Prepared by:
Dredged Material Management Office
Seattle District, US Army Corps of Engineers

Memorandum for Record **January 22, 2024**

Subject: Suitability Determination Memorandum for the Quillayute Federal Navigation Channel and Boat Basin in La Push, Washington (USACE Public Notice # CENPS-PM-ER-17-04 and NWS-2021-456).

Introduction

This suitability determination memorandum (SDM) documents the consensus regarding the suitability of the proposed dredged material for unconfined aquatic disposal or beneficial use placement as determined by the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the U.S. Environmental Protection Agency).

Project Description

The Quillayute River federal navigation project ("project") consists of the navigation channel and small boat basin at La Push, Washington, see Figure 1 for the vicinity map and project area. The authorized depth is -10 ft mean lower low water (MLLW) plus 2 feet of overdepth in the project area. The USACE Seattle District is responsible for dredging portions of the authorized project as needed to maintain navigation.

Sedimentation in the Quillayute navigation channel and boat basin is influenced primarily by input from the Quillayute River. A bathymetric survey conducted in March 2023 indicated significant infill above the authorized depth in the boat basin and smaller amounts of infill in the inner and outer navigation channel. The Quillayute navigation channel and non-slip portion of the boat basin are dredged every two years. The most recent dredging was completed in October 2022. The relatively small amount of shoaling noted in the navigation channel is the result of recent dredging, and additional deposition is expected to continue. USACE contracted with EcoAnalysts to characterize the navigation channel and boat basin to the authorized depth plus two feet of overdepth. Additionally, a new area on the east side of the boat basin was characterized to support Quileute Tribe dredging. The Boat Basin new area is approximately 44 ft wide and runs the length of the boat basin, see Figure 1.

Project Summary

Waterbody	Quillayute River and Pacific Ocean	
Water classification	Marine	
Project rank	Very Low: Outer navigation channel Low: Inner navigation channel and non-slip portion of boat basin Moderate: Boat Basin slip area and new area	
	USACE Dredging Area	***Quileute Tribe Dredging Area***
Public Notice/Permit Number	CENPS-PM-ER-17-04	NWS-2021-456
Dredged area and DMMUs	Navigation Channel and Boat Basin (DMMUs 1 – 5)	Boat Basin new area (DMMUs 6 and 7)
Total proposed dredging volume (cy)	73,990 CY	Up to 24,000 CY
Sampling details	Grab samples	Vibracore samples
Target proposed dredging depth	-10 ft MLLW	0-8 ft below mudline
Max. proposed dredging depth (includes 2 feet overdepth allowance)	-12 ft MLLW	8 - 10 ft below mudline

Proposed disposal location(s)	Beach placement on Rialto or First Beach
DMMO tracking number	QUILL1AF450
EIM Study ID	QUILL23
Sampling and Analysis Plan (SAP) Approval Date	June 20, 2023
Sampling Date(s)	June 21-22, 2023
Testing Parameters	DMMP standard marine COCs
Biological Testing	Not conducted
Suitability Outcome	DMMUs 1-7 are suitable for open-water disposal and DMMU 7 is not suitable for beach placement
Recency Expiration Date (very low = 10 years, low = 7 years, moderate = 5 years)	Outer navigation channel: June 2033 Inner navigation channel and Boat Basin non-slip area: June 2030 Boat Basin slip area and new area: June 2028

Sampling Design Considerations

The outer navigation channel (DMMU 2) has historically been comprised of gravel and cobble. The DMMP agencies determined based on past characterization data that confirmation of grain size and %TOC would be sufficient characterization for this area.

The Boat Basin new area had not been characterized or dredged in the past and due to shoaling in the area no recent bathymetry data was available. This area was ranked moderate and vibracores were required to characterize the area. The actual volume in the new area (DMMUs 6 and 7) is unknown due to the lack of bathymetry. The characterized volume is based on the maximum allowed volume for a moderate ranked DMMU with three cores, or 12,000 CY per DMMU.

Sampling and Analysis Description

Sediment samples were collected by power grab sampler and vibracorer on June 21-22, 2023, aboard the R/V Carolyn Dow, owned and operated by Research Support Services. Figures 2 and 3 show the sediment sampling locations, Table 1 identifies the DMMUs, Table 2 lists the sampling station details for grab samples, and Table 3 lists the sampling details for core samples. A total of 15 grab samples were collected and composited to represent DMMUs 1 to 5 in the navigation channel and boat basin. Three sediment cores were collected and composited to represent DMMUs 6 and 7 in the Boat Basin new area. No sampling issues were encountered, and all sediment samples were considered acceptable by the DMMP agencies.

Table 1. DMMU Identification

DMMU ID	Description
DMMU 1	Inner Navigation Channel
DMMU 2	Outer Navigation Channel
DMMU 3	Boat Basin, non-slip area
DMMU 4	Boat Basin, slip area north
DMMU 5	Boat Basin, slip area south
DMMU 6	Boat Basin new area, surface DMMU
DMMU 7	Boat Basin new area, subsurface DMMU

Samples were submitted to Analytical Resources, LLC in Tukwila, Washington for analysis. Analyses were performed by ARI and Eurofins Environment Testing in Fife, Washington. Sample material for potential bioassay analysis was stored at the EcoAnalysts laboratory in Port Gamble, WA.

Data Validation

A data quality assurance/quality control review comparable to an EPA Stage 2a data validation was performed by EcoChem. The validation process resulted in some additional J and UJ qualified data beyond those assigned by the laboratory, based on specified protocol or technical advisory:

- Sulfide results J-flagged due to analysis 5 days outside the 7-day holding time.
- Ammonia results J-flagged due to low percent recoveries in the MS/MSD.
- Mercury results were J-flagged due to high MS/MSD recoveries in DMMUs 3, 4 and 5.
- Phenol, benzoic acid, pentachlorophenol and 2,4-dimethylphenol were flagged J/UJ in DMMUs 3, 4, 5, 6 and 7 due to low percent difference in the initial calibration.
- Several PCB Aroclor results (ARI analysis) in DMMU 6 were UJ-flagged due to low matrix spike duplicates and internal standard accuracy.

Other notable specifics with the data:

- Hexachlorobenzene was reported at the limit of detection (LOD) in DMMUs 6 and 7 after consultation with the laboratory and data validator.
- Total Chlordane results were reported non-detect at the MDL after evaluation by the laboratory and data validator due to matrix interferences elevating reporting limits.
- DMMU 6 PCB results were reanalyzed by Analytical Resources after Eurofins was unable to perform the required cleanup steps to remove matrix interferences. The ARI results from DMMU 6 are reported and discussed below.

No analytical results were rejected; and all data were considered usable, as qualified, by the data validator.

Analytical Testing Results

Table 4 summarizes the conventional results for DMMU 2. The material from DMMU 2 in the outer navigation channel consisted of primarily sand and gravel, with 5% fines and 0.28% total organic carbon. This material meets the DMMP requirements for exclusions from testing because the site is subject to strong current and tidal energy and contains coarse-grained sediment with at least 80% sand and gravel and less than 0.5% TOC.

Table 5 summarizes the analytical results for DMMUs 1 - 7 alongside the DMMP marine guidelines. The material from DMMU 1 in the inner navigation channel was similar to DMMU 2, with 64% sand and 30% gravel. TOC was 0.37%. The material within the boat basin (DMMUs 3-7) is primarily silt, with 64 – 79% fines in DMMUs 3-7. Similarly, TOC was higher, ranging from 1.1 – 1.9% in the boat basin.

No detected exceedances of the DMMP marine screening levels occurred. There were three non-detect exceedances of total chlordane in DMMUs 3, 4 and 5, which are described in detail below.

Tables 6 and 7 summarize the analytical testing results for DMMUs 1 and DMMUs 3-7, respectively, compared against the Sediment Management Standards. DMMU 1 had a TOC measurement below

0.5% (0.37%), therefore results are presented without TOC normalization for comparison to the marine sediment apparent effects threshold (AET) criteria (WDOE 2021).

There were no detected or non-detected SMS exceedances in DMMUs 1 – 6. DMMU 7 had a single detected SMS exceedance of the sediment cleanup objective for the PAH acenaphthalene.

Pesticides. As a result of elevated sulfides concentrations in the samples, pesticide extracts were analyzed with a 20x dilution, resulting in elevated reporting limits and non-detect exceedances for total chlordane, dieldrin, heptachlor and aldrin in multiple DMMUs. Per the DMMP clarification paper on use of RSET SLs (DMMP, 2020) the following approaches to lowering reporting limits were considered:

- Use additional cleanup steps – there were no additional clean-up steps available to use, clean-ups for Sulphur were already employed.
- Report results at the MDL – in consultation with the analytical laboratory and the data validator, the results were evaluated and reported at the MDL. This approach does not resolve non-detect exceedances for total chlordane in three DMMUs.
- Use alternative analytical methods – this approach was not considered due to project time constraints.
- Best professional judgement – based on the above considerations, the low level of the non-detect exceedance, the results of past characterization events, and the site history, the DMMP agencies have determined that total chlordane is unlikely to be present at levels of concern at the project site.

TBT. Tributyltin analysis was not required by the DMMP for this project based on the history and location of the project. Porewater TBT has been tested for and characterized at very low levels previously (DMMP, 2005), and TBT was determined not to be an ongoing COC for this project.

Dioxins/furans. Dioxin/furan analysis was not required by the DMMP for this project based on the history and location of the project. Dioxins/furans were tested for and characterized at very low levels previously (DMMP 2011) and were determined not to be an ongoing COC for this project.

Biological Results

No biological testing was conducted for this project. Bioassays on DMMU 7 were not conducted because analytical results were received after expiration of the bioassay holding time.

DMMP Determinations

Suitability Determination

Chemical concentrations in the dredge prism composite samples for DMMUs 1 and 3 – 6 passed DMMP guidelines as discussed above, and DMMU 2 passed the exclusionary guidelines. Future testing of the outer navigation channel to confirm exclusionary status (grains size and TOC) will be required.

The DMMP agencies have concluded that 85,990 CY of dredged material from DMMUs 1-6 are suitable for unconfined open-water disposal. DMMU 7 passes DMMP SLs for in-water disposal; however, without further biological testing DMMU 7 fails Washington State SMS and is therefore not suitable for beach placement.

Removal of the sediment within the characterized dredge prism is approved until the recency expiration date as long as there are no significant changes to the project scope or new contaminant sources identified. The recency expires in June 2033 for the very low-ranked outer navigation channel (DMMU 2), in June 2030 for the low-ranked inner navigation channel (DMMU 1) and non-slip portion of the boat basin (DMMU 3), and in June 2028 for the moderate-ranked slip portion of the boat basin and new area (DMMUs 4 -7).

In lieu of open-water disposal, the USACE Navigation dredging program uses the dredged material determined suitable for open-water disposal for beach nourishment. Most material is dredged directly to the Quillayute Spit (Rialto side). Alternatively, the coarse navigation channel material is dewatered at a nearby upland beneficial use site (Site A), where the material is then rehandled to First Beach, at the root of the South Jetty. USACE Navigation maintains the appropriate environmental documentation to cover USACE dredging and placement activities.

Antidegradation Determination

The sediment to be exposed by dredging must meet the State of Washington Sediment Management Standards (SMS) and the State's Antidegradation Standard (Ecology, 2013) as outlined by DMMP guidance (DMMP, 2008). Table 5 shows results for DMMUs 3-7 compared to the SMS values and Table 6 shows results of DMMU 1 compared to dry weight AETs. Due to TOC less than 0.5% in DMMU 1, results cannot be OC-normalized. Detected concentrations of all DMMP chemicals of concern were below the DMMP SLs and SMS benthic standards in DMMUs 1 - 6, and there is no reason to believe that a new exposed surface would be contaminated relative to the overlying materials; therefore, DMMUs 1-6 are in compliance with the State of Washington Antidegradation Standard.

DMMU 7 had a single exceedance of the SMS SCO and does not meet the State of Washington Antidegradation Standard. If DMMU 7 is dredged, a sand cover may be required to meet the Antidegradation Standard. If DMMU 7 is not dredged, a one foot buffer of DMMU 6 must be left in place, therefore only the top 0-3 feet of DMMU 6 may be dredged.

Debris Management

The DMMP agencies implemented a debris screening requirement following the 2015 SMARM to prevent the disposal of solid waste and debris at open-water disposal sites in Puget Sound (DMMP, 2015).

No additional debris screen is required for this project if dredging is performed via hydraulic dredge. While debris management is a concern, primarily in the slip portions of the boat basin where large debris must be removed prior to placement or disposal, the use of hydraulic dredging mitigates the risk of debris transport. If a dredging method other than hydraulic dredging is proposed going forward, the screening requirement must be reconsidered and re-coordinated with the DMMP agencies.

Notes and Clarifications

The decisions documented in this memorandum do ***not*** constitute final agency approval of the project. During the public comment period that follows a public notice, resource agencies will provide input on the overall project. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404(b)(1) of the Clean Water Act.

A pre-dredge meeting with EPA and the Corps of Engineers is required at least 7 days prior to dredging. A dredging quality control plan must be developed and submitted to the USACE Seattle District DMMO and EPA. Refer to the EPA 401 certification for project-specific submittal requirements and timelines.

The DMMP does not make specific beneficial use determinations. However, these data are available for the assessment of project-specific beneficial use by the project proponent, permitting agencies, local health jurisdictions and/or the owner of a receiving property.

References

DMMP, 2005. *Determination of the Suitability of the Proposed Maintenance Dredged Material from the Quillayute Boat Basin, La Push, Washington (CENWS-OD-TS-NS-19) as Evaluated Under Section 404 of the Clean Water Act for Beneficial Use in Maintaining the Spit Protecting the Boat Basin.* Prepared by the DMMP agencies. March 21, 2005.

DMMP, 2008. *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.

DMMP, 2011. *Determination on the Suitability of Proposed Dredged material Tested for the Federal Quillayute O&M Navigation Dredging Project (CENWS-TS-NS-31 FY: 2010-2015) Evaluated Under Section 404 of the Clean Water Act for Beach Nourishment at Designated Beneficial use Sites.* Prepared by the DMMP agencies. January 6, 2011.

DMMP, 2015. *Debris Screening Requirements for Dredged Material Disposed at Open-Water Sites*. Prepared by Erika Hoffman, Celia Barton, and David Fox for the DMMP agencies. October 2, 2015.

DMMP, 2020. *Follow-up to the 2011 DMMP Clarification Paper, Marine Sediment Quality Screen Levels: Adopting RSET Marine SLs for Use in DMMP*. Prepared by the DMMP Agencies. September 14, 2020.

DMMP, 2021. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Dredged Material Management Program, updated July 2021.

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

EcoAnalysts, 2023a. *Sampling and Analysis Plan*, *Dredged Material Characterization, Quillayute River Federal Navigation Channel and Boat Basin, Clallam County, Washington*. Prepared for U.S Army Corps of Engineers, June 15, 2023.

EcoAnalysts, 2023b. *Quillayute River Federal Navigation Channel and Boat Basin Dredged Material Characterization Report, Clallam County, Washington.* Prepared for U.S Army Corps of Engineers, December 20, 2023.

Agency Signatures

The signed copy is on file in the Dredged Material Management Office, Seattle District, U.S. Army Corps of Engineers.

_____	_____
Date	Kelsey van der Elst – U.S. Army Corps of Engineers, Seattle District
_____	_____
Date	Sarah Burgess – U.S. Environmental Protection Agency, Region 10
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Date	Laura Inouye, PhD. – Washington State Department of Ecology
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Date	Shannon Soto – Washington State Department of Natural Resources

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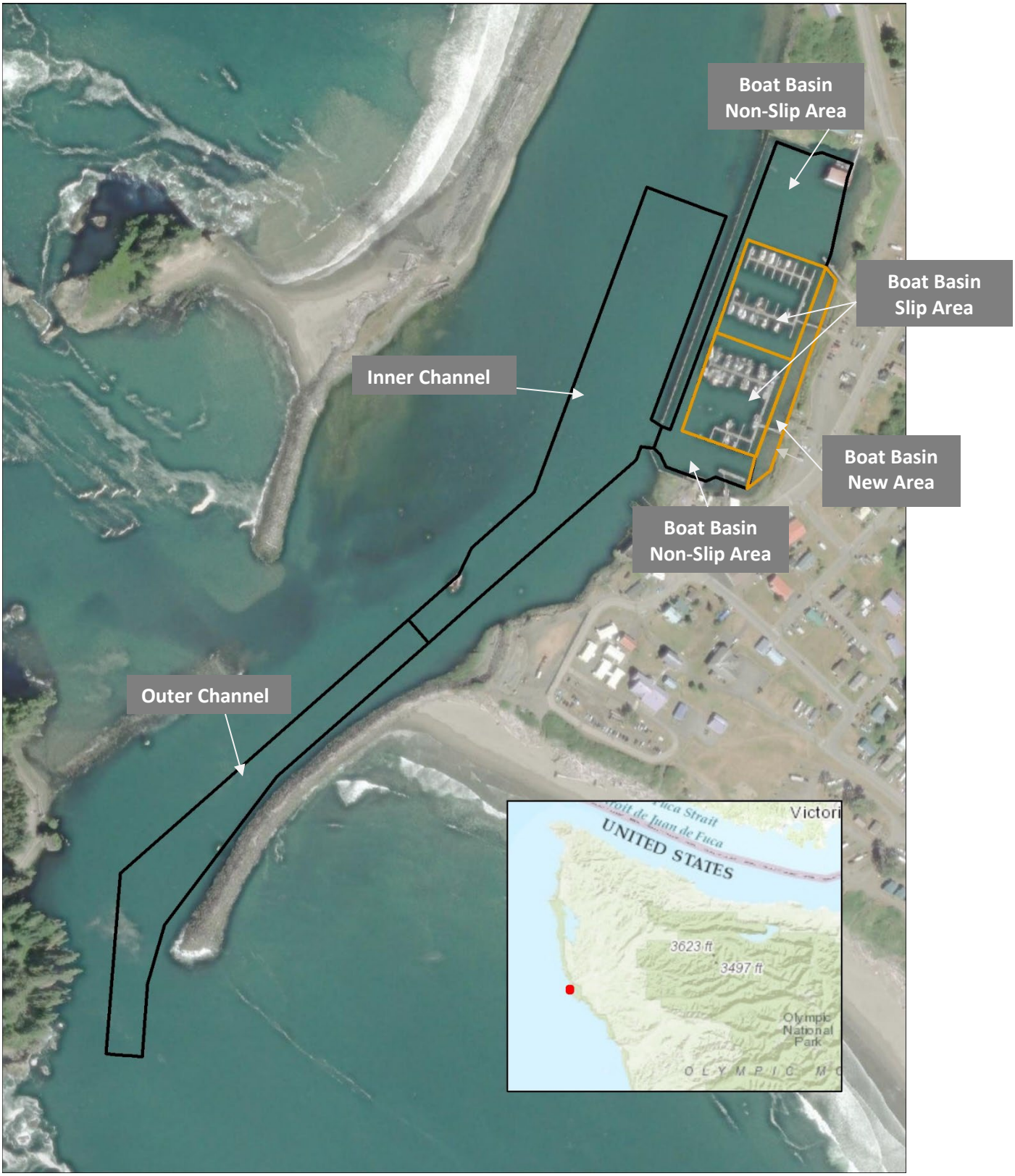

Figure 1. Quillayute River Proposed Dredge Area (adapted from EcoAnalysts, 2023b)

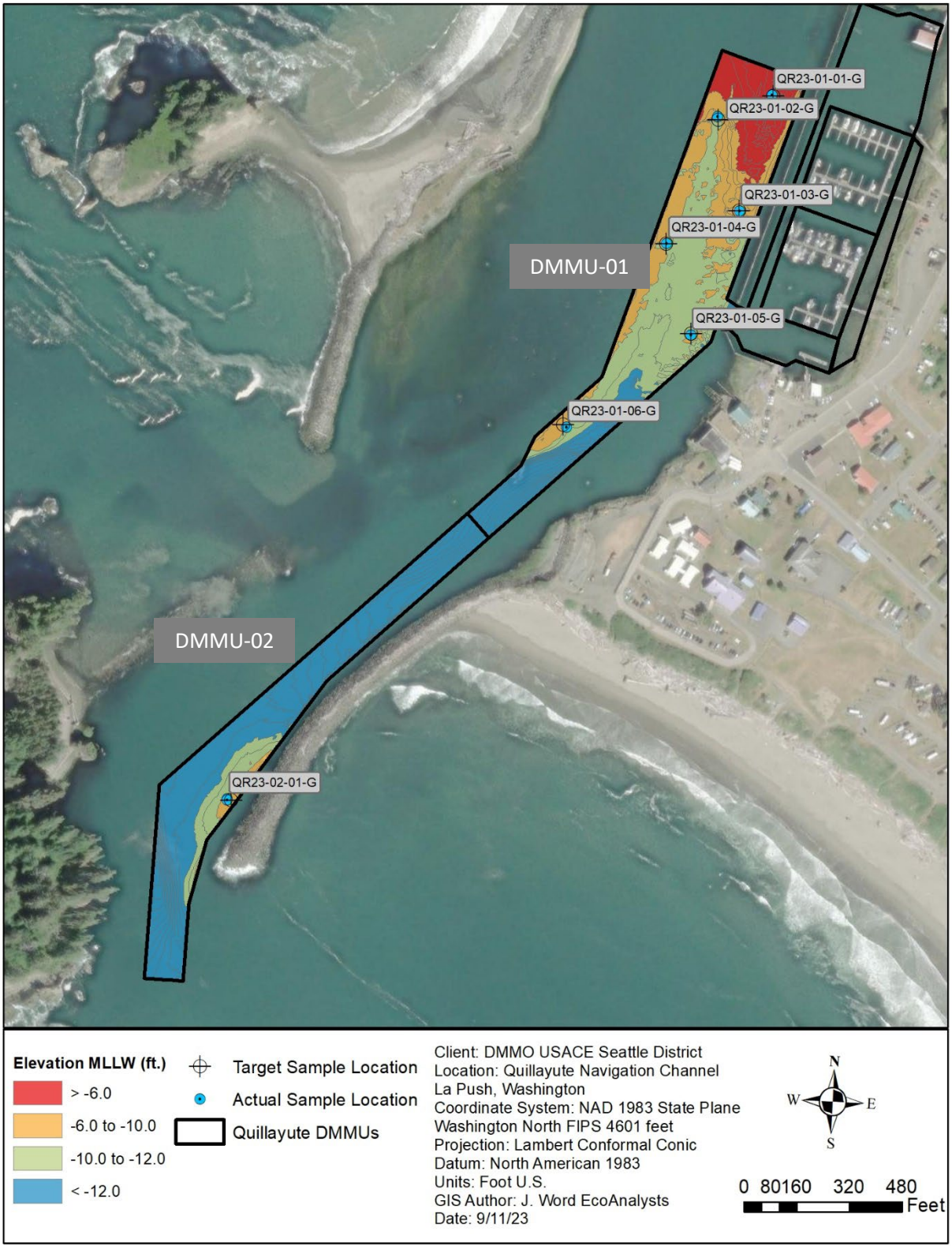

Figure 2. Target and Actual Sampling Locations Channel (adapted from EcoAnalysts, 2023b)

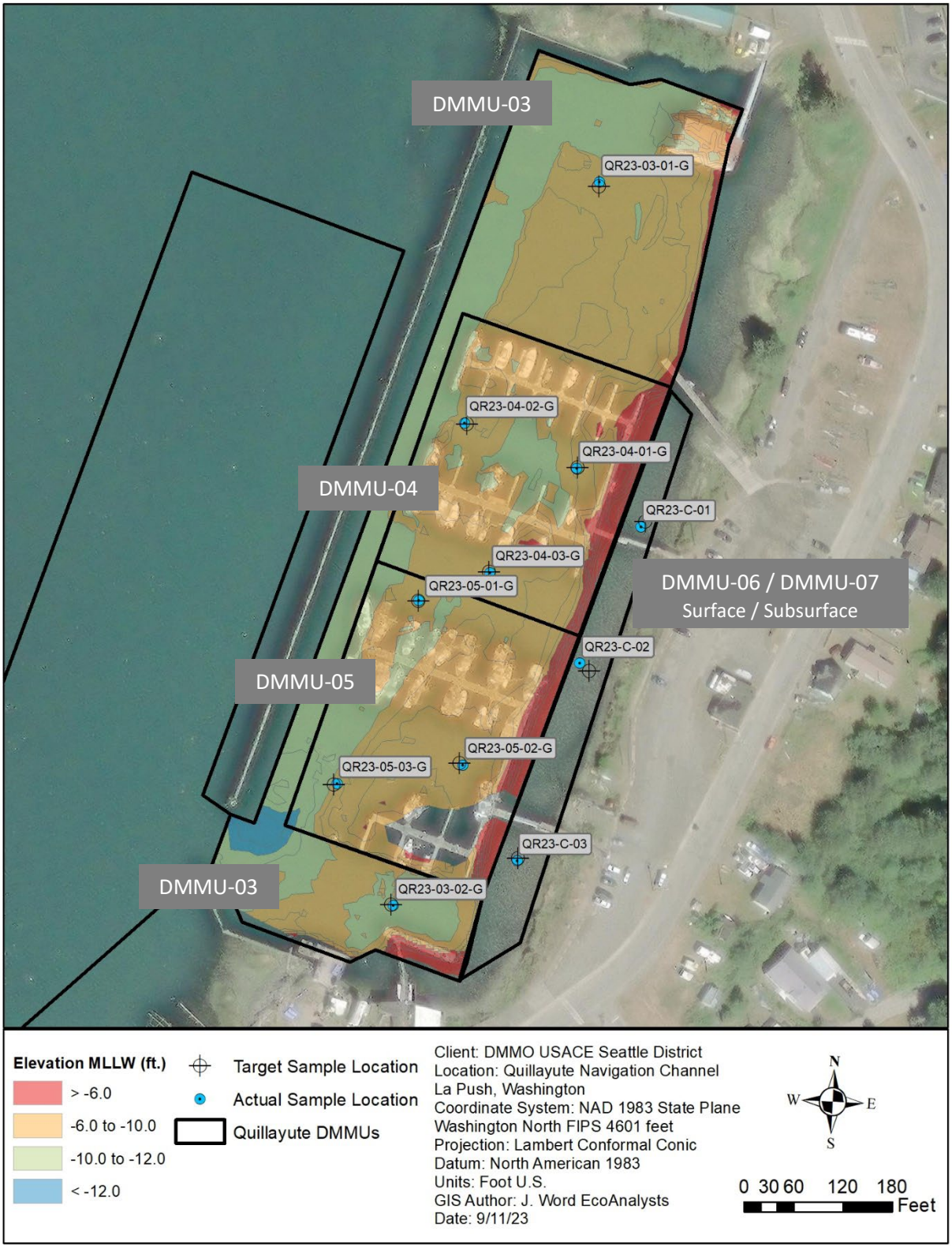

Figure 3. Target and Actual Sampling Locations Boat Basin (adapted from EcoAnalysts, 2023b)

Table 2 Sample Station Details

Section	DMMU	Sample ID / Core ID	Latitude	Longitude	Northing	Easting	Water Depth (ft)	Tidal Stage (ft)	Actual Mudline Elevation (MLLW)	Penetration (cm)
Inner Channel	DMMU-01	QR23-01-01-G	47.912346	-124.637665	355851	707840	4.8	-0.12	-4.9	10
		QR23-01-02-G	47.912144	-124.638329	355785	707675	8.6	-0.31	-8.9	13
		QR23-01-03-G	47.911366	-124.638001	355498	707741	10.0	-0.51	-10.5	20
		QR23-01-04-G	47.911064	-124.638878	355399	707520	10.8	-0.70	-11.5	8
		QR23-01-05-G	47.910313	-124.638527	355121	707593	10.6	-0.80	-11.4	17
		QR23-01-06-G	47.909492	-124.640015	354840	707213	11.3	-0.91	-12.2	6
Outer Channel	DMMU-02	QR23-02-01-G	47.906254	-124.643997	353708	706179	10.2	-1.00	-11.2	10
		QR23-02-01-G	47.906242	-124.643997	353704	706180	9.6	-0.97	-10.6	5
Boat Basin Non-Slip Area	DMMU-03	QR23-03-01-G	47.912731	-124.636292	355975	708185	10.6	0.11	-10.5	27
		QR23-03-02-G	47.910290	-124.637131	355096	707934	11.8	0.38	-11.4	30
Boat Basin Slip Area	DMMU-04	QR23-04-01-G	47.911778	-124.636330	355627	708157	10.6	0.74	-9.9	30
		QR23-04-02-G	47.911907	-124.636902	355682	708020	11.5	1.07	-10.4	27
		QR23-04-03-G	47.911415	-124.636734	355501	708052	11.9	1.23	-10.7	27
	DMMU-05	QR23-05-01-G	47.911312	-124.637085	355467	707964	12.9	2.04	-10.9	27
		QR23-05-02-G	47.910770	-124.636826	355267	708018	10.9	2.26	-8.6	30
		QR23-05-03-G	47.910686	-124.637444	355244	707866	11.6	2.43	-9.2	28

Table 3 Core Sample Info

Section	DMMU	Core ID	Latitude	Longitude	Water Depth (ft)	Tidal Stage (ft)	Actual Mudline Elevation (MLLW)	Core Length (ft)	Penetration (ft)	% Recovery	Elevation Interval (ft MLLW)	Interval Below Mudline (ft)
Boat Basin New Area	DMMU-06	QR23-C-01	47.911591	-124.636002	5.0	6.57	1.6	8.1	9.3	87%	1.6 to -2.4	0 to 4.0
	DMMU-07										-2.4 to -5.4	4.0 to 7.0
	Z-Sample										-5.4 to -6.5	7.0 to 8.1
	DMMU-06	QR23-C-02	47.911129	-124.636269	3.7	5.14	1.4	9.8	11.1	88%	1.4 to -2.6	0 to 4.0
	DMMU-07										-2.6 to -6.6	4.0 to 8.0
	Z-Sample										-6.6 to -8.4	8.0 to 9.8
	DMMU-06	QR23-C-03	47.910461	-124.636536	4.4	6.19	1.8	8.8	11.1	79%	1.8 to -2.2	0 to 4.0
	DMMU-07										-2.2 to -6.2	4.0 to 8.0
	Z-Sample										-6.2 to -7.0	8.0 to 8.8

Table 4 Conventional Results

Parameter	DMMU-02				
	Result	Qualifier		RL	MDL
		Lab	Val		
Total organic carbon (TOC) (%)	0.28	B		0.2	0.0097
Particle/Grain Size, Gravel (%)	60				
Particle/Grain Size, Sand (%)	36				
Particle/Grain Size, Silt (%)	4.1				
Particle/Grain Size, Clay (%)	0.9				
Percent Fines (Silt + Clay) (%)	5.0				

Table 5. Sediment Conventionals & COC Analysis Results Compared to DMMP Guidelines (DMMU-01, DMMU-03, DMMU-04)

Parameter	DMMP Marine Guidelines			DMMU-01					DMMU-03					DMMU-04				
	SL	BT	ML	Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier	
							Lab	VQ				Lab	VQ				Lab	VQ
SEDIMENT CONVENTIONALS																		
Total solids (%)				71.69	0.04	0.04			55.74	0.04	0.04			55.08	0.04	0.04		
Total volatile solids (TVS) (%)				2.4	0.01	0.01			6.42	0.01	0.01			6.36	0.01	0.01		
Total organic carbon (TOC) (%)				0.37	0.2	0.0097	B		1.9	0.2	0.0097	B		1.8	0.2	0.0097	B	
Total Sulfides (mg/kg)				32.1	2.77	2.77		J	568	89.0	89.0		J	498	35.7	35.7		J
Ammonia (mg/kg NH3-N)				13	35	12	J	J	43	43	15	U	UJ	44	44	16	U	UJ
Particle/Grain Size, Gravel (%)				30					0					0				
Particle/Grain Size, Sand (%)				64					25					21				
Particle/Grain Size, Silt (%)				4.7					67					71				
Particle/Grain Size, Clay (%)				2.2					8.2					8.0				
Percent Fines (Silt + Clay) (%)				6.9					75.2					79				
METALS (mg/kg dry weight)																		
Antimony	150	---	200	0.18	0.31	0.035	J	J	0.26	0.37	0.042	J	J	0.26	0.36	0.041	J	J
Arsenic	57	507.1	700	4.1	0.26	0.051			6.7	0.31	0.061			6.9	0.3	0.06		
Cadmium	5.1	--	14	0.067	0.41	0.040	J	J	0.19	0.49	0.047	J	J	0.23	0.48	0.046	J	J
Chromium	260	--	---	23	0.51	0.032			31	0.61	0.039			32	0.6	0.038		
Copper	390	--	1,300	22	0.51	0.11			29	0.61	0.13			31	0.6	0.13		
Lead	450	975	1,200	6.2	0.26	0.025			8.3	0.31	0.029			8.5	0.3	0.029		
Mercury	0.41	1.5	2.3	0.027	0.036	0.011	J	J	0.069	0.042	0.013		J	0.077	0.039	0.012		J
Selenium (EPA 1638)	---	3	---	0.34	0.34	0.17	U	U	0.52	0.43	0.22			0.55	0.4	0.21		
Silver	6.1	--	8.4	0.030	0.10	0.010	J	J	0.089	0.12	0.012	J	J	0.097	0.12	0.012	J	J
Zinc	410	--	3,800	52	2.6	0.83			73	3.1	0.98			76	3.1	0.97		

Table 5. Sediment Conventionals & COC Analysis Results Compared to DMMP Guidelines (DMMU-01, DMMU-03, DMMU-04)

Parameter	DMMP Marine Guidelines			DMMU-01					DMMU-03					DMMU-04				
	SL	BT	ML	Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier	
							Lab	VQ				Lab	VQ				Lab	VQ
ORGANICS																		
PAHs (µg/kg dry weight)																		
LPAH																		
Naphthalene	2,100	---	2,400	39.0	19.9	4.2			105	19.9	4.2			91.7	20.0	4.2		
Acenaphthylene	560	---	1,300	19.9	19.9	6.2	U	U	19.9	19.9	6.2	U	U	20.0	20.0	6.2	U	U
Acenaphthene	500	---	2,000	19.9	19.9	5.2	U	U	20.0	19.9	5.2			58.4	20.0	5.2		
Fluorene	540	---	3,600	19.9	19.9	14.5	U	U	61.1	19.9	14.5			93.9	20.0	14.5		
Phenanthrene	1,500	---	21,000	94.2	19.9	8.7			285	19.9	8.7			435	20.0	8.7		
Anthracene	960	---	13,000	19.9	19.9	7.1	U	U	19.9	19.9	7.2	U	U	21.8	20.0	7.2		
2-Methylnaphthalene	670	---	1,900	81.1	19.9	4.5			235	19.9	4.5			218	20.0	4.5		
Total LPAH	5,200	---	29,000	133.2					471.1					700.8				
HPAH																		
Fluoranthene	1,700	4,600	30,000	11.1	19.9	6.1	J	J	176	19.9	6.1			271	20.0	6.1		
Pyrene	2,600	11,980	16,000	9.3	19.9	5.6	J	J	110	19.9	5.7			167	20.0	5.7		
Benz(a)anthracene	1,300	---	5,100	19.9	19.9	5.9	U	U	25.9	19.9	5.9			59.6	20.0	5.9		
Chrysene	1,400	---	21,000	15.4	19.9	6.0	J	J	85.1	19.9	6.0			94.3	20.0	6.0		
Benzofluoranthenes (b, j ,k)	3,200	---	9,900	39.8	39.8	20.9	U	U	44.2	39.9	20.9			50.6	39.9	20.9		
Benzo(a)pyrene	1,600	---	3,600	19.9	19.9	4.2	U	U	12.5	19.9	4.2	J	J	18.4	20.0	4.2	J	J
Indeno(1,2,3-c,d)pyrene	600	---	4,400	19.9	19.9	14.6	U	U	19.9	19.9	14.6	U	U	20.0	20.0	14.6	U	U
Dibenz(a,h)anthracene	230	---	1,900	19.9	19.9	17.1	U	U	19.9	19.9	17.2	U	U	20.0	20.0	17.2	U	U
Benzo(g,h,i)perylene	670	---	3,200	19.9	19.9	13.5	U	U	19.9	19.9	13.6	U	U	20.0	20.0	13.6	U	U
Total HPAH	12,000	---	69,000	35.8			J	J	453.7			J	J	660.9			J	J
CHLORINATED HYDROCARBONS (µg/kg dry weight)																		
1,4-Dichlorobenzene	110	---	120	5.0	5.0	0.6	U	U	5.0	5.0	0.6	U	U	5.0	5.0	0.6	U	U
1,2-Dichlorobenzene	35	---	110	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U

Table 5. Sediment Conventionals & COC Analysis Results Compared to DMMP Guidelines (DMMU-01, DMMU-03, DMMU-04)

Parameter	DMMP Marine Guidelines			DMMU-01					DMMU-03					DMMU-04				
	SL	BT	ML	Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier	
							Lab	VQ				Lab	VQ				Lab	VQ
1,2,4-Trichlorobenzene	31	---	64	5.0	5.0	2.7	U	U	5.0	5.0	2.7	U	U	5.0	5.0	2.7	U	U
Hexachlorobenzene (HCB)	22	168	230	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U
PHTHALATES (µg/kg dry weight)																		
Dimethyl phthalate	71	---	1,400	19.9	19.9	4.4	U	U	19.9	19.9	4.4	U	U	20.0	20.0	4.4	U	U
Diethyl phthalate	200	---	1,200	49.7	49.7	19.6	U	U	49.9	49.9	19.7	U	U	49.9	49.9	19.7	U	U
Di-n-butyl phthalate	1,400	---	5,100	19.9	19.9	5.6	U	U	19.9	19.9	5.6	U	U	20.0	20.0	5.6	U	U
Butyl benzyl phthalate	63	---	970	19.9	19.9	9.4	U	U	19.9	19.9	9.4	U	U	20.0	20.0	9.4	U	U
Bis(2-ethylhexyl) phthalate	1,300	---	8,300	49.7	49.7	14.0	U	U	49.9	49.9	14.0	U	U	49.9	49.9	14.0	U	U
Di-n-octyl phthalate	6,200	---	6,200	19.9	19.9	4.4	U	U	19.9	19.9	4.4	U	U	20.0	20.0	4.4	U	U
PHENOLS (µg/kg dry weight)																		
Phenol	420	---	1,200	33.6	19.9	4.4		J	19.9	19.9	4.4	U	UJ	20.0	20.0	4.4	U	UJ
2-Methylphenol	63	---	77	19.9	19.9	6.6	U	U	19.9	19.9	6.6	U	U	20.0	20.0	6.6	U	U
4-Methylphenol	670	---	3,600	73.5	19.9	7.3			19.9	19.9	7.4	U	U	20.0	20.0	7.4	U	U
2,4-Dimethylphenol	29	---	210	19.9	19.9	2.2	U	UJ	19.9	19.9	2.2	U	UJ	20.0	20.0	2.2	U	UJ
Pentachlorophenol	400	504	690	99.4	99.4	31.1	U	UJ	99.7	99.7	31.2	U	UJ	99.8	99.8	31.2	U	UJ
MISCELLANEOUS EXTRACTABLES (µg/kg dry weight)																		
Benzyl alcohol	57	---	870	19.9	19.9	16.2	U	U	19.9	19.9	16.2	U	U	20.0	20.0	16.2	U	U
Benzoic acid	650	---	760	317	199	38.8		J	142	199	38.9	J	J	75.8	200	39.0	J	J
Dibenzofuran	540	---	1,700	19.9	19.9	14.0	U	U	48.3	19.9	14.1			20.0	20.0	14.1	U	U
Hexachlorobutadiene	11	---	270	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U
N-Nitrosodiphenylamine	28	---	130	5.0	5.0	1.3	U	U	5.0	5.0	1.3	U	U	5.0	5.0	1.3	U	U

Table 5. Sediment Conventionals & COC Analysis Results Compared to DMMP Guidelines (DMMU-01, DMMU-03, DMMU-04)

Parameter	DMMP Marine Guidelines			DMMU-01					DMMU-03					DMMU-04				
	SL	BT	ML	Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier	
							Lab	VQ				Lab	VQ				Lab	VQ
PESTICIDES[1] & PCBs (µg/kg dry weight)																		
4,4'-DDD	16	---	---	0.64	5.5	0.64	U +	U	0.82	7.1	0.82	U +	U	0.81	7	0.81	U +	U
4,4'-DDE	9	---	---	1.0	5.5	1.0	U +	U	1.3	7.1	1.3	U +	U	1.3	7	1.3	U +	U
4,4'-DDT	12	---	---	1.0	5.5	1.0	U	U	1.3	7.1	1.3	U	U	1.3	7	1.3	U	U
sum of 4,4'-DDD, 4,4'-DDE, 4,4'- DDT	---	50	69	1.0			U +	U	1.3			U +	U	1.3			U +	U
Aldrin	9.5	---	---	1.1	8.3	1.1	U	U	1.4	11	1.4	U	U	1.3	11	1.3	U	U
cis-Chlordane				2.1	5.5	2.1	U +	U	2.7	7.1	2.7	U +	U	2.6	7	2.6	U +	U
cis-Nonachlor				2.4	14	2.4	U	U	3.0	18	3.0	U	U	3.0	18	3.0	U	U
Oxychlordane				2.1	11	2.1	U	U	2.7	14	2.7	U	U	2.7	14	2.7	U	U
trans-Chlordane				0.89	8.3	0.89	U	U	1.1	11	1.1	U	U	1.1	11	1.1	U	U
trans-Nonachlor				2.4	11	2.4	U	U	3.0	14	3.0	U	U	3.0	14	3.0	U	U
Total Chlordane (sum of cis-chlordane, trans- chlordane, cis-nonachlor, trans-nonachlor, oxychlordane)	2.8	37	---	2.4			U	U	3.0			U	U	3.0			U	U
Dieldrin	1.9	---	1700	0.97	5.5	0.97	U +	U	1.2	7.1	1.2	U +	U	1.2	7	1.2	U +	U
Heptachlor	1.5	---	270	0.53	8.3	0.53	U	U	0.68	11	0.68	U	U	0.67	11	0.67	U	U
PCB-Aroclor 1016				28	28	10	U	U	35	35	13	U	U	35	35	13	U	U
PCB-Aroclor 1221				28	28	17	U	U	35	35	21	U	U	35	35	21	U	U
PCB-Aroclor 1232				28	28	6.9	U	U	35	35	8.5	U	U	35	35	8.6	U	U
PCB-Aroclor 1242				28	28	11	U	U	35	35	14	U	U	35	35	14	U	U
PCB-Aroclor 1248				28	28	9.8	U	U	35	35	12	U	U	35	35	12	U	U
PCB-Aroclor 1254				28	28	13	U	U	35	35	16	U	U	35	35	16	U	U
PCB-Aroclor 1260				28	28	10	U	U	35	35	13	U	U	35	35	13	U	U
Total PCBs (Aroclors)	130	38[2]	3,100	28			U	U	35			U	U	35			U	U

(1) Non-detect results = MDL

(2) This value is normalized to TOC and expressed in mg/kg carbon

Shaded cells = Non-detected MDL exceeds DMMP SL

Table 5. Sediment Conventionals & COC Analysis Results Compared to DMMP Guidelines (DMMU-05, DMMU-06, DMMU-07)

Parameter	DMMP Marine Guidelines			DMMU-05					DMMU-06					DMMU-07				
	SL	BT	ML	Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier	
							Lab	VQ				Lab	VQ				Lab	VQ
SEDIMENT CONVENTIONALS																		
Total solids (%)				59.2	0.04	0.04			66.23	0.04	0.04			64.33	0.04	0.04		
Total volatile solids (TVS) (%)				5.22	0.01	0.01			4.23	0.01	0.01			4.40	0.01	0.01		
Total organic carbon (TOC) (%)				1.4	0.2	0.0097	B		1.1	0.2	0.0097	B		1.2	0.2	0.0097	B	
Total Sulfides (mg/kg)				372	83.4	83.4		J	957	150	150		J	978	71.8	71.8		J
Ammonia (mg/kg NH3-N)				14	41	14	J	J	22	38	13	J F1	J	32	37	13	J	J
Particle/Grain Size, Gravel (%)				0					0.40					0.10				
Particle/Grain Size, Sand (%)				36					25					25				
Particle/Grain Size, Silt (%)				57					70					68				
Particle/Grain Size, Clay (%)				7.0					4.9					6.6				
Percent Fines (Silt + Clay) (%)				64					74.9					74.6				
METALS (mg/kg dry weight)																		
Antimony	150	---	200	0.25	0.36	0.040	J	J	0.23	0.34	0.039	J	J	0.26	0.34	0.038	J	J
Arsenic	57	507.1	700	6.5	0.3	0.059			6.5	0.29	0.057			6.4	0.28	0.056		
Cadmium	5.1	--	14	0.16	0.47	0.046	J	J	0.12	0.46	0.044	J	J	0.16	0.45	0.043	J	J
Chromium	260	--	---	31	0.59	0.037			32	0.57	0.036			32	0.56	0.036		
Copper	390	--	1,300	28	0.59	0.13			29	0.57	0.13			32	0.56	0.12		
Lead	450	975	1,200	7.7	0.3	0.028			8.0	0.29	0.027			13	0.28	0.027		
Mercury	0.41	1.5	2.3	0.063	0.037	0.011		J	0.068	0.036	0.011	F1	J	0.091	0.04	0.012		J
Selenium (EPA 1638)	---	3	---	0.43	0.41	0.21			0.39	0.34	0.18			0.43	0.36	0.19		
Silver	6.1	--	8.4	0.083	0.12	0.012	J	J	0.073	0.11	0.011	J	J	0.080	0.11	0.011	J	J
Zinc	410	--	3,800	71	3	0.95			75	2.9	0.92			76	2.9	0.91		

Table 5. Sediment Conventionals & COC Analysis Results Compared to DMMP Guidelines (DMMU-05, DMMU-06, DMMU-07)

Parameter	DMMP Marine Guidelines			DMMU-05					DMMU-06					DMMU-07				
	SL	BT	ML	Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier	
							Lab	VQ				Lab	VQ				Lab	VQ
ORGANICS																		
PAHs (µg/kg dry weight)																		
LPAH																		
Naphthalene	2,100	---	2,400	100	20.0	4.2			56.0	19.9	4.2			64.5	20.0	4.2		
Acenaphthylene	560	---	1,300	20.0	20.0	6.2	U	U	19.9	19.9	6.2	U	U	20.0	20.0	6.2	U	U
Acenaphthene	500	---	2,000	13.8	20.0	5.2	J	J	27.0	19.9	5.2			330	20.0	5.2		
Fluorene	540	---	3,600	56.4	20.0	14.6			61.9	19.9	14.5			271	20.0	14.5		
Phenanthrene	1,500	---	21,000	251	20.0	8.7			220	19.9	8.7			792	20.0	8.7		
Anthracene	960	---	13,000	20.0	20.0	7.2	U	U	19.0	19.9	7.2	J	J	165	20.0	7.2		
2-Methylnaphthalene	670	---	1,900	226	20.0	4.5			134	19.9	4.5			149	20.0	4.5		
Total LPAH	5,200	---	29,000	421.2			J	J	383.9			J	J	1622.5				
HPAH																		
Fluoranthene	1,700	4,600	30,000	50.9	20.0	6.1			223	19.9	6.1			822	20.0	6.1		
Pyrene	2,600	11,980	16,000	37.0	20.0	5.7			142	19.9	5.6			534	20.0	5.7		
Benz(a)anthracene	1,300	---	5,100	16.6	20.0	6.0	J	J	27.5	19.9	5.9			104	20.0	5.9		
Chrysene	1,400	---	21,000	53.9	20.0	6.1			57.4	19.9	6.0			138	20.0	6.0		
Benzofluoranthenes (b, j ,k)	3,200	---	9,900	24.6	40.0	21.0	J	J	41.8	39.8	20.9			103	39.9	20.9		
Benzo(a)pyrene	1,600	---	3,600	6.8	20.0	4.2	J	J	11.5	19.9	4.2	J	J	39.5	20.0	4.2		
Indeno(1,2,3-c,d)pyrene	600	---	4,400	20.0	20.0	14.6	U	U	19.9	19.9	14.6	U	U	17.3	20.0	14.6	J	J
Dibenz(a,h)anthracene	230	---	1,900	20.0	20.0	17.2	U	U	19.9	19.9	17.1	U	U	20.0	20.0	17.2	U	U
Benzo(g,h,i)perylene	670	---	3,200	20.0	20.0	13.6	U	U	19.9	19.9	13.5	U	U	16.4	20.0	13.6	J	J
Total HPAH	12,000	---	69,000	189.8			J	J	503.2			J	J	1774.2			J	J
CHLORINATED HYDROCARBONS (µg/kg dry weight)																		
1,4-Dichlorobenzene	110	---	120	5.0	5.0	0.6	U	U	5.0	5.0	0.6	U	U	5.0	5.0	0.6	U	U
1,2-Dichlorobenzene	35	---	110	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U

Table 5. Sediment Conventionals & COC Analysis Results Compared to DMMP Guidelines (DMMU-05, DMMU-06, DMMU-07)

Parameter	DMMP Marine Guidelines			DMMU-05					DMMU-06					DMMU-07				
	SL	BT	ML	Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier	
							Lab	VQ				Lab	VQ				Lab	VQ
1,2,4-Trichlorobenzene	31	---	64	5.0	5.0	2.7	U	U	5.0	5.0	2.7	U	U	5.0	5.0	2.7	U	U
Hexachlorobenzene (HCB)	22	168	230	5.0	5.0	0.7	U	U	2.5	5.0	0.7	Z, U	U	2.5	5.0	0.7	Z, U	U
PHTHALATES (µg/kg dry weight)																		
Dimethyl phthalate	71	---	1,400	20.0	20.0	4.4	U	U	19.9	19.9	4.4	U	U	20.0	20.0	4.4	U	U
Diethyl phthalate	200	---	1,200	50.0	50.0	19.7	U	U	49.7	49.7	19.6	U	U	24.3	49.9	19.7	J	J
Di-n-butyl phthalate	1,400	---	5,100	20.0	20.0	5.6	U	U	19.9	19.9	5.6	U	U	20.0	20.0	5.6	U	U
Butyl benzyl phthalate	63	---	970	20.0	20.0	9.4	U	U	19.9	19.9	9.4	U	U	20.0	20.0	9.4	U	U
Bis(2-ethylhexyl) phthalate	1,300	---	8,300	50.0	50.0	14.1	U	U	49.7	49.7	14.0	U	U	22.4	49.9	14.0	J	J
Di-n-octyl phthalate	6,200	---	6,200	20.0	20.0	4.4	U	U	19.9	19.9	4.4	U	U	20.0	20.0	4.4	U	U
PHENOLS (µg/kg dry weight)																		
Phenol	420	---	1,200	20.0	20.0	4.4	U	UJ	16.9	19.9	4.4	J	J	14.1	20.0	4.4	J	J
2-Methylphenol	63	---	77	20.0	20.0	6.7	U	U	19.9	19.9	6.6	U	U	20.0	20.0	6.6	U	U
4-Methylphenol	670	---	3,600	20.0	20.0	7.4	U	U	19.9	19.9	7.4	U	U	20.0	20.0	7.4	U	U
2,4-Dimethylphenol	29	---	210	20.0	20.0	2.2	U	UJ	19.9	19.9	2.2	U	UJ	20.0	20.0	2.2	U	UJ
Pentachlorophenol	400	504	690	99.9	99.9	31.2	U	UJ	99.5	99.5	31.1	U	UJ	99.8	99.8	31.2	U	UJ
MISCELLANEOUS EXTRACTABLES (µg/kg dry weight)																		
Benzyl alcohol	57	---	870	20.0	20.0	16.2	U	U	19.9	19.9	16.2	U	U	20.0	20.0	16.2	U	U
Benzoic acid	650	---	760	49.6	200	39.0	J	J	199	199	38.8	U	UJ	76.0	200	39.0	J	J
Dibenzofuran	540	---	1,700	20.0	20.0	14.1	U	U	41.0	19.9	14.0			162	20.0	14.1		
Hexachlorobutadiene	11	---	270	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U	5.0	5.0	0.7	U	U
N-Nitrosodiphenylamine	28	---	130	5.0	5.0	1.3	U	U	5.0	5.0	1.3	U	U	5.0	5.0	1.3	U	U

Table 5. Sediment Conventionals & COC Analysis Results Compared to DMMP Guidelines (DMMU-05, DMMU-06, DMMU-07)

Parameter	DMMP Marine Guidelines			DMMU-05					DMMU-06					DMMU-07				
	SL	BT	ML	Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier		Result	RL	MDL	Qualifier	
							Lab	VQ				Lab	VQ				Lab	VQ
PESTICIDES[1] & PCBs (µg/kg dry weight)																		
4,4'-DDD	16	---	---	0.78	6.8	0.78	U +	U	0.70	6.1	0.70	U F1 +	U	0.73	6.4	0.73	U +	U
4,4'-DDE	9	---	---	1.3	6.8	1.3	U +	U	1.1	6.1	1.1	U F1 +	U	1.2	6.4	1.2	U +	U
4,4'-DDT	12	---	---	1.3	6.8	1.3	U	U	1.1	6.1	1.1	U F1	U	1.2	6.4	1.2	U	U
sum of 4,4'-DDD, 4,4'-DDE, 4,4'- DDT	---	50	69	1.3			U +	U	1.1			U F1 +	U	1.2			U +	U
Aldrin	9.5	---	---	1.3	10	1.3	U	U	1.2	9.2	1.2	U	U	1.2	9.50	1.2	U	U
cis-Chlordane				2.5	6.8	2.5	U +	U	2.3	6.1	2.3	U F1 +	U	2.4	6.4	2.4	U +	U
cis-Nonachlor				2.9	17	2.9	U	U	2.6	15	2.6	U	U	2.7	16	2.7	U	U
Oxychlordane				2.6	14	2.6	U	U	2.4	12	2.4	U	U	2.4	13	2.4	U	U
trans-Chlordane				1.1	10	1.1	U	U	0.98	9.2	0.98	U F1	U	1.0	9.5	1.0	U	U
trans-Nonachlor				2.9	14	2.9	U	U	2.6	12	2.6	U	U	2.7	13	2.7	U	U
Total Chlordane (sum of cis-chlordane, trans- chlordane, cis-nonachlor, trans-nonachlor, oxychlordane)	2.8	37	---	2.9			U	U	2.6			U	U	2.7			U	U
Dieldrin	1.9	---	1700	1.2	6.8	1.2	U +	U	1.1	6.1	1.1	U F1 +	U	1.1	6.4	1.1	U +	U
Heptachlor	1.5	---	270	0.64	10	0.64	U	U	0.58	9.2	0.58	U F1	U	0.60	9.5	0.60	U	U
PCB-Aroclor 1016				33	33	12	U	U	4.0	310	110	U	UJ	32	32	12	U	U
PCB-Aroclor 1221				33	33	20	U	U	4.0	310	180	U	U	32	32	19	U	U
PCB-Aroclor 1232				33	33	8.1	U	U	4.0	310	75	U	U	32	32	7.8	U	U
PCB-Aroclor 1242				33	33	13	U	U	4.0	310	120	U	U	32	32	13	U	U
PCB-Aroclor 1248				33	33	12	U	U	2.4	310	110	J	J	32	32	11	U	U
PCB-Aroclor 1254				33	33	15	U	U	2.4	310	140	J	J	32	32	14	U	U
PCB-Aroclor 1260				33	33	12	U	U	1.7	310	110	J	J	32	32	12	U	U
Total PCBs (Aroclors)	130	38[2]	3,100	33			U	U	6.5			J	J	32			U	U

(1) Non-detect results = MDL
(2) This value is normalized to TOC and expressed in mg/kg carbon
Shaded cells = Non-detected MDL exceeds DMMP SL

Validation Qualifiers (VQ)
U - The analyte was analyzed but was not detected above the reported sample quantitation limit.
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Table 6. COC Analysis Results Compared to Marine Sediment AET

(Results not TOC normalized due to low TOC)

Parameter	Marine Sediment AETs		DMMU-01		
	SCO	CSL	Result	Qualifier	
				Lab	VQ
TOC (decimal %)			0.0037	B	
METALS (mg/kg dry weight)					
Arsenic	57	93	4.100		
Cadmium	5.1	6.7	0.067	J	J
Chromium	260	270	23.000		
Copper	390	390	22.000		
Lead	450	530	6.200		
Mercury	0.41	0.59	0.027	J	J
Silver	6.1	6.1	0.030	J	J
Zinc	410	960	52.000		
ORGANICS					
PAHs (µg/kg dry weight)					
LPAH					
Naphthalene	2,100	2,100	39.000		
Acenaphthylene	1,300	1,300	19.900	U	U
Acenaphthene	500	500	19.900	U	U
Fluorene	540	540	19.900	U	U
Phenanthrene	1,500	1,500	94.200		
Anthracene	960	960	19.900	U	U
2-Methylnaphthalene	670	670	81.100		
Total LPAH	5,200	5,200	133.200		
HPAH					
Fluoranthene	1,700	2,500	11.100	J	J
Pyrene	2,600	3,300	9.300	J	J
Benz(a)anthracene	1,300	1,600	19.900	U	U
Chrysene	1,400	2,800	15.400	J	J
Benzofluoranthenes (b, j ,k)	3,200	3,600	39.800	U	U
Benzo(a)pyrene	1,600	1,600	19.900	U	U
Indeno(1,2,3-c,d)pyrene	600	690	19.900	U	U

Table 6. COC Analysis Results Compared to Marine Sediment AET

(Results not TOC normalized due to low TOC)

Parameter	Marine Sediment AETs		DMMU-01		
	SCO	CSL	Result	Qualifier	
				Lab	VQ
Dibenz(a,h)anthracene	230	230	19.900	U	U
Benzo(g,h,i)perylene	670	720	19.900	U	U
Total HPAH	12,000	17,000	35.800	J	J
CHLORINATED HYDROCARBONS (µg/kg dry weight)					
1,4-Dichlorobenzene	110	110	5.000	U	U
1,2-Dichlorobenzene	35	50	5.000	U	U
1,2,4-Trichlorobenzene	31	51	5.000	U	U
Hexachlorobenzene (HCB)	22	70	5.000	U	U
PHTHALATES (µg/kg dry weight)					
Dimethyl phthalate	71	160	19.900	U	U
Diethyl phthalate	200	>1,200	49.700	U	U
Di-n-butyl phthalate	1,400	1,400	19.900	U	U
Butyl benzyl phthalate	63	900	19.900	U	U
Bis(2-ethylhexyl) phthalate	1,300	1,900	49.700	U	U
Di-n-octyl phthalate	6,200	6,200	19.900	U	U
PHENOLS (µg/kg dry weight)					
Phenol	420	1,200	33.600		J
2-Methylphenol	63	63	19.900	U	U
4-Methylphenol	670	670	73.500		
2,4-Dimethylphenol	29	29	19.900	U	UJ
Pentachlorophenol	360	690	99.400	U	UJ
MISCELLANEOUS EXTRACTABLES (µg/kg dry weight)					
Benzyl alcohol	57	73	19.900	U	U
Benzoic acid	650	650	317.000		J
Dibenzofuran	540	540	19.900	U	U
Hexachlorobutadiene	11	120	5.000	U	U
N-Nitrosodiphenylamine	28	40	5.000	U	U
PCBs (mg/kg OC)					
Total PCBs (Aroclors)	130	1000	28.000	U	U

Validation Qualifiers (VQ)

U - The analyte was analyzed but was not detected above the reported sample quantitation limit.

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Table 7. COC Analysis Results Compared to SMS Criteria

Parameter	SMS Marine Sediment		DMMU-03			DMMU-04			DMMU-05			DMMU-06			DMMU-07		
	SCO	CSL	Result	Qualifier		Result	Qualifier		Result	Qualifier		Result	Qualifier		Result	Qualifier	
				Lab	VQ		Lab	VQ		Lab	VQ		Lab	VQ		Lab	VQ
TOC (decimal %)			0.019	B		0.018	B		0.014	B		0.011	B		0.012	B	
METALS (mg/kg dry weight)																	
Arsenic	57	93	6.7			6.9			6.5			6.5			6.4		
Cadmium	5.1	6.7	0.19	J	J	0.23	J	J	0.16	J	J	0.12	J	J	0.16	J	J
Chromium	260	270	31			32			31			32			32		
Copper	390	390	29			31			28			29			32		
Lead	450	530	8.3			8.5			7.7			8			13		
Mercury	0.41	0.59	0.069		J	0.077		J	0.063		J	0.068	F1	J	0.091		J
Silver	6.1	6.1	0.089	J	J	0.097	J	J	0.083	J	J	0.073	J	J	0.08	J	J
Zinc	410	960	73			76			71			75			76		
ORGANICS																	
PAHs (mg/kg OC)																	
LPAH																	
Naphthalene	99	170	5.526			5.094			7.143			5.091			5.375		
Acenaphthylene	66	66	1.047	U	U	1.111	U	U	1.429	U	U	1.809	U	U	1.667	U	U
Acenaphthene	16	57	1.053			3.244			0.986	J	J	2.455			27.500		
Fluorene	23	79	3.216			5.217			4.029			5.627			22.583		
Phenanthrene	100	480	15.000			24.167			17.929			20.000			66.000		
Anthracene	220	1,200	1.047	U	U	1.211			1.429	U	U	1.727	J	J	13.750		
2-Methylnaphthalene	38	64	12.368			12.111			16.143			12.182			12.417		
Total LPAH	370	780	24.795			38.933			30.086	J	J	34.900	J	J	135.208		
HPAH																	
Fluoranthene	160	1,200	9.263			15.056			3.636			20.273			68.500		
Pyrene	1,000	1,400	5.789			9.278			2.643			12.909			44.500		

Table 7. COC Analysis Results Compared to SMS Criteria

Parameter	SMS Marine Sediment		DMMU-03			DMMU-04			DMMU-05			DMMU-06			DMMU-07		
	SCO	CSL	Result	Qualifier		Result	Qualifier		Result	Qualifier		Result	Qualifier		Result	Qualifier	
				Lab	VQ		Lab	VQ		Lab	VQ		Lab	VQ		Lab	VQ
Benz(a)anthracene	110	270	1.363			3.311			1.186	J	J	2.500			8.667		
Chrysene	110	460	4.479			5.239			3.850			5.218			11.500		
Benzofluoranthenes (b, j ,k)	230	450	2.326			2.811			1.757	J	J	3.800			8.583		
Benzo(a)pyrene	99	210	0.658	J	J	1.022	J	J	0.486	J	J	1.045	J	J	3.292		
Indeno(1,2,3-c,d)pyrene	34	88	1.047	U	U	1.111	U	U	1.429	U	U	1.809	U	U	1.442	J	J
Dibenz(a,h)anthracene	12	33	1.047	U	U	1.111	U	U	1.429	U	U	1.809	U	U	1.667	U	U
Benzo(g,h,i)perylene	31	78	1.047	U	U	1.111	U	U	1.429	U	U	1.809	U	U	1.367	J	J
Total HPAH	960	5,300	23.879	J	J	36.717	J	J	13.557	J	J	45.745	J	J	147.850	J	J
CHLORINATED HYDROCARBONS (mg/kg OC)																	
1,4-Dichlorobenzene	3.1	9	0.263	U	U	0.278	U	U	0.357	U	U	0.455	U	U	0.417	U	U
1,2-Dichlorobenzene	2.3	2.3	0.263	U	U	0.278	U	U	0.357	U	U	0.455	U	U	0.417	U	U
1,2,4-Trichlorobenzene	0.81	1.8	0.263	U	U	0.278	U	U	0.357	U	U	0.455	U	U	0.417	U	U
Hexachlorobenzene (HCB)	0.38	2.3	0.263	U	U	0.278	U	U	0.357	U	U	0.227	Z, U	U	0.208	Z, U	U
PHTHALATES (mg/kg OC)																	
Dimethyl phthalate	53	53	1.047	U	U	1.111	U	U	1.429	U	U	1.809	U	U	1.667	U	U
Diethyl phthalate	61	110	2.626	U	U	2.772	U	U	3.571	U	U	4.518	U	U	2.025	J	J
Di-n-butyl phthalate	220	1,700	1.047	U	U	1.111	U	U	1.429	U	U	1.809	U	U	1.667	U	U
Butyl benzyl phthalate	4.9	64	1.047	U	U	1.111	U	U	1.429	U	U	1.809	U	U	1.667	U	U
Bis(2-ethylhexyl) phthalate	47	78	2.626	U	U	2.772	U	U	3.571	U	U	4.518	U	U	1.867	J	J
Di-n-octyl phthalate	58	4,500	1.047	U	U	1.111	U	U	1.429	U	U	1.809	U	U	1.667	U	U
PHENOLS (µg/kg dry weight)																	
Phenol	420	1,200	19.9	U	UJ	20	U	UJ	20	U	UJ	16.9	J	J	14.1	J	J
2-Methylphenol	63	63	19.9	U	U	20	U	U	20	U	U	19.9	U	U	20	U	U
4-Methylphenol	670	670	19.9	U	U	20	U	U	20	U	U	19.9	U	U	20	U	U

Table 7. COC Analysis Results Compared to SMS Criteria

Parameter	SMS Marine Sediment		DMMU-03			DMMU-04			DMMU-05			DMMU-06			DMMU-07		
	SCO	CSL	Result	Qualifier		Result	Qualifier		Result	Qualifier		Result	Qualifier		Result	Qualifier	
				Lab	VQ		Lab	VQ		Lab	VQ		Lab	VQ		Lab	VQ
2,4-Dimethylphenol	29	29	19.9	U	UJ	20	U	UJ	20	U	UJ	19.9	U	UJ	20	U	UJ
Pentachlorophenol	360	690	99.7	U	UJ	99.8	U	UJ	99.9	U	UJ	99.5	U	UJ	99.8	U	UJ
MISCELLANEOUS EXTRACTABLES																	
Benzyl alcohol (µg/kg dry weight)	57	73	19.9	U	U	20	U	U	20	U	U	19.9	U	U	20	U	U
Benzoic acid (µg/kg dry weight)	650	650	142	J	J	75.8	J	J	49.6	J	J	199	U	UJ	76	J	J
Dibenzofuran (mg/kg OC)	15	58	2.542			1.111	U	U	1.429	U	U	3.727			13.5		
Hexachlorobutadiene (mg/kg OC)	3.9	6.2	0.263	U	U	0.278	U	U	0.357	U	U	0.455	U	U	0.417	U	U
N-Nitrosodiphenylamine (mg/kg OC)	11	11	0.263	U	U	0.278	U	U	0.357	U	U	0.455	U	U	0.417	U	U
PCBs (mg/kg OC)																	
Total PCBs (Aroclors)	12	65	1.842	U	U	1.944	U	U	2.357	U	U	0.591	J		2.667	U	U

Shaded cell = Detected result exceeds SMS SCO

Validation Qualifiers (VQ)
U - The analyte was analyzed but was not detected above the reported sample quantitation limit.
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.