CENWS-OD-TS-NR

MEMORANDUM FOR: RECORD November 12, 2015

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM WEYERHAEUSER LONGVIEW FOR OPEN-WATER FLOWLANE DISPOSAL IN THE COLUMBIA RIVER.

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 152,400 cubic yards (cy) of dredged material adjacent to the Weyerhaeuser property in Longview, Washington for open-water disposal (Figure 1). Proposed disposal is in the flow-lane area of the Columbia River between river miles (RM) 61.3 and 62.5 (Figure 2).

2. Background. The Weyerhaeuser property is located on the Washington side of the Columbia River between RM 63 and 66. Weyerhaeuser is proposing maintenance dredging of the Mount Coffin Ship Access Channel in the Columbia River and areas adjacent to the Weyerhaeuser property to ensure navigation depths for ocean-going vessels and river barges that are shipping mill products and raw materials to existing Weyerhaeuser facilities (Figure 1). The Mount Coffin Ship Access Channel provides ship access from the federal navigation channel to the docks and turning basin. The areas to be dredged that are addressed by this suitability determination are the Salt Dock, Cargo Dock, Turning Basin, Chip Barge Slip, and the Mt. Coffin Ship Access Channel. The Export Dock was not characterized and is not covered by this suitability determination.

   Several previous maintenance dredging activities have occurred at the Weyerhaeuser Longview property; the most recent dredging event occurred in 2014. Previous DMMP memoranda associated with this property include the following:
   - DMMP, 2014. Recency Extension for Chip Barge slip and Mt. Coffin Ship Access Channel
   - DMMP, 2010. Suitability Determination for the Turning Basin and Salt Dock
   - DMMP, 2009. Suitability Determination for the Chip Barge Slip and Mt. Coffin Access Channel
   - DMMP, 2003. Suitability Determination for the Mt. Coffin Access Channel

   In fall 2015, a comprehensive sampling and testing effort was conducted at all locations with sediment accumulation. This memorandum documents the suitability determination as a result of this sampling event.

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

Table 1. Project Summary

Project ranking	Low-Moderate
Characterized dredging volume (CY)	Total: 152,400
Proposed dredging depth (ft CRD, including over dredge allowance)	Cargo Dock, Turning Basin, and Salt Dock: -40

	Chip Barge Slip: -14 Mt Coffin Ship Access Channel: -42 ft
Draft SAP received	August 8, 2015
DMMP comments provided on draft SAP	August 20, 2015
Final SAP received	August 28, 2015
SAP approved	August 28, 2015
Sampling date	August 31-Sept 5, 2015
Draft sediment data characterization report received	October 16, 2015
DMMP comments provided on draft data report	Oct 27, 2015 and Nov 3, 2015
Final data report received	November 12, 2015
DMMO tracking number	WEYLO-1-A-F-370
EIM study ID	WEYLO15
USACE Permit Application Number	NWS-2011-181
Recency Determination (moderate rank = 5 years)	September 2020

4. Project Ranking and Sampling Requirements. Sediments at the Weyerhaeuser property in Longview are currently ranked "low-moderate" (DMMP, 2014). For a low-moderate-ranked project with heterogeneous sediment, the number of samples and analyses are calculated using the following guidelines (DMMP, 2014):
   - Maximum volume of sediment represented by each field sample = 8,000 cubic yards
   - Maximum volume of sediment represented by each analysis in the upper 4-feet of the dredging prism (surface sediment) = 32,000 cubic yards
   - Maximum volume of sediment represented by each analysis in the subsurface portion of the dredging prism = 48,000 cubic yards

   Due to the overall volume of material proposed for dredging, the project was characterized as nine separate surface DMMUs. The number of cores planned for collection within each DMMU to form each composite sample ranged from one to five, depending upon the DMMU size. In addition, one z-sample core was planned per DMMU.

   The actual characterization collected samples from 8 of the 9 DMMUs (Table 2). Insufficient sediment accumulation was cited as the reason for not collecting sample material from the Export Dock DMMU. For all other DMMUs, the sampling frequency meets or exceeds DMMP requirements.

   Table 2 lists all project locations characterized, their assigned DMMU nomenclature, and the sampling and compositing scheme.

5. Sampling. Sampling occurred August 31 through September 5, 2015 at the locations shown in Figures 3 and 4. Surface grab samples were collected using a stainless-steel power grab sampler. Table 2 presents the sample locations, collection details, and DMMU compositing schema for the surface grab samples.

   Z-samples. Two foot z-samples were collected from all but the Export Dock DMMU using a vibratory

core device. Z-sample material was archived pending the results of the composite samples from the overlying dredge prism. Because no exceedances of DMMP freshwater criteria were found in the dredge prism samples, z-sample analysis was not required for this project and z-sample collection details are not included in this suitability document.

6. Sediment Conventional, Grain Size and Chemical Analysis.

   The chemical analysis results compared to DMMP freshwater guidelines are found in Table 3. No chemicals were detected in exceedance of the DMMP screening level 1 (SL1) guidelines. Metals, PAHs, chlorinated hydrocarbons, phenols, pesticides, organotins, PCBs, and the miscellaneous extractables were either not detected or were detected at concentrations well below the SL1 at all sampling locations.

   Dioxins/furans. Dioxins/furans analysis was not required at the Salt Dock (DMMU5), Mt. Coffin Access Channel (DMMUs 8, 9, and 10), and Cargo Dock (DMMU1) based on previous investigation results that indicated that dioxin/furans are not a concern at those locations (DMMP, 2009).

   Dioxins/furans analysis was required at the Chip Barge Slip (DMMU6) and the Export Dock (DMMU7) given their separate locations, past historical site use, and lack of previous dioxin/furans sediment data. Due to insufficient sediment accumulation at the Export Dock, samples for chemical analysis were only collected from the Chip Barge Slip. Dioxin/furan data for Chip Barge Slip are presented in Table 4.

   In the 2015 sampling event, dioxins/furans were detected at low levels in the DMMU6 composite sample. The dioxin/furan toxicity equivalent (TEQ, with U = ½ estimated reporting limit) for DMMU6 was 1.38 pptr, which is within the range of background values for sediment samples from the lower Columbia River (0.65 to 2.89 pptr TEQ) (DMMP, 2014). The DMMP agencies concur that the material from DMMU6 passes the DMMP dioxin/furan guidelines for open-water disposal.

7. Biological Testing. There were no SL1 exceedances for the standard COCs. The dioxin/furan concentration in the Chip Barge Slip (DMMU6) of 1.38 pptr TEQ lies within the range of Columbia River background (0.65 to 2.89 pptr TEQ) (DMMP, 2014). Therefore, bioassays and bioaccumulation testing were not required.

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 anti-degradation standard (DMMP, 2008). Two foot z-samples were collected from 8 of the 9 DMMUs (all except the Export Dock) (Table 3). Based on the tiered testing approach, analysis of z-samples is not required because all DMMU composite samples are below the SL1 criteria. Therefore, this project is in compliance with the State of Washington anti-degradation standard.

9. Suitability Determination. In summary, based on the results of the previously described testing, the DMMP agencies concluded that the 152,400 cubic yards of dredged material in DMMUs 1, 2, 4, 5, 6, 8, 9, and 10 are suitable for open-water disposal.

   Because there is no existing suitability determination for the Export Dock (DMMU7), dredging may not occur at the Export Dock until the sediment has been characterized.

A pre-dredge meeting with DNR, Ecology, EPA and the Corps of Engineers is required at least 7 days prior to dredging. A dredging and disposal quality control plan must be developed and submitted to the Regulatory Branch of the Seattle District Corps of Engineers at least 7 days prior to the pre-dredge meeting. Dredging, positioning, and disposal will all need to be addressed with enough detail to provide assurance to the agencies that the dredge plan will be properly implemented.

A Portland District Corps of Engineers agreement must be acquired for open-water disposal. Disposal at the selected flow-lane site must be in accordance with Portland District procedures.

This suitability determination does ***not*** constitute final agency approval of the project. During the public comment period that follows a public notice, the 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.

10. References.

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, 2009. *Determination Regarding the Suitability of Proposed Dredged Material from the Weyerhaeuser Property, Longview, Washington, for Flow-lane Disposals in the Columbia River, or for Beneficial Use*. January 2, 2009.

DMMP, 2014. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, December 2014.

DMMP, 2014. *DMMP Recency Extension for the Weyerhaeuser Longview Chip Barge Slip and Mount Coffin Ship Access Channel*. April 3, 2014.

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

Integral Consulting, Inc., 2015. *Sediment Characterization Report*, Weyerhaeuser Property, Longview, Washington. November 12, 2015.

11. Agency Signatures.

signed copy on file in DMMO - Seattle District office

Concur:

_____ _____
Date Heather Fourie – U.S. Army Corps of Engineers, Seattle District

_____ _____
Date Erika Hoffman - Environmental Protection Agency

_____ _____
Date Laura Inouye, Ph.D. - Washington Department of Ecology

_____ _____
Date Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Danette Guy – USACE, Seattle District Regulatory
Susan Fitzgerald – Integral Consulting Inc.
Jon Gornick - USACE, Portland District Waterways Maintenance Section

Table 2. Sample locations and DMMUs

DMMU Location	DMMU ID/ Composite Sample Designation	Station Designation	NAD83 Sample Collection Coordinates		Collection Date	Collection Time	Grab Penetration (ft)	DMMU Volume (cy)	Proposed Dredge Depth, including 2 ft overdepth (ft CRD)
			Latitude	Longitude					
Cargo Dock	DMMU1	G1-1	46.127182	-122.985601	Aug. 31	1351	0.7		
		G1-2	46.126141	-122.983932	Aug. 31	1418	0.75		
		G1-3	46.125200	-122.982427	Aug. 31	1437	0.7	19,750	-40
Turning Basin	DMMU2	G2-1	46.126683	-122.985898	Sept. 1	0932	0.7		-40
		G2-2	46.124845	-122.983087	Sept. 1	1125	0.8		
		G2-3	46.125570	-122.984745	Sept. 1	1104	0.75		
		G2-4	46.126001	-122.986449	Sept. 1	1012	0.6		
		G2-5	46.124518	-122.983510	Sept. 1	1146	0.75	37,720	
Turning Basin	DMMU4	G4-1	46.126928	-122.986914	Sept. 2	0910	0.65		
		G4-2	46.126881	-122.988594	Sept. 2	0925	0.7	9,020	
Salt Dock	DMMU5	G5-1	46.128027	-122.989469	Aug. 31	1606	0.4	760	-40
Chip Barge Slip	DMMU6	G6-1	46.112233	-122.965217	Sept. 2	1309	0.75		
		G6-2	46.112137	-122.965795	Sept. 2	1346	0.75	6,000	-14
Export Dock[a]	DMMU7	G7-1	not sampled[a]					Not applicable	Not applicable
		G7-2							
		G7-3							
Mt. Coffin Channel	DMMU8	G8-1	46.128803	-122.992578	Sept. 1	1318	0.9		-42
		G8-2	46.128066	-122.991487	Sept. 1	1339	0.7		
		G8-3	46.128316	-122.992826	Sept. 1	1351	0.7		
		G8-4	46.127635	-122.990932	Sept. 1	1406	0.7	27,060	
	DMMU9	G9-1	46.129401	-122.994221	Sept. 1	1451	0.75		
		G9-2	46.128999	-122.993037	Sept. 1	1508	0.7		
		G9-3	46.128892	-122.994564	Sept. 1	1530	0.75		
		G9-4	46.128471	-122.993360	Sept. 1	1544	0.7	25,340	
	DMMU10	G10-1	46.129925	-122.995875	Sept. 2	1012	0.75		
		G10-2	46.129639	-122.994973	Sept. 2	1029	0.5		
		G10-3	46.129456	-122.995219	Sept. 2	1052	0.6		
		G10-4	46.129109	-122.995248	Sept. 2	1108	0.75	26,930	

Notes: Washington State Plane South coordinates are shown.

Table 3. Chemical analysis results for Weyerhaeuser Longview compared to DMMP freshwater guidelines

		Freshwater Guidelines		DMMU1		DMMU2		DMMU4		DMMU5		DMMU6		DMMU8		DMMU9		DMMU10	
CHEMICAL	Units	SL1	SL2	Result		Result		Result		Result		Result		Result		Result		Result	
CONVENTIONALS																			
Gravel, %	percent			0.1		0.2		0.1		15.4		0		0.5		0.6		2.4	
Sand, %	percent			41.7		68.9		90.4		82.7		58.9		97.7		98.6		96.7	
Silt, %	percent			52.5		28.5		8.3		1.2		37.1		0.9		0.1		0.1	
Clay, %	percent			5.8	J	2.6	J	1.1		0.8	J	4		0.9	J	0.9	J	0.9	
Fines (Silt + Clay), %	percent			58.3	J	31.1	J	9.4		2.0	J	41.1		1.8	J	1.0	J	1.0	
Total Solids, %	percent	--	--	65.82		69.48		71.33		79.51		68.29		74.34		75.89		74.25	
Total organic carbon, %	percent	--	--	0.73		0.269		0.179	J	0.108		0.301	J	0.047		0.064		0.061	J
Total Ammonia, mg N/kg	mg/kg	--	--	23.2		11.6		2.32		0.33		10.5		0.12	U	0.13	U	0.13	U
Total Sulfides, mg/kg	mg/kg	--	--	82.8	J	25	J	1.22	U	1.25	UJ	13.7		1.13	UJ	1.34	UJ	1.22	U
Preserved total solids	percent	--	--	67.63		69.41		70.38		76.52		67.42		75.93		72.85		73.73	
Total volatile solids	percent	--	--	1.75		1.09		0.76		0.91		1.34		0.46		0.37		0.43	
METALS (mg/kg dry)																			
Arsenic	mg/kg	14	120	1.6		1.3		1		2.6		1.3		0.8		0.8		1	
Cadmium	mg/kg	2.1	5.4	0.2	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Chromium	mg/kg	72	88	7.7		5.7		4.6		12.2		5.7		3.7		4.3		3.7	
Copper	mg/kg	400	1200	22.3		16.6		13.3		20.1		18.3		9.7		9		9.7	
Lead	mg/kg	360	1300	2.6	J	1.6	J	1.1		4.1	J	1.8		0.6	J	0.7	J	0.8	
Mercury	mg/kg	0.66	0.8	0.04		0.03	U	0.03	U	0.35		0.03	U	0.02	U	0.03	U	0.03	U
Nickel	mg/kg	38	110	8		7.2		6.1		11.5		6.8		5.9		8.1		6.3	
Selenium	mg/kg	11	20	1		0.7		0.7	U	1.1		0.9		0.6	U	0.7		0.6	U
Silver	mg/kg	0.57	1.7	0.3	U	0.3	U	0.3	U	0.2	U	0.3	U	0.3	U	0.3	U	0.3	U
Zinc	mg/kg	3200	4200	33		24		20		59		26		18		19		20	
ORGANOMETALLIC COMPOUNDS (ug/kg dry)																			
Butyltin ion	ug/kg	540	4800	4.1	UJ	3.8	UJ	3.9	UJ	3.6	UJ	4	UJ	3.8	UJ	3.7	UJ	3.9	UJ
Dibutyltin ion	ug/kg	910	130000	5.8	UJ	5.4	UJ	5.6	UJ	5.1	UJ	5.7	UJ	5.4	UJ	5.2	UJ	5.5	UJ
Tetrabutyltin	ug/kg	97	97	5	U	4.7	U	4.8	U	4.4	U	5	UJ	4.7	U	4.5	U	4.8	U
Tributyltin ion	ug/kg	47	320	3.9	U	3.6	U	3.7	U	3.4	U	3.8	UJ	3.6	U	3.5	U	3.7	U
PAHs (ug/kg dry)																			
1-Methylnaphthalene	ug/kg	--	--	19	U	19	U	19	U	19	U	20	U	19	U	20	U	19	U
2-Methylnaphthalene	ug/kg	--	--	8.4	J	19	UJ	19	UJ	19	UJ	20	UJ	19	UJ	20	UJ	19	UJ
Acenaphthene	ug/kg	--	--	8.4	J	19	UJ	19	UJ	19	UJ	20	UJ	19	UJ	20	UJ	19	UJ
Acenaphthylene	ug/kg	--	--	6.5	J	19	UJ	19	UJ	19	UJ	20	UJ	19	UJ	20	UJ	19	UJ
Anthracene	ug/kg	--	--	8.4	J	19	UJ	19	UJ	19	UJ	7	J	19	UJ	20	UJ	19	UJ
Benzo(a)anthracene	ug/kg	--	--	14	J	19	UJ	19	UJ	19	UJ	19	J	19	UJ	20	UJ	19	UJ
Benzo(a)pyrene	ug/kg	--	--	7.5	J	19	UJ	19	UJ	6.7	J	12	J	19	UJ	20	UJ	19	UJ
Benzo(b)fluoranthene	ug/kg	--	--	19	U	19	U	19	U	19	U	11	J	19	U	20	U	19	U
Benzo(g,h,i)perylene	ug/kg	--	--	19	UJ	19	UJ	19	UJ	8.6	J	8.9	J	19	UJ	20	UJ	19	UJ
Benzo(k)fluoranthene	ug/kg	--	--	19	UJ	19	UJ	19	UJ	19	UJ	15	J	19	UJ	20	UJ	19	UJ
Benzofluoranthenes	ug/kg	--	--	25	J	10	J	38	UJ	11	J	25	J	37	UJ	39	UJ	38	UJ
Chrysene	ug/kg	--	--	13	J	19	UJ	19	UJ	19	UJ	23	J	19	UJ	20	UJ	19	UJ
Dibenzo(a,h)anthracene	ug/kg	--	--	19	U	19	U	19	U	19	U	20	U	19	U	20	U	19	U
Fluoranthene	ug/kg	--	--	16	J	9.4	J	7.7	J	12	J	43	J	19	UJ	20	UJ	19	UJ
Fluorene	ug/kg	--	--	7.5	J	19	UJ	19	UJ	19	UJ	5	J	19	UJ	20	UJ	19	UJ
Indeno(1,2,3-cd)pyrene	ug/kg	--	--	19	U	19	U	19	U	19	U	7	J	19	U	20	U	19	U

		Freshwater Guidelines		DMMU1		DMMU2		DMMU4		DMMU5		DMMU6		DMMU8		DMMU9		DMMU10	
CHEMICAL	Units	SL1	SL2	Result		Result		Result		Result		Result		Result		Result		Result	
Naphthalene	ug/kg	--	--	10	J	19	UJ	19	UJ	6.7	J	20	UJ	19	UJ	20	UJ	19	UJ
Phenanthrene	ug/kg	--	--	14	J	6.6	J	19	U	7.6	J	27		19	U	20	U	19	U
Pyrene	ug/kg	--	--	14	J	8.5	J	5.8	J	11	J	34	J	19	UJ	20	UJ	19	UJ
Total PAHs	ug/kg	17000	30000	152.7	J	34.5	J	13.5	J	63.6	J	210.9	J	37	UJ	39	UJ	38	UJ
CHLORINATED BENZENES (ug/kg dry)																			
beta-Hexachlorocyclohexane	ug/kg	7.2	11	0.82	U	0.83	U	0.79	U	0.82	U	0.82	U	0.82	U	0.79	U	0.78	U
PHTHALATES (ug/kg dry)																			
Bis(2-ethylhexyl) phthalate	ug/kg	500	22000	47	U	47	U	48	U	48	U	50	U	47	U	49	U	48	U
Dibutyl phthalate	ug/kg	380	1000	19	U	13	J	14	J	18	J	14	J	19	U	12	J	12	J
Di-n-octyl phthalate	ug/kg	39	1100	19	U	19	U	19	U	19	U	20	U	19	U	20	U	19	U
PHENOLS																			
4-Methylphenol	ug/kg	260	2000	29	J	19	UJ	19	UJ	19	UJ	20	UJ	19	UJ	20	UJ	19	UJ
Pentachlorophenol	ug/kg	1200	1200	93	U	94	U	96	U	95	U	99	U	93	U	98	U	95	UJ
Phenol	ug/kg	120	210	20	J	9.4	J	19	UJ	11	J	8.9	J	19	UJ	20	UJ	19	UJ
MISCELLANEOUS EXTRACTABLES (ug/kg dry)																			
Benzoic acid	ug/kg	2900	3800	160	J	72	J	190	U	190	U	200	U	190	U	200	U	190	UJ
Carbazole	ug/kg	900	1100	19	U	19	U	19	U	19	U	20	U	19	U	20	U	19	U
Dibenzofuran	ug/kg	200	680	19	U	19	U	19	U	19	U	20	U	19	U	20	U	19	U
PESTICIDES & PCBs (ug/kg dry)																			
2,4"-DDD	ug/kg	--	--	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
2,4"-DDE	ug/kg	--	--	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
2,4"-DDT	ug/kg	--	--	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
4,4"-DDD	ug/kg	--	--	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
4,4"-DDE	ug/kg	--	--	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ
4,4"-DDT	ug/kg	--	--	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ
Total of 2,4" and 4,4"-DDD	ug/kg	310	860	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
Total of 2,4" and 4,4"-DDE	ug/kg	21	33	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ
Total of 2,4" and 4,4"-DDT	ug/kg	100	8100	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ
Dieldrin	ug/kg	4.9	9.3	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
Endrin ketone	ug/kg	8.5	8.5	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
Oxychlordane	ug/kg	--	--	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
cis-Chlordane	ug/kg	--	--	0.82	U	0.83	U	0.79	U	0.82	U	0.82	U	0.82	U	0.79	U	0.78	U
cis-Nonachlor	ug/kg	--	--	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
trans-Chlordane	ug/kg	--	--	0.82	UJ	0.83	UJ	0.79	UJ	0.82	UJ	0.82	UJ	0.82	UJ	0.79	UJ	0.78	UJ
trans-Nonachlor	ug/kg	--	--	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
Total Chlordane	ug/kg			1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
Total Aroclors (PCBs)	ug/kg	110	2500	3.9	U	3.9	U	4	U	3.1	J	3.8	U	3.8	U	4	U	3.9	U
BULK PETROLEUM HYDROCARBONS (mg/kg dry)																			
Diesel Range Hydrocarbons	mg/kg	340	510	36		6.6	U	6.8	U	26		10		6.5	U	6.3	U	6.7	U
Residual Range Hydrocarbons	mg/kg	3600	4400	120		27		14	U	220		31		13	U	13	U	13	U
DMMP DETERMINATION				PASS		PASS		PASS		PASS		PASS		PASS		PASS		PASS	
DMMU Volume (cubic yards)				19,570		37,720		9,020		760		6,000		27,060		25,340		26,930	

J = estimated concentration
U = undetected
SL = screening level

Bold = detected value
Shaded cell exceeds one or more criteria.

Table 4. Dioxin/Furan data for Weyerhaeuser Longview

CHEMICAL	TEF (WHO 2005)	Units	DMMU6			
DIOXINS/FURANS			Result	Flag	TEQ (U = 1/2 RL)	TEQ (U = 0)
2,3,7,8-TCDD	1	pg/g	0.168	U	0.084	0
1,2,3,7,8-PeCDD	1	pg/g	0.399	J	0.399	0.399
1,2,3,4,7,8-HxCDD	0.1	pg/g	0.487	U	0.02435	0
1,2,3,6,7,8-HxCDD	0.1	pg/g	1.28		0.128	0.128
1,2,3,7,8,9-HxCDD	0.1	pg/g	0.852	J	0.0852	0.0852
1,2,3,4,6,7,8-HpCDD	0.01	pg/g	23.1		0.231	0.231
OCDD	0.0003	pg/g	177		0.0531	0.0531
2,3,7,8-TCDF	0.1	pg/g	0.153	J	0.0153	0.0153
1,2,3,7,8-PeCDF	0.03	pg/g	0.494	J	0.01482	0.01482
2,3,4,7,8-PeCDF	0.3	pg/g	0.394	U	0.0591	0
1,2,3,4,7,8-HxCDF	0.1	pg/g	0.882	J	0.0882	0.0882
1,2,3,6,7,8-HxCDF	0.1	pg/g	0.524	J	0.0524	0.0524
1,2,3,7,8,9-HxCDF	0.1	pg/g	0.665	J	0.0665	0.0665
2,3,4,6,7,8-HxCDF	0.1	pg/g	0.498	J	0.0498	0.0498
1,2,3,4,6,7,8-HpCDF	0.01	pg/g	2.73		0.0273	0.0273
1,2,3,4,7,8,9-HpCDF	0.01	pg/g	0.524	U	0.00262	0
OCDF	0.0003	pg/g	5.57		0.001671	0.001671
TOTAL TEQ					1.38	1.21

J = estimated concentration
U = undetected
TEF = toxic equivalency factor
TEQ = toxic equivalency

Figure 1. Site Location Map

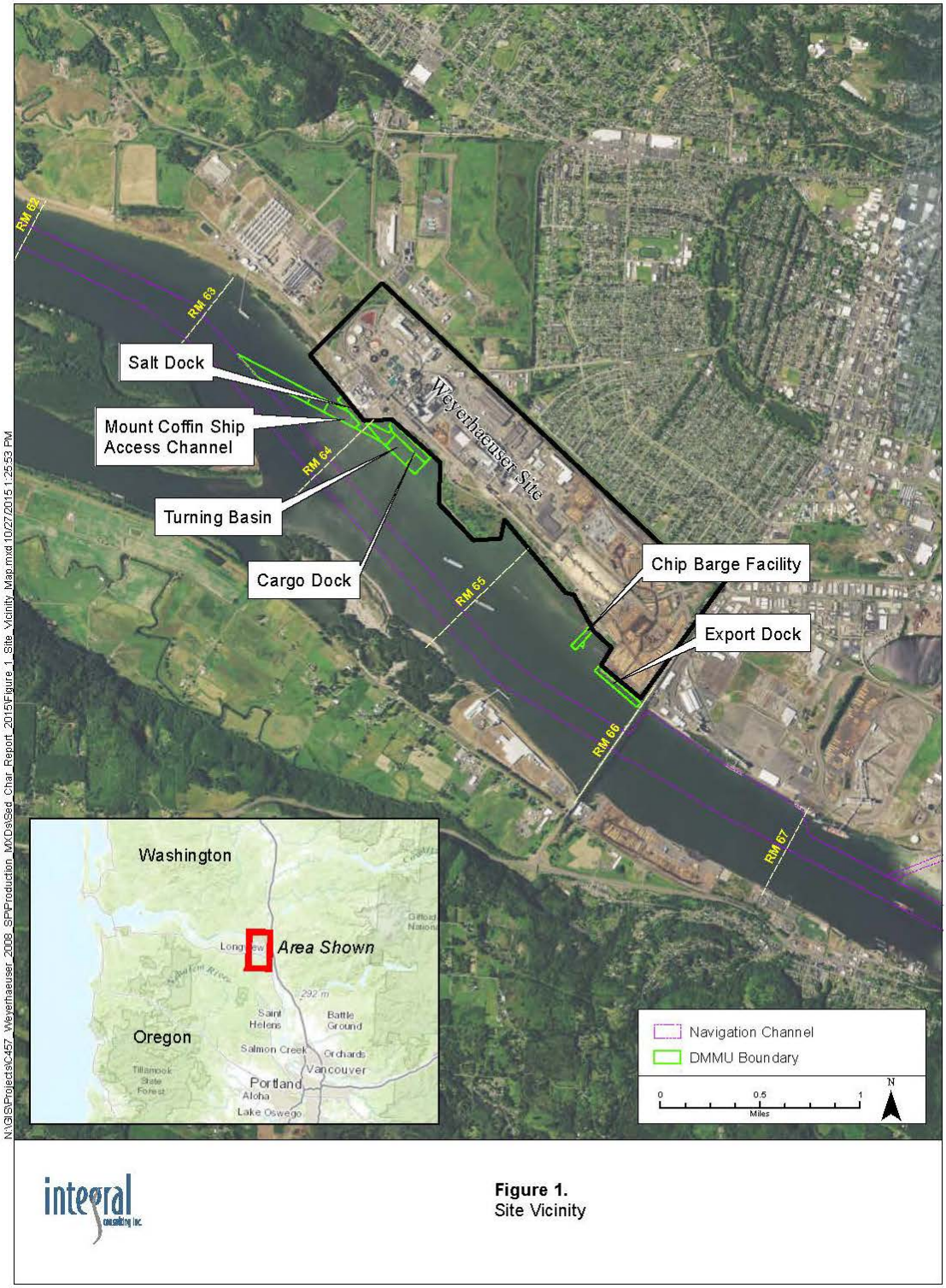

Figure from Integral, 2015.

Figure 2. Disposal Site Location

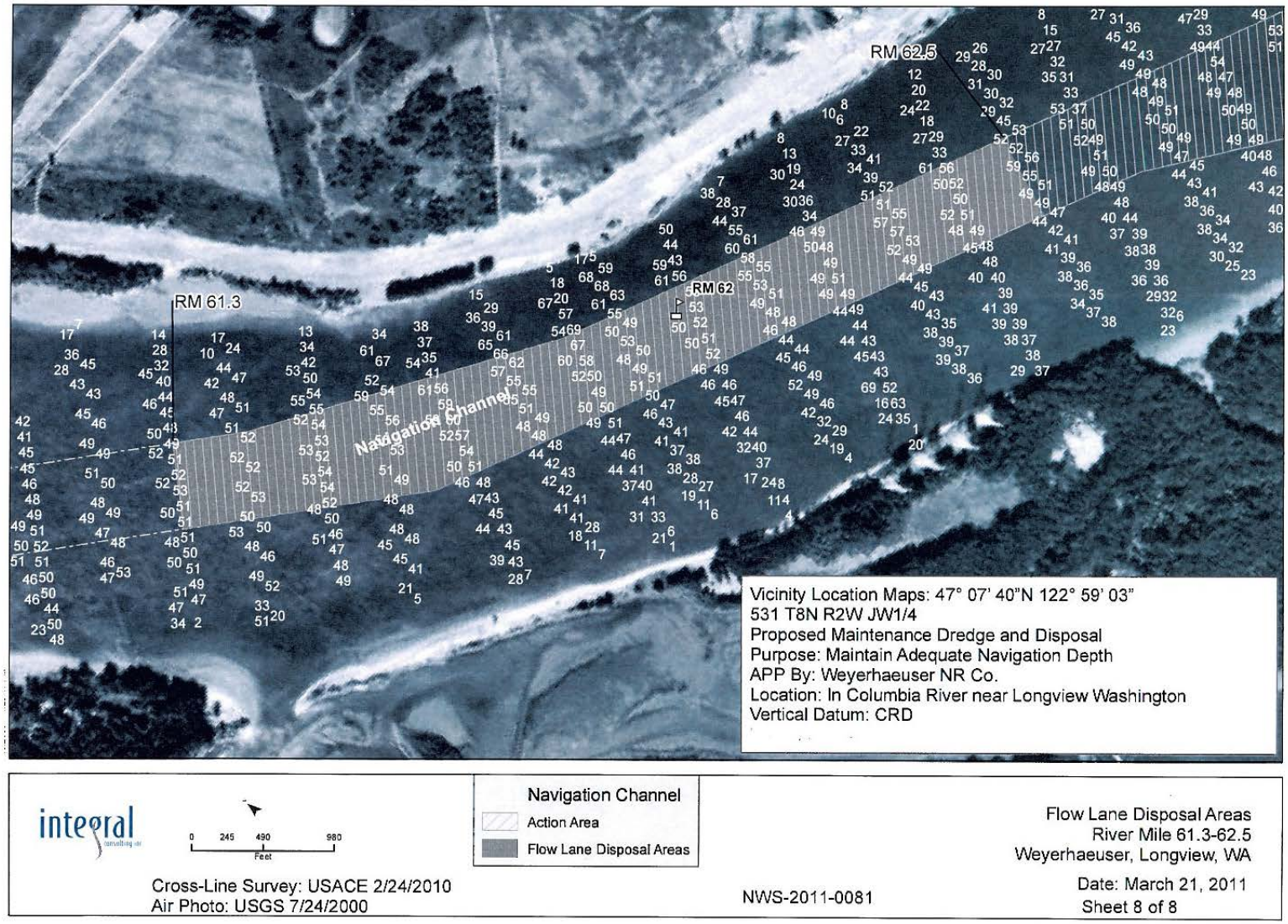

Figure from USACE Dredge Permit NWS-2011-181

Figure 3. Sample Locations for the Cargo Loading Dock, Turning Basin, Salt Dock, and Mt Coffin Access Channel

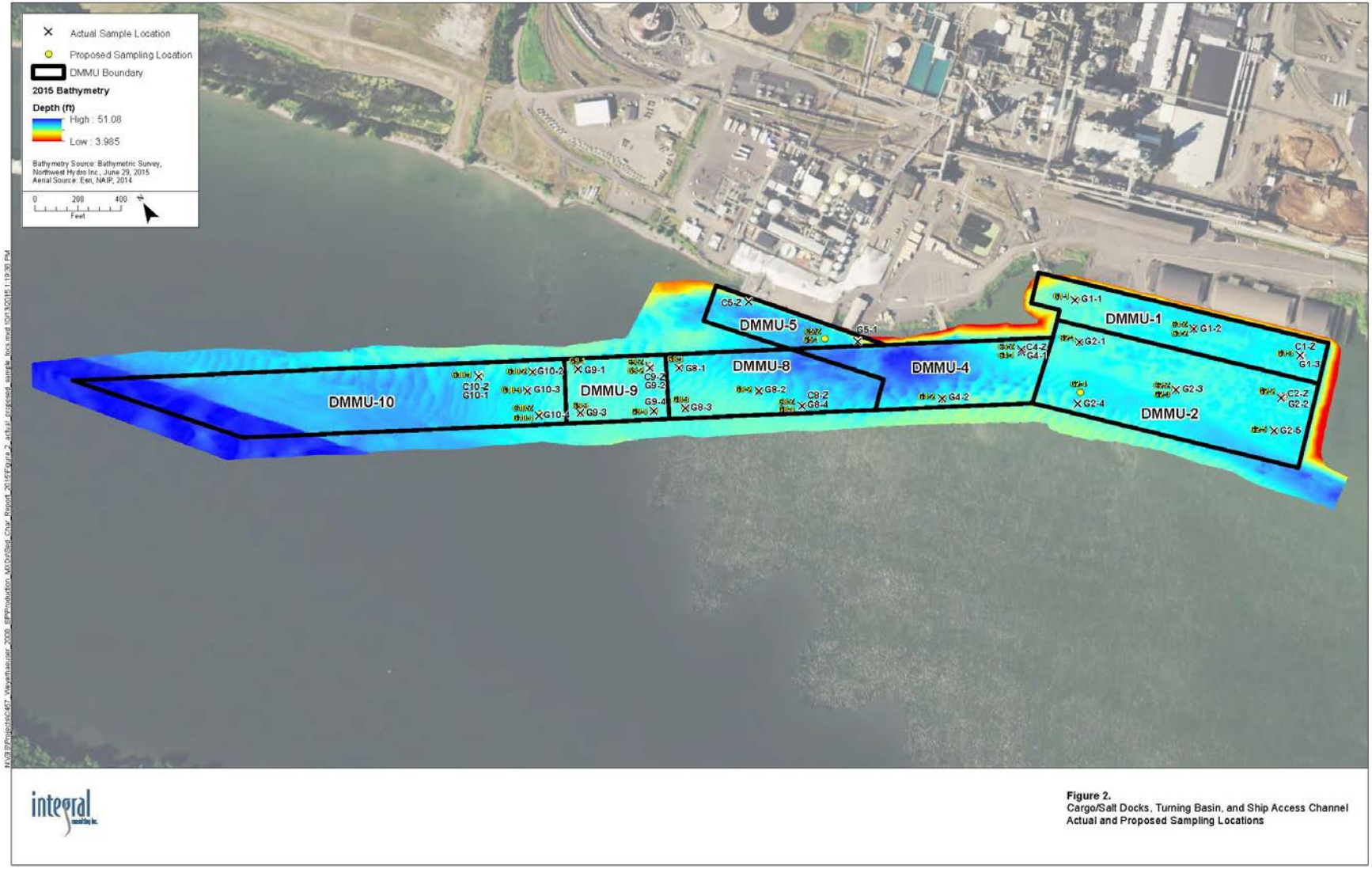

Figure 2.
Cargo/Salt Docks, Turning Basin, and Ship Access Channel
Actual and Proposed Sampling Locations

Figure from Integral, 2015.

Figure 4. Sample Locations for the Chip Barge Slip

Notes: Figure from Integral, 2015.