Memorandum for Record **October 5, 2020**

Subject: Supplement to the Suitability Determination Memorandum for the Kilisut Harbor Restoration Project (NWS-2016-1130).

Introduction

This memorandum supplements the DMMP suitability determination memorandum (SDM) dated April 5, 2018 for the Kilisut Harbor Restoration Project (Figure 1). This memo documents the consensus regarding the compliance of the newly exposed surface with the state antidegradation policy 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

In the 2018 SDM, the DMMP agencies required that the project proponent collect and analyze confirmation samples of the new surface upon completion of the full project excavation to ensure that state antidegradation requirements are met. Project construction occurred in July/August 2020, and confirmation samples were collected in accordance with the approved Sampling and Analysis Plan (Cardno, 2017).

Project Summary

Waterbody	Puget Sound
Water classification	Marine
Project rank	Low-moderate
DMMO tracking number	KILIS1AO419
EIM Study ID	KILIS20
USACE Regulatory Reference Number	NWS-2016-1130
Sampling Date(s)	August 14, 2020
Testing Parameters	DMMP standard marine COCs
Biological Testing	Not required
Testing Outcome	No exceedances of DMMP Screening Levels or state Sediment Quality Standards (SQS)

Sampling and Analysis Description

Nine surface grab samples were collected by hand from the top 0 to 6 inches and composited into three samples for laboratory analysis. Figure 2 shows the sediment sampling locations and Table 1 lists the sampling station details and compositing plan.

Samples were submitted to ALS Environmental in Kelso, WA, for analysis.

Analytical Testing Results

The three composite samples were analyzed for the standard DMMP marine chemicals of concern (COCs). Dioxin/furan analysis was not required. No detected or non-detected exceedances of the marine screening levels or the dry-weight state sediment quality standards (SQS) occurred (Table 2). Comparison to organic-carbon-normalized SQS values is not appropriate due to the low Total Organic Carbon (TOC) measured in the samples.

DMMP Determinations

Antidegradation Determination

The sediment that has been exposed by dredging meets the State of Washington Sediment Management Standards (SMS) and the State's Antidegradation Standard (Ecology, 2013) as outlined by DMMP guidance (DMMP, 2008). Concentrations of all DMMP chemicals of concern in the newly exposed surface are below the DMMP SLs and state SQS. Therefore, this project is in compliance with the State of Washington Antidegradation Standard.

References

Cardno, 2017. Final Kilisut Harbor Restoration Sediment Sampling and Analysis Plan. Prepared by Cardno for the North Olympic Salmon Coalition, November 6, 2017.

Cardno, 2020. Kilisut Harbor Restoration Project Sediment Characterization Final Z-Sampling Report. Prepared by Cardno for the North Olympic Salmon Coalition, September 18, 2020.

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, 2018. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Dredged Material Management Program, updated December 2018.

DMMP, 2018. Determination regarding the Suitability of Proposed Dredged Material from the Kilisut Harbor Restoration Project for Open-Water Disposal at a Dispersive or Non-Dispersive DMMP Disposal Site. April 5, 2018.

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

Agency Signatures

Signed copy on file in the USACE Seattle District DMMO.

_____	_____
Date	Heather Whitney Fourie – U.S. Army Corps of Engineers, Seattle District
_____	_____
Date	Justine Barton – U.S. Environmental Protection Agency, Region 10
_____	_____
Date	Laura Inouye, PhD. – Washington State Department of Ecology
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Date	Shannon Soto – Washington State Department of Natural Resources

Copies Furnished:
DMMP agencies
Brandon Clinton, USACE Regulatory Project Manager
DMMO File

Tables

Table 1. Sample Location and Compositing Details

z-sample composite	Sampling Location	Actual Latitude	Actual Longitude
1	1a	48.018372	-122.704056
	1b	48.018106	-122.703603
	1c	48.018067	-122.703011
2	2a	48.017783	-122.700003
	2b	48.017644	-122.7021
	2c	48.018256	-122.704881
3	3a	48.020708	-122.699567
	3b	48.019781	-122.6997
	3c	48.018708	-122.699469

Table 2. Analytical Results

			Sample Name	Kilisut 1				Kilisut 2				Kilisut 3			
			Collection Date	8/14/2020				8/14/2020				8/14/2020			
Chemical of Concern	**Analytical Method**	**DMMP Marine Screening Level**	**SQS**	**Result**	**Flag**	**MDL**	**MRL**	**Result**	**Flag**	**MDL**	**MRL**	**Result**	**Flag**	**MDL**	**MRL**
DMMP Grain Sizes															
Gravel (>2 mm)		--	--	4.86	--	--	--	24.46	--	--	--	51.2	--	--	--
Sand (62.5-2,000 µm)		--	--	85.54	--	--	--	73.49	--	--	--	49.8	--	--	--
Silt (3.9-62.5 µm)		--	--	8.48	--	--	--	1.11	--	--	--	0.69	--	--	--
Clay (0-3.9 µm)		--	--	4.51	--	--	--	0.52	--	--	--	0.66	--	--	--
Fines (silt + clay)		--	--	12.99	--	--	--	1.63	--	--	--	1.35	--	--	--
Conventionals															
Ammonia (mg/kg)	Plumb 1981	--	--	13.8		0.06	0.63	9.93		0.05	0.61	7.73		0.05	0.55
TOC (%)	PSEP 1986 - 9060M	--	--	0.241		0.02	0.05	0.1		0.02	0.05	0.102		0.02	0.05
Total solids (%)	PSEP 1986	--	--	77.9		-	-	78.8		--	--	93.1		--	--
Total sulfides (mg/kg)	PSEP 1986	--	--	8.8	*,J	2.9	9.6	ND	ND,*	2.4	7.9	ND	ND,*	2.5	8.2
Total volatile solids (%)	EPA 160.4 modified	--	--	2.1		-	0.026	1.6		--	0.023	1.2		--	0.034
Metals (mg/kg dry weight)															
Antimony	EPA 6020A	150	--	0.025	J	0.021	0.051	0.036	J	0.019	0.048	0.062		0.021	0.052
Arsenic	EPA 6020A	57	57	1.95		0.06	0.51	1.15		0.06	0.48	1.83		0.06	0.52
Cadmium	EPA 6020A	5.1	5.1	0.102		0.007	0.021	0.052		0.007	0.019	0.047		0.007	0.021
Chromium	EPA 6020A	260	260	21.1		0.06	0.21	13.9		0.06	0.19	21		0.06	0.21
Copper	EPA 6020A	390	390	7.5		0.04	0.1	9.06		0.038	0.096	10.5		0.04	0.1
Lead	EPA 6020A	450	450	1.94		0.021	0.051	1.37		0.019	0.048	2.65		0.021	0.052
Mercury	EPA 7471B	0.41	0.41	0.007	J	0.003	0.025	0.008	J	0.002	0.022	0.006	J	0.002	0.017
Selenium	EPA 6020A	--	--	0.1	J	0.09	1	ND	ND	0.09	0.96	0.1	J	0.09	1
Silver	EPA 6020A	6.1	6.1	0.024		0.004	0.021	0.01	J	0.004	0.019	0.019	J	0.004	0.021
Zinc	EPA 6020A	410	410	24.1		0.21	0.51	24.5		0.19	0.48	30.3		0.21	0.52
PAHs (µg/kg dry weight)			**mg/kg OC**												
Naphthalene	EPA 8270D	2,100	99	ND	ND	2.9	6.5	ND	ND	2.9	6	ND	ND	2.9	6
Acenaphthylene	EPA 8270D	560	66	ND	ND	2.6	6.5	ND	ND	2.6	6	ND	ND	2.6	6
Acenaphthene	EPA 8270D	500	16	ND	ND	3.2	6.5	ND	ND	3.2	6	ND	ND	3.2	6
Fluorene	EPA 8270D	540	23	ND	ND	3.3	6.5	ND	ND	3.3	6	ND	ND	3.3	6
Phenanthrene	EPA 8270D	1,500	100	ND	ND	3.6	6.5	ND	ND	3.6	6	ND	ND	3.6	6
Anthracene	EPA 8270D	960	220	ND	ND	3.2	6.5	ND	ND	3.2	6	ND	ND	3.2	6
2-Methylnaphthalene	EPA 8270D	670	38	ND	ND	2.8	6.5	ND	ND	2.8	6	ND	ND	2.8	6
Total LPAH	EPA 8270D	5,200	370	ND	ND	--	--	ND	ND	--	--	ND	ND	--	--
Fluoranthene	EPA 8270D	1,700	160	ND	ND	3.7	6.5	ND	ND	3.7	6	ND	ND	3.7	6
Pyrene	EPA 8270D	2,600	1000	ND	ND	3.7	6.5	ND	ND	3.7	6	ND	ND	3.7	6
Benzo(a)anthracene	EPA 8270D	1,300	110	ND	ND	3.6	6.5	ND	ND	3.6	6	ND	ND	3.6	6
Chrysene	EPA 8270D	1,400	110	ND	ND	4.1	6.5	ND	ND	4.1	6	ND	ND	4.1	6
Benzo(b)fluoranthene	EPA 8270D	3,200	230	ND	ND	3.4	6.5	ND	ND	3.4	6	ND	ND	3.4	6
Benzo(k)fluoranthene	EPA 8270D	3,200	230	ND	ND	4	6.5	ND	ND	4	6	ND	ND	4	6
Benzo(a)pyrene	EPA 8270D	1,600	99	ND	ND	3.6	6.5	ND	ND	3.6	6	ND	ND	3.6	6
Indeno(1,2,3-c,d)pyrene	EPA 8270D	600	34	ND	ND	3.2	6.5	ND	ND	3.2	6	ND	ND	3.2	6
Dibenz(a,h)anthracene	EPA 8270D	230	12	ND	ND	3	6.5	ND	ND	3	6	ND	ND	3	6
Benzo(g,h,i)perylene	EPA 8270D	670	31	ND	ND	3.7	6.5	ND	ND	3.7	6	ND	ND	3.7	6
Total HPAH	EPA 8270D	12,000	960	ND	ND	--	--	ND	ND	--	--	ND	ND	--	--
Total PAHs	EPA 8270D	--	--	ND	ND	--	--	ND	ND	--	--	ND	ND	--	--
Chlorinated Hydrocarbons (µg/kg dry weight)			**mg/kg OC**												
1,4-dichlorobenzene	EPA 8270D	110	3.1	ND	ND	2.5	6.5	ND	ND	2.5	6	ND	ND	2.5	6
1,2-dichlorobenzene	EPA 8270D	35	2.3	ND	ND	2.4	6.5	ND	ND	2.4	6	ND	ND	2.4	6
1,2,4-trichlorobenzene	EPA 8270D	31	0.81	ND	ND	2.6	6.5	ND	ND	2.6	6	ND	ND	2.6	6
Hexachlorobenzene (HCB)	EPA 8270D	22	0.38	ND	ND	3.3	6.5	ND	ND	3.3	6	ND	ND	3.3	6
Phthalates (µg/kg dry weight)			**mg/kg OC**												
Dimethyl phthalate	EPA 8270D	71	53	ND	ND	4	6.5	ND	ND	4	6	ND	ND	4	6
Diethyl phthalate	EPA 8270D	200	61	ND	ND	3.7	6.5	ND	ND	3.7	6	ND	ND	3.7	6
Di-n-butyl phthalate	EPA 8270D	1,400	220	ND	ND	4.8	13	ND	ND	4.8	12	ND	ND	4.8	11
Butyl benzyl phthalate	EPA 8270D	63	4.9	ND	ND	3.7	6.5	ND	ND	3.7	6	ND	ND	3.7	6
Bis(2-ethylhexyl) phthalate	EPA 8270D	1,300	47	ND	ND	8.9	65	29	J	8.9	60	ND	ND	8.9	55
Di-n-octyl phthalate	EPA 8270D	6,200	58	ND	ND	3.2	6.5	ND	ND	3.2	6	ND	ND	3.2	6
Phenols (µg/kg dry weight)															
Phenol	EPA 8270D	420	420	ND	ND	3.1	20	ND	ND	3.1	18	ND	ND	3.1	16
2-Methylphenol	EPA 8270D	63	63	ND	ND	4.1	6.5	ND	ND	4.1	6	ND	ND	4.1	6
4-Methylphenol	EPA 8270D	670	670	7.7		4.5	6.5	ND	ND	4.5	6	ND	ND	4.5	6
2,4-Dimethylphenol	EPA 8270D	29	29	ND	ND	6.3	33	ND	ND	6.3	30	ND	ND	6.3	27
Pentachlorophenol	EPA 8270D	400	360	ND	ND	5.3	65	ND	ND	5.3	60	ND	ND	5.3	55
Miscellaneous Extractables (µg/kg dry weight)															
Benzyl alcohol	EPA 8270D	57	57	ND	ND	4.9	13	ND	ND	4.9	12	ND	ND	4.9	11
Benzoic acid	EPA 8270D	650	650	ND	ND	96	260	ND	ND	96	240	ND	ND	96	220
Dibenzofuran	EPA 8270D	540	15 mg/kg OC	ND	ND	3.4	6.5	ND	ND	3.4	6	ND	ND	3.4	6
Hexachlorobutadiene	EPA 8270D	11	3.9 mg/kg OC	ND	ND	3	6.5	ND	ND	3	6	ND	ND	3	6
N-Nitrosodiphenylamine	EPA 8270D	28	11 mg/kg OC	ND	ND	3.2	6.5	ND	ND	3.2	6	ND	ND	3.2	6

			Sample Name	Kilisut 1				Kilisut 2				Kilisut 3			
			Collection Date	8/14/2020				8/14/2020				8/14/2020			
Chemical of Concern	**Analytical Method**	**DMMP Marine Screening Level**	**SQS**	**Result**	**Flag**	**MDL**	**MRL**	**Result**	**Flag**	**MDL**	**MRL**	**Result**	**Flag**	**MDL**	**MRL**
Pesticides & PCBs (µg/kg dry weight)			**mg/kg OC**												
4.4'-DDD	EPA 8081B	16	--	ND	ND	0.74	2.4	ND	ND	0.6	2	ND	ND	0.6	2
4.4'-DDE	EPA 8081B	9	--	ND	ND	0.49	1.2	ND	ND	0.4	1	ND	ND	0.4	1
4.4'-DDT	EPA 8081B	12	--	ND	ND	0.75	2.4	ND	ND	0.61	2	ND	ND	0.61	2
sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT	EPA 8081B	--	--	ND	ND	--	--	ND	ND	--	--	ND	ND	--	--
Aldrin	EPA 8081B	9.5	--	ND	ND	0.72	2.4	ND	ND	0.59	2	ND	ND	0.59	2
gamma-Chlordane[b]	EPA 8081B	2.8[b]	--	ND	ND	0.47	1.2	ND	ND	0.38	1	ND	ND,i	0.4	1
cis-Chlordane[d]	EPA 8081B	2.8[b]		ND	ND	0.5	1.2	ND	ND	0.41	1	ND	ND	0.41	1
Oxychlordane	EPA 8081B	2.8[b]	--	ND	ND	0.31	1.2	ND	ND	0.25	0.86	ND	ND	0.25	0.98
cis-Nonachlor	EPA 8081B	2.8[b]	--	ND	ND	0.36	1.2	ND	ND	0.29	1	ND	ND	0.29	1
Trans-Nonachlor	EPA 8081B	2.8[b]	--	ND	ND	0.87	2.4	ND	ND	0.71	2	ND	ND	0.71	2
Total Chlordane[e]	EPA 8081B	2.8	--	ND	ND	--	--	ND	ND	--	--	ND	ND	--	--
Dieldrin	EPA 8081B	1.9	--	ND	ND	0.27	1.2	ND	ND	0.22	0.86	ND	ND	0.22	0.98
Heptachlor	EPA 8081B	1.5	--	ND	ND,i	0.48	1.2	ND	ND	0.39	1	ND	ND,i	0.45	1
Total PCBs (Aroclors)	EPA 8082A	130	12	ND	ND	--	--	ND	ND	--	--	ND	ND	--	--

Notes:
[a] For summed PAHs, PCBs, and Chlordanes the MRL and MDL shown is the maximum value reported for any individual constituent
[b] Marine SL is for Total Chlordane
[c] For this analyte (CAS Registry No. 5103-74-2), the U.S. Environmental Protection Agency (USEPA) has corrected the name to be beta-Chlordane, also known as trans-Chlordane.
[d] This analyte (CAS Registry No. 5103-71-9) also known as alpha-Chlordane.
e Total chlordane is the sum of cis-chlordane, gamma-chlordane, cis-nonachlor, trans-nonachlor, oxychlordane.
% rec – percent recovery
DOD-QSM 4.2 definition: Analyte was not detected and is reported as less than the level of detection (LOD) or as defined by the project. The detection limit is adjusted for dilution.
MDL – Method Detection Limit MRL – Method Reporting Limit
HPAH – high molecular weight PAHs J – The result is an estimated value. LPAH – low molecular weight PAHs ND – Non-detect
PAH – polycyclic aromatic hydrocarbons OC – organic carbon
TOC – total organic carbon
U – The analyte was analyzed for, but was not detected ("Non-detect," or ND) at or above the MRL/MDL. i – The MRL/MDL is elevated due to a chromatographic interference

Figure 1. Overview Map (Cardno, 2020)

Figure 2. Sediment Sample Locations (Cardno, 2020)

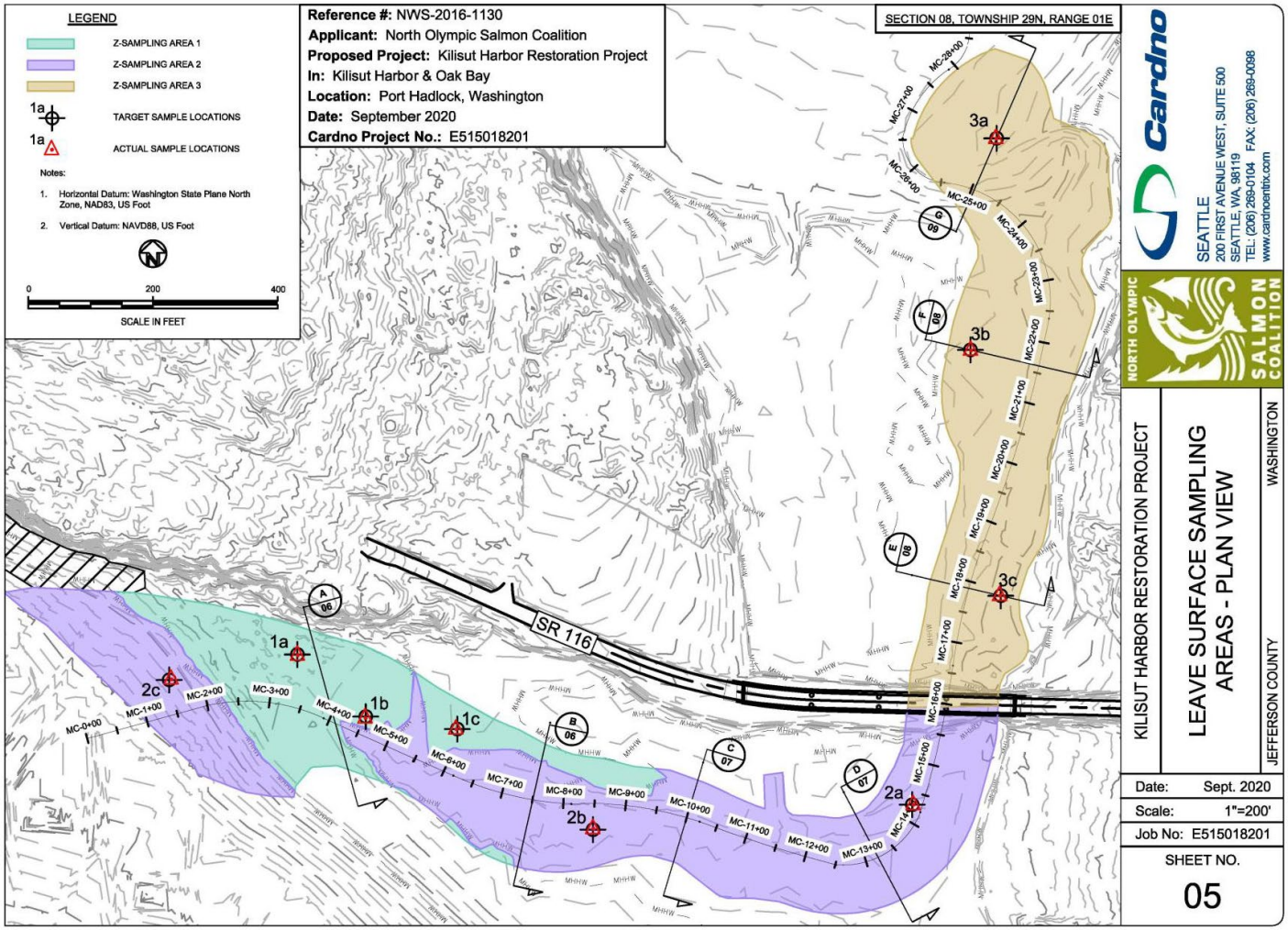

Figure 1-2 **Sampling areas 1, 2, 3 target and actual sampling locations.**