			0.34		
Sand	% dw	--	--	--	45.98			59.86			47.17			40.90			38.77			40.58			22.55			25.62			15.52			14.43		
Total Fines	% dw	--	--	--	32.91			24.05			48.33			55.85			57.48			62.73			78.23			68.54			84.45			84.32		
Silt	% dw	--	--	--	21.46			16.92			29.58			36.58			39.83			39.16			53.24			42.47			59.12			54.81		
Clay	% dw	--	--	--	11.45			7.13			18.75			19.27			17.65			23.57			24.99			26.07			25.33			29.51		
Metals																																		
Antimony	mg/kg dw	150	--	200	1.7	J,N		1.3	J,N		1.7	J,N		1.7	J,N		1.2	J,N		4.4	N		3.2	J,N		4.5	N		3.7	J,N		3.2	J,N	J
Arsenic	mg/kg dw	57	507.1	700	15.4			12.3			16.6			23.0			17.3			36.8			27.9			28.9			32.7			32.2		
Cadmium	mg/kg dw	5.1	11.3	14.0	0.12	J		0.08	J		0.30			0.30			0.21			0.55			0.40			0.31			0.43			0.39		
Chromium	mg/kg dw	260	260	--	18.6			16.3			23.7			23.7			24.3			31.9			32.5			24.8			35.0			35.8		
Copper	mg/kg dw	390	1027	1300	58.5			37.4			69.2			77.9			79.1			116			130			94.3			133			130		
Lead	mg/kg dw	450	975	1200	154			51.6			41.2			58.4			38.3			87.4			63.3			65.7			66.7			67.6		
Mercury	mg/kg dw	0.41	1.5	2.3	0.188			0.151			0.171			0.220			0.201			**0.456**			0.324			0.312			0.304			0.339		
Selenium	mg/kg dw	--	3	--	***3.4***	U		***3.2***	U		***3.3***	U		***3.7***	U		***3.8***	U		***3.8***	U		***3.6***	U		***3.6***	U		***3.8***	U		***3.7***	U	
Silver	mg/kg dw	6.1	6.1	8.4	0.2	J		0.2	J		0.2	J		0.4	J		0.4	J		0.7	J		0.5	J		0.4	J		0.6	J		0.6	J	
Zinc	mg/kg dw	410	2783	3800	77.8			48.8			75.4			130			92.6			145			159			117			155			152		
Organometallic Compounds																																		
Tributyltin (interstitial)	ug/l	--	0.15	--	0.091			0.110	U		0.140			0.099	U		**0.360**			**0.360**			**0.230**			**0.500**			**0.250**			**0.230**		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAH)																																		
Naphthalene	µg/kg dw	2100	--	2400	72	D		360	D		120			130			25	JD		42	JD		46	JD		35	JD		46	JD		34	JD	
Acenaphthylene	µg/kg dw	560	--	1300	42	D		51	D		37			38			23	JD		34	JD		58	D		22	JD		39	JD		40	JD	
Acenaphthene	µg/kg dw	500	--	2000	52	D		240	D		41			48			43	U		21	JD		25	JD		37	U		35	JD		21	JD	
Fluorene	µg/kg dw	540	--	3600	72	D		170	D		47			60			21	JD		30	JD		38	JD		24	JD		39	JD		30	JD	
Phenanthrene	µg/kg dw	1500	--	21000	350	D		440	D		180			250			100	D		160	D		200	D		130	D		340	D		170	D	
Anthracene	µg/kg dw	960	--	13000	420	D		230	D		110			140			61	D		91	D		120	D		74	D		100	D		100	D	
2-Methylnaphthalene	µg/kg dw	670	--	1900	50	D		140	D		68			73			18	JD		27	JD		28	JD		21	JD		29	JD		23	JD	
Total LPAH	µg/kg dw	5200	--	29000	1058			1631			603			739			248			405			515			306			628			418		
High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAH)																																		
Fluoranthene	µg/kg dw	1700	4600	30000	850	D		610	D		280			330			210	D		320	D		510	D		300	D		500	D		360	D	
Pyrene	µg/kg dw	2600	11980	16000	1700	D		**3200**	D		530			620			440	D		690	D		910	D		580	D		840	D		700	D	
Benzo(a)anthracene	µg/kg dw	1300	--	5100	560	D		290	D		150			180			120	D		170	D		290	D		150	D		230	D		200	D	
Chrysene	µg/kg dw	1400	--	21000	800	D		560	D		240			360			230	D		340	D		480	D		370	D		460	D		390	D	
Benzo(k)fluoranthene	µg/kg dw	--	--	--	230	D		210	D		90			100			95	D		160	D		180	D		140	D		180	D		170	D	
Benzo(b)fluoranthene	µg/kg dw	--	--	--	1100	D		900	D		420			540			450	D		740	D		830	D		630	D		870	D		780	D	
Benzoflouranthenes	µg/kg dw	3200	--	9900	1330			1110			510			640			545			900			1010			770			1050			950		
Benzo(a)pyrene	µg/kg dw	1600	--	3600	510	D		440	D		200			240			190	D		300	D		390	D		240	D		370	D		330	D	
Indeno(1,2,3-cd)pyrene	µg/kg dw	600	--	4400	310	D		230	D		140			180			190	D		280	D		350	D		230	D		360	D		350	D	
Dibenzo(a,h)anthracene	µg/kg dw	230	--	1900	52	D		40	D		28			32			31	JD		48	D		59	D		39	D		61	D		58	D	
Benzo(ghi)perylene	µg/kg dw	670	--	3200	160	D		120	D		80			110			110	D		160	D		210	D		130	D		210	D		190	D	
Total HPAH	µg/kg dw	12000	--	69000	6272			6600			2158			2692			2066			3208			4209			2809			4081			3528		
Phenols																																		
Phenol	µg/kg dw	420	--	1200	130	U		120	U		15	J		8.7	J		130	U		22	JD		27	JD		110	U		29	JD		26	JD	
2,4-Dimethylphenol[a]	µg/kg dw	29	--	210	***32***	U		***32***	U		11	J		8.2	J		***32***	U		***32***	U		***32***	U		***32***	U		***34***	U		***33***	U	
2-Methylphenol	µg/kg dw	63	--	77	41	U		38	U		5.0	J		4.3	J		43	U		47	U		50	U		38	U		53	U		53	U	
4-Methylphenol	µg/kg dw	670	--	3600	41	U		38	U		16			29			43	U		47	U		50	U		38	U		53	U		53	U	
Pentachlorophenol	µg/kg dw	400	504	690	***410***	U		380	U		80	U		25	J		***430***	U		***470***	U		***500***	U		370	U		***530***	U		***530***	U	

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			C1			C1-Z			C2			C2-Z			D1			D1-Z			D2			D2-Z			D3			X1 (Dup)		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Phthalates																																		
Butylbenzylphthalate	µg/kg dw	63	--	970	41	U		38	U		8.3			8.2	U		21	JD		49	D		61	D		24	JD		58	D		50	JD	
Di-N-Butylphthalate	µg/kg dw	1400	--	5100	82	U		76	U		16	U		17	U		86	U		93	U		99	U		73	U		110	U		110	U	
Di-N-Octyl Phthalate	µg/kg dw	6200	--	6200	41	U		38	U		8.0	U		8.2	U		43	U		47	U		50	U		37	U		53	U		53	U	
Diethylphthalate	µg/kg dw	200	--	1200	41	U		38	U		8.0	U		8.2	U		43	U		47	U		50	U		37	U		53	U		53	U	
Dimethylphthalate	µg/kg dw	71	--	1400	41	U		38	U		8.0	U		8.2	U		43	U		47	U		50	U		37	U		53	U		22	JD	
Bis(2-Ethylhexyl) Phthalate	µg/kg dw	1300	--	8300	160	JD		380	U		89			46	J		170	JD		310	JD		300	JD		210	JD		370	JD		410	JD	
Other Semivolatile Organic Compounds (SVOC)																																		
Benzoic Acid	µg/kg dw	650	--	760	2000	U	UJ	2000	U	UJ	400	U	UJ	400	U	UJ	2000	U	UJ	2000	U	UJ	2000	U	UJ	2000	U	UJ	2200	U	UJ	2100	U	UJ
Dibenzofuran	µg/kg dw	540	--	1700	56	D		230	D		45			57			17	JD		27	JD		28	JD		20	JD		36	JD		24	JD	
Benzyl Alcohol	µg/kg dw	57	--	870	82	U		76	U		16	U		17	U		86	U		93	U		99	U		73	U		110	U		110	U	
1,2-Dichlorobenzene	µg/kg dw	35	--	110	41	U		38	U		8.0	U		8.2	U		43	U		47	U		50	U		37	U		53	U		53	U	
1,4-Dichlorobenzene	µg/kg dw	110	--	120	41	U		38	U		4.8	J		3.5	J		43	U		47	U		50	U		37	U		53	U		53	U	
Hexachlorobenzene	µg/kg dw	22	168	230	41	U		38	U		14			31			43	U		47	U		50	U		37	U		53	U		53	U	
Hexachlorobutadiene	µg/kg dw	11	--	270	41	U		38	U		14			28			43	U		47	U		50	U		37	U		53	U		53	U	
N-Nitrosodiphenylamine[a]	µg/kg dw	28	--	130	16	U		16	U		3.2	U		3.2	U		16	U		16	U		16	U		16	U		17	U		17	U	
1,2,4-Trichlorobenzene	µg/kg dw	31	--	64	41	U		38	U		4.9	J		16			43	U		47	U		50	U		37	U		53	U		53	U	
PCB Aroclors																																		
PCB-aroclor 1016	µg/kg dw	--	--	--	19	Ui		29	Ui		31	Ui		180	Ui		33	Ui		38	Ui		48	Ui		38	Ui		12	Ui		35	Ui	
PCB-aroclor 1221	µg/kg dw	--	--	--	41	Ui		140	Ui		61	Ui		230	Ui		46	Ui		73	Ui		70	Ui		110	Ui		54	Ui		53	Ui	
PCB-aroclor 1232	µg/kg dw	--	--	--	22	Ui		17	Ui		39	Ui		150	Ui		26	Ui		32	Ui		44	Ui		61	Ui		22	Ui		24	Ui	
PCB-aroclor 1242	µg/kg dw	--	--	--	8.2	Ui		7.5	Ui		18	Ui		50	Ui		16	Ui		12	Ui		9.9	Ui		24	Ui		13	Ui		11	Ui	
PCB-aroclor 1248	µg/kg dw	--	--	--	15	Ui		23	Ui		20	Ui		130	Ui		27	Ui		29	Ui		16	Ui		55	Ui		15	Ui		17	Ui	
PCB-aroclor 1254	µg/kg dw	--	--	--	38			86			38			480	D		69			80			100			220	D		55			74		
PCB-aroclor 1260	µg/kg dw	--	--	--	19			31	P		8.0	U		130	PD		49			64			65			82	PD		47			53		
PCB-aroclor 1262	µg/kg dw	--	--	--	8.2	U		7.5	U		130			22	U		8.6	U		9.4	U		9.9	U		22	U		11	U		11	U	
PCB-aroclor 1268	µg/kg dw	--	--	--	8.2	Ui		15	Ui		31	Ui		64	Ui		16	Ui		19	Ui		21	Ui		22	Ui		15	Ui		15	Ui	
Total PCBs (µg/kg dw)	µg/kg dw	130	--	3100	57			117			168			610			118			144			165			302			102			127		
Total PCBs (mg/kg OC)	mg/kg OC	--	38	--	2.8			5.3			4.4			8.8			4.8			5.0			4.6			17			2.8			3.5		
Pesticides																																		
Aldrin	µg/kg dw	9.5	--	--	0.82	Ui		0.75	Ui		0.8	Ui		8.2	Ui		0.86	Ui		0.94	Ui		0.99	Ui		3.7	Ui		1.1	Ui		1.1	Ui	
Dieldrin	µg/kg dw	1.9	--	1700	0.82	Ui		0.75	Ui		3.4	Ui		12	Ui		0.86	Ui		0.94	Ui		0.99	Ui		3.7	Ui		1.1	Ui		1.1	Ui	
Heptachlor	µg/kg dw	1.5	--	270	0.83	Ui		0.75	Ui		0.8	U		8.2	Ui		0.86	Ui		0.94	Ui		1.0	Ui		3.7	Ui		1.1	Ui		1.1	Ui	
4,4'-DDD	µg/kg dw	16	--	--	1.2	Ui		1.5	P		1.5	Ui		8.2	JD		2.8	Ui		3.0	Ui		3.0	Ui		2.8	JPD		2.0	Ui		2.7	Ui	
4,4'-DDE	µg/kg dw	9	--	--	2.0	Ui		0.75	Ui		1.9	Ui		8.2	Ui		4.7	Ui		5.1	Ui		6.5	Ui		3.7	Ui		4.2	Ui		4.8	Ui	
4,4'-DDT	µg/kg dw	12	--	--	5.5	Ui		7.8	Ui		9.5	Ui		45	Ui		11	Ui		15	Ui		16	Ui		27	Ui		10	Ui		12	Ui	
Total DDTs	µg/kg dw	--	50	69	5.5	U		1.5			9.5	U		8.2	J		11	U		15	U		16	U		2.8	J		10	U		12	U	
cis-Chlordane	µg/kg dw	--	--	--	0.82	Ui		0.75	Ui		0.8	Ui		8.2	Ui		0.86	Ui		1.1	Ui		1.1	Ui		3.7	Ui		1.4	Ui		1.1	Ui	
trans-Chlordane	µg/kg dw	--	--	--	18	Ui		2.1	Ui		21	Ui		16	Ui		13	Ui		11	Ui		13	Ui		19	Ui		7.6	Ui		9.7	Ui	
cis-Nonachlor	µg/kg dw	--	--	--	0.82	Ui		2.0			0.97	Ui		8.2	Ui		1.9	Ui		2.1	Ui		2.1	Ui		3.7	Ui		1.4	Ui		1.9	Ui	
trans-Nonachlor	µg/kg dw	--	--	--	0.82	U		0.75	Ui		0.8	U		8.2	Ui		0.86	U		0.95	Ui		0.99	Ui		3.7	U		1.1	U		1.1	U	
Oxychlordane	µg/kg dw	--	--	--	1.4	Ui		0.75	U		1.5	Ui		14	Ui		1.2	Ui		1.8	Ui		1.5	Ui		3.7	U		1.3	Ui		1.3	Ui	
Total chlordane	µg/kg dw	2.8	37	--	18	U		2.0			21	U		16	U		13	U		11	U		13	U		19	U		7.6	U		9.7	U	
Volatile Organic Compounds (VOC)																																		
Ethylbenzene	µg/kg dw	10		50	8.2	U		7.6	U		8.0	U		8.1	U		8.6	U		9.1	U		9.8	U		7.2	U		11	U		11	U	
Total Xylenes	µg/kg dw	40		160	16	U		15	U		0.47	J		16	U		17	U		18	U		20	U		0.37	J		22	U		22	U	
Tetrachloroethene	µg/kg dw	57		210	8.2	U		7.6	U		8.0	U		8.1	U		8.6	U		9.1	U		9.8	U		7.2	U		11	U		11	U	
Trichloroethene	µg/kg dw	160		1600	8.2	U	UJ	7.6	U	UJ	8.0	U	UJ	8.1	U	UJ	8.6	U	UJ	9.1	U	UJ	9.8	U	UJ	7.2	U	UJ	11	U	UJ	11	U	UJ

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			C1			C1-Z			C2			C2-Z			D1			D1-Z			D2			D2-Z			D3			X1 (Dup)		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Dioxin/Furan Congeners																																		
2,3,7,8-TCDD	ng/kg	--	--	--	0.961			0.705	JK	U	0.759	U		0.771	JK	U	0.82	JK	U	2.08			1.13			1.51			1.05			0.886	J	
1,2,3,7,8-PeCDD	ng/kg	--	--	--	2.90	J		0.74	JK	U	2.38	JK	U	1.07	JK	U	2.44	JK	U	7.38	K	U	4.10	JK	U	7.72	K	U	5.13	J		4.63	JK	U
1,2,3,4,7,8-HxCDD	ng/kg	--	--	--	4.55	K	U	3.12	J		4.1	K	U	4	U		3.34	JK	U	8.34	K	U	5.35	K	U	7.69	K	U	6.9	K	U	6.73	K	U
1,2,3,6,7,8-HxCDD	ng/kg	--	--	--	38.2	K	U	15.3	K	U	27.2	K	U	24.8	K	U	28.5	K	U	87.6	K	U	51.8	K	U	152			49.4	K	U	52.9		
1,2,3,7,8,9-HxCDD	ng/kg	--	--	--	14.1			8.67			10.8			11.5	K	U	9.97			28.3			17.1			3.44	JK	U	17.7			18.0		
1,2,3,4,6,7,8-HpCDD	ng/kg	--	--	--	559	B		190	B		286	B		421	B		405	B		803	B		586	B		1010	B		604	B		659	B	
OCDD	ng/kg	--	--	--	6150	B,D		2060	B		2680	B		3380	B		4200	B		10700	B,D		5770	B		7960	B,D		5630	B		5940	B	
2,3,7,8-TCDF	ng/kg	--	--	--	121			110			89.6			179			170			2550	D		357			813	D		240			275		
1,2,3,7,8-PeCDF	ng/kg	--	--	--	140			130			115			238			244			2230			491			1040			335			670		
2,3,4,7,8-PeCDF	ng/kg	--	--	--	58.5			54.4			48.7			95.7			95.5			1100			217			452			134			242		
1,2,3,4,7,8-HxCDF	ng/kg	--	--	--	275			266			210			588			478			3590			903			1700			673			1090		
1,2,3,6,7,8-HxCDF	ng/kg	--	--	--	57.7			57.2			47.0			111			103			716			184			373			140			244		
1,2,3,7,8,9-HxCDF	ng/kg	--	--	--	3.38	J		3.96			2.77	J		5.18			6.99			38.8			9.76			19.3			8.39			11.4		
2,3,4,6,7,8-HxCDF	ng/kg	--	--	--	21.5			18.6			17.0			32.0			32.1			231			61.3			123			46.1			75.4		
1,2,3,4,6,7,8-HpCDF	ng/kg	--	--	--	220			182			163			404			295			1550			465			872			423			466		
1,2,3,4,7,8,9-HpCDF	ng/kg	--	--	--	96.9			84.8			60.9			161			135			941			221			407			179			215		
OCDF	ng/kg	--	--	--	864	B		670	B		643	B		1520	B		1060	B		5910	B		1610	B		2870	B		1400	B		1780	B	
Total TCDD	ng/kg	--	--	--	55.4			63.9			68.0			34.9			34.4			116			55.3			83.1			58.4			62.1		
Total PeCDD	ng/kg	--	--	--	30.9			28.4			40.4			26.4			18.9			12.7			19.8			49.1			34.0			48.1		
Total HxCDD	ng/kg	--	--	--	205			83.6			194			164			146			398			252			771			253			359		
Total HpCDD	ng/kg	--	--	--	1580			451			865			1120			1150			1880			1600			2290			1660			1980		
Total TCDF	ng/kg	--	--	--	356			311			351			611			428			4240			934			1690			593			868		
Total PeCDF	ng/kg	--	--	--	679			373			564			927			774			6960			1590			3340			1030			1950		
Total HxCDF	ng/kg	--	--	--	748			619			545			1140			929			6330			1700			3390			1300			2030		
Total HpCDF	ng/kg	--	--	--	704			549			487			1120			863			4580			1350			2450			1190			1350		
Total TEQ (U = 1/2)	ng/kg	4	10	--	87.9			73.8			65.0			141.6			129.1			1160.8			254.0			516.9			185.9			288.6		
Total TEQ (U = 0)	ng/kg	4	10	--	85.7			72.4			61.9			138.7			125.9			1152.3			249.1			512.5			183.1			286.0		

[a] 2,4-Dimethylphenol and N-nitrosodiphenylamine are reported to the method detection limit (MDL) for non-detected values.

Analyte detected above Screening Level (SL)

Analyte detected above Bioaccumulation Trigger (BT)

Non-detected result above SL or BT

BT = bioaccumulation trigger
DMMP = dredged material management program
dw = dry weight
LQ = laboratory qualifier
ML = maximum level
OC = organic carbon normalized
PCBs = polychlorinated biphenyls
SL = screening level
TEQ = toxic equivalent
VQ = validation qualifier

Qualifier Definitions:

- B = method blank contamination
- D = value reported from a dilution
- J = estimated value
- K = estimated maximum possible concentration
- N = spiked sample recovery not within control limits
- P = >25% detected result difference between GC columns
- U = nondetect at reporting limit
- Ui = nondetect at elevated reporting limit

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			D3-Z			D4			D4-Z			E1			E1-Z			E2			E2-Z			E3			E3-Z			E4			E4-Z		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Conventionals																																					
Ammonia	mg N/kg dw	--	--	--	32.6			28.6			37.0			9.8			16.4			19.8			19.3			12.2			15.7			16.3			26.1		
Sulfide	mg/kg dw	--	--	--	2820			980			2120			1530			1600			4300			2540			4300			1490			1020			222		
Total Organic Carbon	% dw	--	--	--	2.13			3.92			1.86			5.14			2.98			4.03			1.30			4.97			2.05			4.41			2.07		
Total Volatile Solids	% dw	--	--	--	4.21			7.84			3.80			8.91			6.25			7.85			3.18			9.74			3.06			9.90			3.94		
Total Solids	% dw	--	--	--	59.2			47.6			61.2			47.8			47.9			47.8			64.9			44.5			60.0			44.6			55.3		
pH	pH units	--	--	--	8.97			8.11			8.66			7.72			8.08			8.02			8.00			7.86			8.30			7.95			8.37		
Grainsize																																					
Gravel	% dw	--	--	--	0.70			2.69			0.20			0.00			0.00			0.18			0.28			0.23			0.02			0.04			0.21		
Sand	% dw	--	--	--	44.47			18.79			46.11			30.84			7.94			10.93			31.15			8.21			24.54			16.98			3.29		
Total Fines	% dw	--	--	--	58.42			79.50			50.59			60.95			91.01			92.82			68.85			86.86			71.99			90.67			91.95		
Silt	% dw	--	--	--	39.01			49.73			34.83			14.84			67.32			59.92			51.28			54.34			44.94			69.52			55.39		
Clay	% dw	--	--	--	19.41			29.77			15.76			46.11			23.69			32.90			17.57			32.52			27.05			21.15			36.56		
Metals																																					
Antimony	mg/kg dw	150	--	200	4.4	N		2.2	J,N		3.2	J,N		2.9	J,N		2.1	J,N		2.2	J,N		0.9	J,N	J	3.1	J,N		0.8	J,N		3.4	J,N		1.7	J,N	
Arsenic	mg/kg dw	57	507.1	700	36.3			29.4			19.3			27.1			20.5			29.3			10.2			34.7			7.8			36.3			14.7		
Cadmium	mg/kg dw	5.1	11.3	14.0	0.55			0.32			0.24			0.47			0.19			0.34			0.15	U		0.43			0.06	J		0.58			0.11	J	
Chromium	mg/kg dw	260	260	--	28.6			31.9			24.0			34.0			35.0			31.3			19.1			37.3			21.7			36.8			25.4		
Copper	mg/kg dw	390	1027	1300	108			120			62.3			106			86.0			97.0			36.3			124			38.1			120			54.2		
Lead	mg/kg dw	450	975	1200	92.6			61.2			47.9			47.4			28.0			45.6			12.4			59.4			5.2			57.5			17.9		
Mercury	mg/kg dw	0.41	1.5	2.3	0.323			0.401			0.239			0.282			0.327			0.295			0.079			0.387			0.220			0.346			0.111		
Selenium	mg/kg dw	--	3	--	0.8	J		***3.8***	U		***4.0***	U		***3.9***	U		***3.9***	U		1	J		2.9	U		***3.9***	U		***3.7***	U		***3.7***	U		***3.8***	U	
Silver	mg/kg dw	6.1	6.1	8.4	0.6	J		0.4	J		0.3	J		0.4	J		0.4	J		0.3	J		0.6	U		0.5	J		0.7	U		0.5	J		0.8	U	
Zinc	mg/kg dw	410	2783	3800	138			141			85.8			161			93.1			142			44.7			189			36.1			187			63.2		
Organometallic Compounds																																					
Tributyltin (interstitial)	ug/l	--	0.15	--	**0.350**			**0.290**			0.099			0.110			0.089			**0.240**		J	**0.170**		J	0.078			0.120			0.140			0.120		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAH)																																					
Naphthalene	µg/kg dw	2100	--	2400	46	D		45	JD		38			53	U		3.7	J		10	J		7.7	U		22	JD		3.3	J		15			3.4	J	
Acenaphthylene	µg/kg dw	560	--	1300	23	JD		34	JD		21			25	JD		6.7	J		25			7.7	U		30	JD		4.4	J		33			6.0	J	
Acenaphthene	µg/kg dw	500	--	2000	19	JD		19	JD		12			53	U		11	U		8.0	J		7.7	U		56	U		8.3	U		11	J		9.0	U	
Fluorene	µg/kg dw	540	--	3600	32	JD		35	JD		20			53	U		6.9	J		12			7.7	U		25	JD		4.7	J		19			6.1	J	
Phenanthrene	µg/kg dw	1500	--	21000	120	D		170	D		110			87	D		41			67			14			130	D		24			120			30		
Anthracene	µg/kg dw	960	--	13000	76	D		110	D		82			64	D		25			63			8.2			110	D		18			88			20		
2-Methylnaphthalene	µg/kg dw	670	--	1900	26	JD		27	JD		19			53	U		5.2	J		9.0	J		7.7	U		56	U		4.6	J		14			4.9	J	
Total LPAH	µg/kg dw	5200	--	29000	342			440			302			176			88.5			194			22.2			317			59			300			70.4		
High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAH)																																					
Fluoranthene	µg/kg dw	1700	4600	30000	380	D		460	D		660			230	D		89			190			47			360	D		95			170			63		
Pyrene	µg/kg dw	2600	11980	16000	550	D		710	D		640			550	D		280			350			84			860	D		160			770			270		
Benzo(a)anthracene	µg/kg dw	1300	--	5100	200	D		240	D		150			150	D		65			92			25			180	D		48			130			55		
Chrysene	µg/kg dw	1400	--	21000	450	D		520	D		400			400	D		190			250			73			530	D		150			440			150		
Benzo(k)fluoranthene	µg/kg dw	--	--	--	130	D		230	D		160			230	D		120			120			32			340	D		75			210			70		
Benzo(b)fluoranthene	µg/kg dw	--	--	--	610	D		860	D		520			1100	D		560			560			130			1300	D		240			1100			340		
Benzoflouranthenes	µg/kg dw	3200	--	9900	740			1090			680			1330			680			680			162			1640			315			1310			410		
Benzo(a)pyrene	µg/kg dw	1600	--	3600	240	D		360	D		230			410	D		210			220			52			460	D		100			400			120		
Indeno(1,2,3-cd)pyrene	µg/kg dw	600	--	4400	240	D		210	D		170			400	D		190			140			31			310	D		73			280			110		
Dibenzo(a,h)anthracene	µg/kg dw	230	--	1900	42	JD		67	D		49			74	D		42			42			10			83	D		21			67			22		
Benzo(ghi)perylene	µg/kg dw	670	--	3200	130	D		250	D		160			220	D		110			140			33			340	D		67			170			59		
Total HPAH	µg/kg dw	12000	--	69000	2972			3907			3139			3764			1856			2104			517			4763			1029			3737			1259		
Phenols																																					
Phenol	µg/kg dw	420	--	1200	130	U		160	U		25	U		36	JD		10	J		27	J		4.6	J		170	U		25	U		49			7	J	
2,4-Dimethylphenol[a]	µg/kg dw	29	--	210	***32***	U		***33***	U		6.3	U		***33***	U		6.6	U		6.6	U		6.3	U		***36***	U		6.3	U		7.1	U		6.3	U	
2-Methylphenol	µg/kg dw	63	--	77	43	U		53	U		8.2	U		53	U		11	U		11	U		7.7	U		56	U		8.3	U		12	U		9.0	U	
4-Methylphenol	µg/kg dw	670	--	3600	43	U		53	U		8.2	U		53	U		11	U		11	U		7.7	U		56	U		8.3	U		9.4	J		9.0	U	
Pentachlorophenol	µg/kg dw	400	504	690	***430***	U		***530***	U		82	U		***530***	U		110	U		110	U		77	U		***560***	U		83	U		120	U		27	J	

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			D3-Z			D4			D4-Z			E1			E1-Z			E2			E2-Z			E3			E3-Z			E4			E4-Z		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Phthalates																																					
Butylbenzylphthalate	µg/kg dw	63	--	970	21	JD		53	U		8.2	U		43	JD		9.7	J		26			7.7	U		56	U		8.3	U		36			6.8	J	
Di-N-Butylphthalate	µg/kg dw	1400	--	5100	85	U		110	U		17	U		110	U		21	U		5.9	J		16	U		120	U		17	U		11	J		18	U	
Di-N-Octyl Phthalate	µg/kg dw	6200	--	6200	43	U		53	U		8.2	U		53	U		11	U		11	U		7.7	U		56	U		8.3	U		12	U		9.0	U	
Diethylphthalate	µg/kg dw	200	--	1200	43	U		53	U		8.2	U		53	U		11	U		4.5	J		7.7	U		56	U		8.3	U		12	U		9.0	U	
Dimethylphthalate	µg/kg dw	71	--	1400	43	U		53	U		8.2	U		53	U		11	U		11			7.7	U		31	JD		8.3	U		27			9.0	U	
Bis(2-Ethylhexyl) Phthalate	µg/kg dw	1300	--	8300	180	JD		320	JD		110			290	JD		85	J		160			27	J		310	JD		32	J		330			61	J	
Other Semivolatile Organic Compounds (SVOC)																																					
Benzoic Acid	µg/kg dw	650	--	760	2000	U	UJ	2100	U	UJ	400	U	UJ	2100	U	UJ	420	U	UJ	420	U	UJ	400	U	UJ	2300	U	UJ	400	U	UJ	450	U	UJ	400	U	UJ
Dibenzofuran	µg/kg dw	540	--	1700	25	JD		27	JD		17			53	U		4.8	J		9.2	J		7.7	U		56	U		3.9	J		12			3.7	J	
Benzyl Alcohol	µg/kg dw	57	--	870	85	U		110	U		17	U		110	U		21	U		21	U		16	U		120	U		17	U		23	U		18	U	
1,2-Dichlorobenzene	µg/kg dw	35	--	110	43	U		53	U		8.2	U		53	U		11	U		11	U		7.7	U		56	U		8.3	U		12	U		9.0	U	
1,4-Dichlorobenzene	µg/kg dw	110	--	120	43	U		53	U		8.2	U		53	U		11	U		11	U		7.7	U		56	U		8.3	U		12	U		9.0	U	
Hexachlorobenzene	µg/kg dw	22	168	230	43	U		53	U		16			53	U		11	U		11	U		7.7	U		56	U		8.3	U		12	U		9.0	U	
Hexachlorobutadiene	µg/kg dw	11	--	270	43	U		53	U		18			53	U		11	U		11	U		7.7	U		56	U		8.3	U		12	U		9.0	U	
N-Nitrosodiphenylamine[a]	µg/kg dw	28	--	130	16	U		17	U		7.4	J		17	U		3.4	U		3.9	J		3.2	U		18	U		3.2	U		3.6	U		3.2	U	
1,2,4-Trichlorobenzene	µg/kg dw	31	--	64	43	U		53	U		8.6			53	U		11	U		11	U		7.7	U		56	U		8.3	U		12	U		9.0	U	
PCB Aroclors																																					
PCB-aroclor 1016	µg/kg dw	--	--	--	110	Ui		58	Ui		180	Ui		41	Ui		26	Ui		22	Ui		7.7	Ui		17	Ui		30	Ui		12	Ui		15	Ui	
PCB-aroclor 1221	µg/kg dw	--	--	--	240	Ui		200	Ui		250	Ui		35	Ui		58	Ui		75	Ui		21	Ui		28	Ui		33	Ui		38	Ui		18	Ui	
PCB-aroclor 1232	µg/kg dw	--	--	--	52	Ui		48	Ui		88	Ui		31	Ui		14	Ui		41	Ui		8.6	Ui		25	Ui		13	Ui		16	Ui		9.0	Ui	
PCB-aroclor 1242	µg/kg dw	--	--	--	22	Ui		15	Ui		70	Ui		13	Ui		11	Ui		19	Ui		7.7	Ui		16	Ui		8.4	Ui		12	Ui		9.0	U	
PCB-aroclor 1248	µg/kg dw	--	--	--	69	Ui		46	Ui		150	Ui		35	Ui		21	Ui		60	Ui		30	Ui		37	Ui		29	Ui		13	Ui		13	Ui	
PCB-aroclor 1254	µg/kg dw	--	--	--	290	D		160			450			110			93			150			84			100			89			63			47		
PCB-aroclor 1260	µg/kg dw	--	--	--	100	D		55			95			42			22			57			22			40			17			25			13		
PCB-aroclor 1262	µg/kg dw	--	--	--	22	U		11	U		8.1	U		11	U		11	U		--			--			12	U		8.4	U		12	U		9.0	U	
PCB-aroclor 1268	µg/kg dw	--	--	--	24	Ui		15	Ui		22	Ui		11	Ui		11	Ui		--			--			12	Ui		8.4	U		12	Ui		9.0	U	
Total PCBs (µg/kg dw)	µg/kg dw	130	--	3100	390			215			545			152			115			207			106			140			106			88			60		
Total PCBs (mg/kg OC)	mg/kg OC	--	38	--	18			5.5			29			3.0			3.9			5.1			8.2			2.8			5.2			2.0			2.9		
Pesticides																																					
Aldrin	µg/kg dw	9.5	--	--	4.2	Ui		1.1	Ui		4.1	Ui		1.1	Ui		1.1	U		1.1	Ui		0.77	U		1.2	Ui		0.84	U		1.2	Ui		0.9	U	
Dieldrin	µg/kg dw	1.9	--	1700	4.2	Ui		1.1	Ui		6.9	Ui		2.3	Ui		1.6	Ui		2.4	Ui		1.3	Ui		1.7	Ui		0.84	Ui		1.4	Ui		0.9	Ui	
Heptachlor	µg/kg dw	1.5	--	270	4.2	Ui		1.1	Ui		4.1	Ui		1.1	U		1.1	Ui		1.1	Ui		0.77	Ui		1.2	Ui		0.84	U		1.2	Ui		0.9	Ui	
4,4'-DDD	µg/kg dw	16	--	--	3.7	JPD		1.1	Ui		2.2	JD		4.0			1.8			3.7			1.0			3.3			0.78	J		4.4			1.3		
4,4'-DDE	µg/kg dw	9	--	--	4.2	Ui		1.1	Ui		4.1	Ui		3.7	P		1.1	Ui		3.0	Ui		0.77	Ui		3.3	P		0.84	Ui		4.2	P		0.9	Ui	
4,4'-DDT	µg/kg dw	12	--	--	39	Ui		7.7	Ui		41	Ui		9.4	Ui		9.0	Ui		13	Ui		6.3	Ui		7.5	Ui		5.3	Ui		7.2	Ui		5.5	Ui	
Total DDTs	µg/kg dw	--	50	69	3.7	J		7.7	U		2.2	J		7.7			1.8			3.7			1.0			6.6			0.78	J		8.6			1.3		
cis-Chlordane	µg/kg dw	--	--	--	4.2	Ui		1.1	Ui		4.1	Ui		1.1	Ui		1.1	Ui		0.67	JP		0.77	Ui		0.27	JP		0.84	Ui		1.4	P		0.9	Ui	
trans-Chlordane	µg/kg dw	--	--	--	28	Ui		1.1	Ui		4.1	Ui		1.1	Ui		5.0	Ui		6.9	Ui		3.4	Ui		4.7	Ui		3.3	Ui		1.2	Ui		0.9	Ui	
cis-Nonachlor	µg/kg dw	--	--	--	4.2	Ui		1.1	Ui		4.1	U		4.4			4.6	Ui		5.6	P		0.77	Ui		2.8	Ui		0.84	Ui		3.6			1.1	Ui	
trans-Nonachlor	µg/kg dw	--	--	--	4.2	U		1.1	U		4.1	Ui		2.1	Ui		1.1	Ui		2.2	Ui		0.81	Ui		2.0	P		0.84	U		1.8	Ui		0.9	Ui	
Oxychlordane	µg/kg dw	--	--	--	4.2	Ui		1.5	Ui		4.1	U		1.1	U		1.1	U		1.1	U		0.77	U		1.2	U		0.84	U		1.2	U		0.9	U	
Total chlordane	µg/kg dw	2.8	37	--	28	U		1.5	U		4.1	U		4.4			5.0	U		6.3	J		3.4	U		2.3	J		3.3	U		5.0	U		1.1	U	
Volatile Organic Compounds (VOC)																																					
Ethylbenzene	µg/kg dw	10		50	8.5	U		11	U		8.1	U		11	U		11	U		11	U		7.7	U		11	U		8.3	U		12	U		9.0	U	
Total Xylenes	µg/kg dw	40		160	17	U		22	U		1.3	J		22	U		22	U		22	U		0.77	J		22	U		17	U		24	U		18	U	
Tetrachloroethene	µg/kg dw	57		210	8.5	U		11	U		8.1	U		11	U		11	U		11	U		7.7	U		11	U		8.3	U		12	U		9.0	U	
Trichloroethene	µg/kg dw	160		1600	8.5	U	UJ	11	U		8.1	U		11	U	UJ	11	U	UJ	11	U		7.7	U		11	U		8.3	U		12	U	UJ	9.0	U	UJ

Table 6. Sediment Conventionals/Chemistry Results

Chemical	Unit	DMMP Criteria			D3-Z			D4			D4-Z			E1			E1-Z			E2			E2-Z			E3			E3-Z			E4			E4-Z		
		SL	BT	ML	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
Dioxin/Furan Congeners																																					
2,3,7,8-TCDD	ng/kg	--	--	--	1.48			1.60			1.51	K	U	0.728	J		0.546	J		0.878	J		0.764	U		1.27	K	U	0.54	JK	U	1.09			0.871	U	
1,2,3,7,8-PeCDD	ng/kg	--	--	--	6.34			7.04	K	U	4.56	K	U	4.50	J		4.06	J		6.55			1.25	J		9.07	K	U	2.49	J		5.98			2.70	JK	U
1,2,3,4,7,8-HxCDD	ng/kg	--	--	--	7.2	K	U	9.76	K	U	7.59	K	U	4.25	JK	U	3.19	J		8.07			1.54	JK	U	9.37			2.59	J		5.51			2.24	JK	U
1,2,3,6,7,8-HxCDD	ng/kg	--	--	--	83.1			112			58.4			69.0			72.0			113			25.9			161			36.8			99.0			41.1		
1,2,3,7,8,9-HxCDD	ng/kg	--	--	--	23.3			31.6			18.9	K	U	16.7			12.3			26.1			5.14			36.7			9.53			20.5			8.66		
1,2,3,4,6,7,8-HpCDD	ng/kg	--	--	--	692	B		968			567			748	B		503	B		1060			185			1640			289			929	B		297	B	
OCDD	ng/kg	--	--	--	5770	B		8300			4920			7550	B		4200	B		10200	D		1570			17400	D		2570			7630	B		2330	B	
2,3,7,8-TCDF	ng/kg	--	--	--	1040	D		380			1750	D		279			243			210			63.4			214			153			205			99.4		
1,2,3,7,8-PeCDF	ng/kg	--	--	--	1270			636			1740			398			301			338			98.6			395			265			285			143		
2,3,4,7,8-PeCDF	ng/kg	--	--	--	489			239			665			152			141			136			38.9			157			101			114			53.1		
1,2,3,4,7,8-HxCDF	ng/kg	--	--	--	2750			1420			5380	D		547			669			627			187			909			489			585			278		
1,2,3,6,7,8-HxCDF	ng/kg	--	--	--	572			313			731			125			137			130			39.4			199			105			111			58.5		
1,2,3,7,8,9-HxCDF	ng/kg	--	--	--	38.5			14.3			38.5	K	U	7.30			6.64			6.76			2.83	J		7.74			6.12			5.50			5.80	K	U
2,3,4,6,7,8-HxCDF	ng/kg	--	--	--	161			88.7			209			45.9			42.1			56.3			14.2			68.8			34.4			46.5			22.5		
1,2,3,4,6,7,8-HpCDF	ng/kg	--	--	--	1300			943			1680			350			397			492			125			596			265			413			188		
1,2,3,4,7,8,9-HpCDF	ng/kg	--	--	--	849			386			1010			149			163			170			57.9			194			146			146			88.5		
OCDF	ng/kg	--	--	--	4950	B		2770			9950	D		1160	B		1280	B		1650			468			2150			1060			1420	B		586	B	
Total TCDD	ng/kg	--	--	--	77.5			78.4			68.4			21.7			17.7			25.3			7.75			22.5			34.9			37.8			6.1		
Total PeCDD	ng/kg	--	--	--	37.3			50.3			10.3			28.1			20.2			30.1			6.46			34.2			26.9			26.3			10.0		
Total HxCDD	ng/kg	--	--	--	455			623			321			372			347			584			123			823			188			489			205		
Total HpCDD	ng/kg	--	--	--	1620			2470			1270			1980			1260			2650			446			4060			742			2550			739		
Total TCDF	ng/kg	--	--	--	2260			1210			3000			593			807			695			192			733			490			564			276		
Total PeCDF	ng/kg	--	--	--	3780			2240			4430			1160			1160			1290			276			1590			830			1010			518		
Total HxCDF	ng/kg	--	--	--	4780			2790			5770			1210			1370			1560			431			2160			943			1320			601		
Total HpCDF	ng/kg	--	--	--	3730			2400			4510			1070			1060			1460			374			1820			768			1350			570		
Total TEQ (U = 1/2)	ng/kg	4	10	--	691.4			358.6			1107.9			187.1			186.7			196.9			54.8			254.8			132.7			175.2			79.8		
Total TEQ (U = 0)	ng/kg	4	10	--	691.0			354.6			1101.6			186.8			186.7			196.9			54.7			249.7			132.5			175.2			77.6		

[a] 2,4-Dimethylphenol and N-nitrosodiphenylamine are reported to the method detection limit (MDL) for non-detected values.

Analyte detected above Screening Level (SL)

Analyte detected above Bioaccumulation Trigger (BT)

Non-detected result above SL or BT

BT = bioaccumulation trigger
DMMP = dredged material management program
dw = dry weight
LQ = laboratory qualifier
ML = maximum level
OC = organic carbon normalized
PCBs = polychlorinated biphenyls
SL = screening level
TEQ = toxic equivalent
VQ = validation qualifier

Qualifier Definitions:

- B = method blank contamination
- D = value reported from a dilution
- J = estimated value
- K = estimated maximum possible concentration
- N = spiked sample recovery not within control limits
- P = >25% detected result difference between GC columns
- U = nondetect at reporting limit
- Ui = nondetect at elevated reporting limit

Table 7. Sediment PCB and PBDE Congener Results

Chemical	Unit	HW13-A1-S			HW13-D1-S			HW13-E1-S		
		Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
PCB Congeners										
PCB-001	ng/kg dw	33.2	K	U	1800			44.1		
PCB-002	ng/kg dw	34.8			152	K	U	12.9	U	
PCB-003	ng/kg dw	36.4			285			56.2		
PCB-004	ng/kg dw	18.9			688		J	133		
PCB-005	ng/kg dw	11.5			238			8.19	U	
PCB-006	ng/kg dw	10.4	U		221			83.3		
PCB-007	ng/kg dw	9.63	U		93.5			22.2		
PCB-008	ng/kg dw	66.7			699			477		
PCB-009	ng/kg dw	10.4	U		93.6			27		
PCB-010	ng/kg dw	14.9	U		33.1			19.5	U	
PCB-011	ng/kg dw	35.6	B	U	61	B	U	66.9	B	U
PCB-012/013	ng/kg dw	16			122			101		
PCB-014	ng/kg dw	10.8	U		19	U		8.6	U	
PCB-015	ng/kg dw	109			535			778		
PCB-016	ng/kg dw	105	K	U	249			332		
PCB-017	ng/kg dw	163			93	U		499		
PCB-018/030	ng/kg dw	302			454			668		
PCB-019	ng/kg dw	30.3	U		91.3	U		118		
PCB-020/028	ng/kg dw	902			1540			2370		
PCB-021/033	ng/kg dw	281			478			742		
PCB-022	ng/kg dw	219			410			604		
PCB-023	ng/kg dw	62	U		88.8	U		32.6	U	
PCB-024	ng/kg dw	21.2	U		65.7	U		66.4		
PCB-025	ng/kg dw	48.2	K	U	170	K	U	169		
PCB-026/029	ng/kg dw	92.8			430			349		
PCB-027	ng/kg dw	30	K	U	69.2	U		92.9		
PCB-031	ng/kg dw	727			1250			1730		
PCB-032	ng/kg dw	194			233	K	U	397		
PCB-034	ng/kg dw	61.7	U		92.2	U		32.5	U	
PCB-035	ng/kg dw	62.3	U		92.1	U		32.8	U	
PCB-036	ng/kg dw	59	U		81.9	U		31	U	
PCB-037	ng/kg dw	368			611			955		
PCB-038	ng/kg dw	67	U		92.9	U		35.3	U	
PCB-039	ng/kg dw	55.1	U		79.2	U		29	U	
PCB-040/041/071	ng/kg dw	665			835			2030		
PCB-042	ng/kg dw	230			375			774		
PCB-043/073	ng/kg dw	16.9	U		101			21.1	U	
PCB-044/047/065	ng/kg dw	1080			2420			3650		
PCB-045/051	ng/kg dw	167			219			652		
PCB-046	ng/kg dw	54.7			93.2			216		
PCB-046/069	ng/kg dw	713			1960			3110		
PCB-048	ng/kg dw	208			241	K	U	615		
PCB-050/053	ng/kg dw	120			249			522		
PCB-052	ng/kg dw	1690			5240			6960		
PCB-054	ng/kg dw	23.3	U		19.8	U		24	U	
PCB-055	ng/kg dw	14.9	U		28.7	U		19.5	U	
PCB-056	ng/kg dw	673			532			1460		
PCB-057	ng/kg dw	15.4	U		30.9	U		19.5	U	
PCB-058	ng/kg dw	14.9	U		28.2	U		19.5	U	
PCB-059/062/075	ng/kg dw	62.1			177			441		

Table 7. Sediment PCB and PBDE Congener Results

Chemical	Unit	HW13-A1-S			HW13-D1-S			HW13-E1-S		
		Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
PCB-060	ng/kg dw	365			225			561		
PCB-061/070/074/076	ng/kg dw	2850			4140			6490		
PCB-063	ng/kg dw	15.2	U		167	K	U	117	K	U
PCB-064	ng/kg dw	396			629			1000		
PCB-066	ng/kg dw	1630			2070			4010		
PCB-067	ng/kg dw	27.5			67.1			90.9	K	U
PCB-068	ng/kg dw	14.7	JK	U	24.7	U		19.5	U	
PCB-072	ng/kg dw	40.4			91.4			84.5		
PCB-077	ng/kg dw	201			280			518		
PCB-078	ng/kg dw	14.9	U		108	K	U	21.1	U	
PCB-079	ng/kg dw	22.6	K	U	17	U		126		
PCB-080	ng/kg dw	14.9	U		17	U		58.8		
PCB-081	ng/kg dw	17.1	U		14.9	U		23.9	U	
PCB-082	ng/kg dw	424			1480			1980		
PCB-083/099	ng/kg dw	1810			6800			9070		
PCB-084	ng/kg dw	752			2380			4170		
PCB-085/116	ng/kg dw	894			2240			4140		
PCB-086/087/097/109/119/125	ng/kg dw	2500			9600			11600		
PCB-088/091	ng/kg dw	414			1320			2560		
PCB-089	ng/kg dw	22.5	U		47.3	U		135	K	U
PCB-090/101/113	ng/kg dw	3680			10700			19000		
PCB-092	ng/kg dw	666			2020			304	K	U
PCB-093/100	ng/kg dw	20.7	JK	U	97.4	K	U	145	K	U
PCB-094	ng/kg dw	21.1	U		149	K	U	56.7	K	U
PCB-095	ng/kg dw	2750			8210			12800		
PCB-096	ng/kg dw	20.8			61.3	K	U	75.3		
PCB-098/102	ng/kg dw	63.8	K	U	216	K	U	336	K	U
PCB-103	ng/kg dw	33.4	K	U	127	K	U	145		
PCB-104	ng/kg dw	17.3	U		41.6	U		20.2	U	
PCB-105	ng/kg dw	1800			6880			7650		
PCB-106	ng/kg dw	42.5	U		96	K	U	30.7	U	
PCB-107	ng/kg dw	389	K	U	1390			1350		
PCB-108/124	ng/kg dw	114			539			549		
PCB-110/115	ng/kg dw	3850			15500			17900		
PCB-111	ng/kg dw	93.3	U		49.6	U		44.4	U	
PCB-112	ng/kg dw	107	U		54.2	U		50.8	U	
PCB-114	ng/kg dw	42.7	U		256			257		
PCB-117	ng/kg dw	104	U		730			49.5	U	
PCB-118	ng/kg dw	4760			19600	E	J	19700	E	J
PCB-120	ng/kg dw	96.8	U		51.8	U		46.1	U	
PCB-121	ng/kg dw	96.2	U		49.3	U		45.8	U	
PCB-122	ng/kg dw	44.7	U		119			178		
PCB-123	ng/kg dw	129	K	U	305	K	U	229		
PCB-126	ng/kg dw	48.1	U		34.4	U		39.5		
PCB-127	ng/kg dw	41.6	U		31.1	U		30	U	
PCB-128/166	ng/kg dw	797			3240			3760		
PCB-129/138/163	ng/kg dw	5300			18200			19600		
PCB-130	ng/kg dw	383			1380			1480		
PCB-131	ng/kg dw	52.7	U		58.3	U		228		
PCB-132	ng/kg dw	1550			5850			6760		
PCB-133	ng/kg dw	119			70	U		303		

Table 7. Sediment PCB and PBDE Congener Results

Chemical	Unit	HW13-A1-S			HW13-D1-S			HW13-E1-S		
		Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
PCB-134	ng/kg dw	213			773			978		
PCB-135/151	ng/kg dw	2030			4710			5860		
PCB-136	ng/kg dw	550			64.8			2550		
PCB-137	ng/kg dw	182	K	U	734			1100		
PCB-139/140	ng/kg dw	79.5	K	U	326	K	U	390		
PCB-141	ng/kg dw	801			2760			2980		
PCB-142	ng/kg dw	72	U		74.2	U		58.6	U	
PCB-143	ng/kg dw	69.5	U		70.4	U		56.5	U	
PCB-144	ng/kg dw	302			651	K	U	828		
PCB-145	ng/kg dw	14.9	U		1380			19.5	U	
PCB-146	ng/kg dw	1210			2760			2700		
PCB-147/149	ng/kg dw	4310			12700			14000		
PCB-148	ng/kg dw	20.2	U		24.8	U		26.7	U	
PCB-150	ng/kg dw	14.9	U		18.3	K	U	19.5	U	
PCB-152	ng/kg dw	15.1	U		18.7	U		20	U	
PCB-153/168	ng/kg dw	5620			15100			15000		
PCB-154	ng/kg dw	84.2			258	K	U	208		
PCB-155	ng/kg dw	16.8	U		32.5	U		18.7	U	
PCB-156/157	ng/kg dw	605			2600			3030		
PCB-158	ng/kg dw	539			1890			2150		
PCB-159	ng/kg dw	85.9	K	U	151			106	K	U
PCB-160	ng/kg dw	59.7	U		68.1	U		77.9	U	
PCB-161	ng/kg dw	47.2	U		50	U		38.4	U	
PCB-162	ng/kg dw	29.4	U		153			113		
PCB-164	ng/kg dw	488			1190			1320		
PCB-165	ng/kg dw	46.8	U		49.6	U		38.1	U	
PCB-167	ng/kg dw	253			936			936		
PCB-169	ng/kg dw	30.5	U		34	U		49.7	U	
PCB-170	ng/kg dw	1600			3930			3170		
PCB-171/173	ng/kg dw	524			1360			1110		
PCB-172	ng/kg dw	491			809			584		
PCB-174	ng/kg dw	2720			4880			3180		
PCB-175	ng/kg dw	145			286	K	U	182		
PCB-176	ng/kg dw	247			588			484		
PCB-177	ng/kg dw	1130			2690			1830		
PCB-178	ng/kg dw	994			1390			852		
PCB-179	ng/kg dw	1100			2130			1480		
PCB-180/193	ng/kg dw	4830			8760			5730		
PCB-181	ng/kg dw	59.1	U		304			284		
PCB-182	ng/kg dw	30	K	U	46.9	K	U	24.8	U	
PCB-183	ng/kg dw	1520	K	U	4110			2160		
PCB-184	ng/kg dw	14.9	U		17	U		19.5	U	
PCB-185	ng/kg dw	68.9	U		72.2	U		68.2	U	
PCB-186	ng/kg dw	15.5	U		18.4	U		19.5	U	
PCB-187	ng/kg dw	3730			6940			4050		
PCB-188	ng/kg dw	24.9	K	U	32.8			20	U	
PCB-189	ng/kg dw	48.8	U		122			141		
PCB-190	ng/kg dw	300			832			643		
PCB-191	ng/kg dw	139			197	K	U	132	K	U
PCB-192	ng/kg dw	49.2	U		63.3	U		48.7	U	
PCB-194	ng/kg dw	4790			5100			2420		

Table 7. Sediment PCB and PBDE Congener Results

Chemical	Unit	HW13-A1-S			HW13-D1-S			HW13-E1-S		
		Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
PCB-195	ng/kg dw	472			1180			757		
PCB-196	ng/kg dw	1530			2160			1120		
PCB-197	ng/kg dw	60.7	K	U	100	K	U	68		
PCB-198/199	ng/kg dw	9350			7850			3360		
PCB-200	ng/kg dw	331			613			338		
PCB-201	ng/kg dw	407			584			320		
PCB-202	ng/kg dw	1280			1290			586		
PCB-203	ng/kg dw	1780			2910			1540		
PCB-204	ng/kg dw	48.9	U		62	U		55.3	U	
PCB-205	ng/kg dw	322			361			129		
PCB-206	ng/kg dw	15800	E	J	9260			3020		
PCB-207	ng/kg dw	564			422			226		
PCB-208	ng/kg dw	4250			2480			972		
PCB-209	ng/kg dw	21700	E	J	13800	E	J	4040		
PCB, Monochlorobiphenyls	ng/kg dw	104			2230			100		
PCB, Dichlorobiphenyls	ng/kg dw	258			2780			1690		
PCB, Trichlorobiphenyls	ng/kg dw	3430			5830			9100		
PCB, Tetrachlorobiphenyls	ng/kg dw	11200			20200			33500		
PCB, Pentachlorobiphenyls	ng/kg dw	25100			90800			114000		
PCB, Hexachlorobiphenyls	ng/kg dw	25500			77900			86400		
PCB, Heptachlorobiphenyls	ng/kg dw	19500			39400			26000		
PCB, Octachlorobiphenyls	ng/kg dw	20300			22200			10600		
PCB, Nonachlorobiphenyls	ng/kg dw	20600			12200			4220		
PCB	ng/kg dw	148000			287000			290000		
PBDE Congeners										
BDE 7	ng/kg dw	39.6	M		219	M		171	M	J
BDE 8/11	ng/kg dw	31.2	M		66	M		41.9	M	
BDE 10	ng/kg dw	0.18	U	UJ	1.8	U	UJ	0.33	M,J,R	UJ
BDE 12/13	ng/kg dw	6.61	M,J		19.7	M,J		8.3	M,J	
BDE 15	ng/kg dw	21.3	M		50.2	M		26.8	M	
BDE 17/25	ng/kg dw	73.3	M		293	M		292	M	J
BDE 28/33	ng/kg dw	10.6	M		26.2	M,J		23.6	M	
BDE 30	ng/kg dw	0.3	U		3	U		0.7	U	
BDE 32	ng/kg dw	11	M		129	M		8.18	M	
BDE 35	ng/kg dw	1.4	M,J,R	U	1.9	M,J,R	U	23	M,R	U
BDE 37	ng/kg dw	0.75	M,J,R	U	2.1	M,J,R	U	1.8	M,J,R	U
BDE 47	ng/kg dw	124	M		550	M		491	M	
BDE 49	ng/kg dw	54.4	M		261	M		268	M	J
BDE 51	ng/kg dw	9.4	M		36.4	M		43.6	M	
BDE 66	ng/kg dw	2.6	U		16	M,J,R	U	17.8	M	
BDE 71	ng/kg dw	2.3	U		6.9	U		11.1	M	
BDE 75	ng/kg dw	1.9	U		5.7	U		2.6	M,J,R	U
BDE 77	ng/kg dw	2.4	U		5.8	U		0.88	M,J	
BDE 79	ng/kg dw	1.5	U		4.4	U		0.98	M,J	
BDE 85	ng/kg dw	2.8	M,J		20.2	M,J		17.5	M	
BDE 99	ng/kg dw	56.6	M		479	M		413	M	
BDE 100	ng/kg dw	17.8	M		118	M		126	M	
BDE 105	ng/kg dw	1.7	U		10	U		0.98	M,J,R	U
BDE 116	ng/kg dw	2.1	U		13	U		2.3	M,J	
BDE 118	ng/kg dw	1.6	U		9.9	U		13.5	M	
BDE 119/120	ng/kg dw	4.1	M,J		32.6	M,J		44.1	M	

Table 7. Sediment PCB and PBDE Congener Results

Chemical	Unit	HW13-A1-S			HW13-D1-S			HW13-E1-S		
		Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
BDE 126	ng/kg dw	0.71	U		4.8	U		1.12	M,J	
BDE 128	ng/kg dw	2.6	M,J,R	U	37	M,J		3	M,J,R	U
BDE 138/166	ng/kg dw	1.1	U		11	M,U,R	U	11.6	M,J	
BDE 140	ng/kg dw	0.65	U		6.7	U		5.58	M,J	
BDE 153	ng/kg dw	7.85	M		109	M		100	M	
BDE 154	ng/kg dw	8.3	M		76.8	M		98.7	M	
BDE 155	ng/kg dw	1.87	M,J		10.7	M,J		21.3	M	
BDE 156	ng/kg dw	1.7	U		18	U		1.5	U	
BDE 181	ng/kg dw	0.28	U		2.9	U		4.51	M,J	
BDE 183	ng/kg dw	4.18	M,J		223	M		96.1	M	
BDE 184	ng/kg dw	2.5	M,J		19.9	M,J		30.9	M	
BDE 190	ng/kg dw	3.1	M,J,R	UJ	14.3	M,J		12.7	M	
BDE 191	ng/kg dw	1.24	M,J		6.1	M,J,R	U	19.6	M	
BDE 196	ng/kg dw	3.46	M,J	J	92.9	M		87.8	M	
BDE 197	ng/kg dw	5.1	M,J,R	UJ	142	M		112	M	
BDE 203	ng/kg dw	4.05	M,J	J	73.5	M		91.3	M	
BDE 206	ng/kg dw	41.1	M	J	561	M		653	M	
BDE 207	ng/kg dw	29.7	M,J	J	509	M		672	M	
BDE 208	ng/kg dw	19.8	M,J		288	M		403	M	
BDE 209	ng/kg dw	1340			24000			20300	M	

LQ = laboratory qualifier
VQ = validation qualifier
Laboratory Qualifier Definitions:
- B = method blank contamination
- E = estimated value due to interference
- J = detected below the quantitation limit
- K = estimated maximum possible concentration
- M = peak was manually integrated
- R = ion abundance ratio did not meet acceptance criterion
- U = nondetect at method detection limit

Validation Qualifier Definitions:
- J = estimated value
- U = nondetect at reporting limit