Exhibit 3
SHOR17-03

9/9/17

Georgia-Pacific
CONSUMER PRODUCTS (CAMAS) LLC
401 NE Adams Street, Camas, WA 98607
Telephone: (360) 834-3021

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

September 15, 2017

Mr. James Carsner
Seattle District Corps of Engineers
CENWS-OD-RG
P.O. Box 3755
Seattle, WA 98124-3755

Dear Mr. Carsner:

Pursuant to your request, we are submitting our Camas Slough Maintenance Dredging Biological Evaluation. This accompanies the Camas Slough Maintenance Dredging JARPA sent on August 15th, 2017. The biological evaluation covers 14 ESA-listed populations (comprising eight species) that potentially occur in the Camas Slough Project Area. If you have any questions or need additional information, please contact Phil Oyer at 360-834-8109 or phillip.oyer@gapac.com.

Sincerely,

Jeremy Ness
Vice President

JN/ms

Attachment

cc:
Charles Stambaugh-Bowey - WDFW
Sarah Fox - City of Camas
Denise Wilhelm - WDNR
Phil Oyer - GP/Camas

BIOLOGICAL EVALUATION

Georgia-Pacific Consumer Products (Camas) LLC Maintenance Dredging Project

Clark County, Washington
Hayden Island-Columbia River (6th Field HUC #170900120500)

Chinook Salmon (*Oncorhynchus tshawytscha)*
Lower Columbia River ESU
Upper Columbia River Spring-Run ESU
Snake River Spring/Summer-Run ESU
Snake River Fall-Run ESU

Steelhead (*Oncorhynchus mykiss*)
Lower Columbia River DPS
Middle Columbia River DPS
Upper Columbia River DPS
Snake River DPS

Coho Salmon (*Oncorhynchus kisutch*
Lower Columbia River ESU

Sockeye Salmon (*Oncorhynchus nerka*)
Snake River ESU

Chum Salmon (*Oncorhynchus keta)*
Columbia River ESU

Eulachon (*Thaleichthys pacificus*)
Southern DPS

Green Sturgeon (*Acipenser medirostris*)
Southern DPS

Bull Trout (*Salvelinus confluentus*)
Columbia River IRU

Prepared for

Jeremy Ness
Georgia-Pacific Consumer Products (Camas) LLC
401 NE Adams Street
Camas, WA 98607

Prepared by

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PHS #6201

September 11, 2017

TABLE OF CONTENTS

TABLE OF CONTENTS

Tables

Appendices

1.0 INTRODUCTION

This Biological Evaluation (BE) addresses the potential effects of the proposed Georgia-Pacific Consumer Products (Camas) LLC Maintenance Dredging Project (the project) on fish and wildlife species listed as threatened or endangered under the federal Endangered Species Act (ESA). This document also addresses the potential effects of the proposed project on designated or proposed Critical Habitat and on Essential Fish Habitat (EFH) as designated under the Magnuson-Stevens Fishery Conservation Act (MSA). The proposed project will require a U.S. Army Corp of Engineers (Corps) permit under Section 10 of the Rivers and Harbors Act, thus providing the federal nexus.

This BE was prepared pursuant to Section 7(c) of the ESA by Pacific Habitat Services, Inc. (PHS) for the Corps on behalf of Georgia-Pacific Consumer Products (Camas) LLC (GP), to facilitate the Corps' compliance with Section 7(a)(2) of the ESA, as amended. Section 7(a)(2) ensures that through consultation (or conferencing for proposed species) with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), federal actions do not jeopardize the continued existence of any threatened, endangered or proposed species, or result in the destruction or adverse modification of designated or proposed Critical Habitat.

1.1 Project Background

GP owns and operates a paper mill (Camas Mill (Mill)) located along the northern shoreline of the Camas Slough (a branch of the lower Columbia River) near river mile (RM) 120 in Camas, Washington (see Figure 1, Appendix A). The Mill is a 661-acre pulp and paper manufacturing complex established in 1883 as the Columbia River Paper Company. The project site is in the Camas Slough, which runs along the south end of the Mill. Lady Island separates the Camas Slough from the mainstem of the Columbia River and is situated directly south of the slough and covers some 476 acres. The island is only partially developed, but hosts a wastewater treatment system, a dredged materials landfill, and a limited purpose landfill which are all part of the Mill's operation. The Washougal River drains to the Camas Slough near the eastern end of the project site. The Camas Slough accumulates sediment from both the Washougal and Columbia Rivers.

GP utilizes the Camas Slough for access and operations, including navigation for staging and transport of materials to and from the Mill and as a water source for the Mill's operations and fire suppression system. The accumulation of sediment necessitates periodic dredging to maintain tug and barge access and ensure the functionality of the Mill's water intake structures. GP is seeking to renew their maintenance dredging permit (Section 10 permit #NWS-2003-1135-CRS). The dredge areas are shown on Plan Sheets 1 through 9 (Appendix A). The Corps must prepare a new Biological Evaluation to provide an updated analysis of GP's on-going maintenance dredging activities in the Camas Slough on ESA-listed species, critical habitats, and EFH.

1.2 Species and Critical Habitat

Activities associated with the proposed project will occur below the ordinary high water (OHW) of the Camas Slough. As such, the project has the potential to affect the federally-listed fish species shown in Table 1. Each of these listed species may occur within the vicinity of the proposed project at various times of the year. In addition, proposed project activities have the potential to affect designated Critical Habitats for ESA-listed fish species and Pacific Salmon EFH. Further discussion of the natural history and potential occurrence of ESA-listed species within the project area is provided below in Section 4.0.

Table 1. ESA-listed species included in this consultation*.

Species	Population	ESA Listing Status**	Listing Status	Critical Habitat Designation
Chinook salmon *Oncorhynchus tshawytscha*	Lower Columbia River	T	June 28, 2005 (70 FR 37160)	September 2, 2005 (70 FR 52630)
	Upper Columbia River Spring-Run	E	June 28, 2005 (70 FR 37160)	September 2, 2005 (70 FR 52630)
	Snake River Spring/ Summer-Run	T	June 28, 2005 (70 FR 37160)	October 25, 1999 (64 FR 57399)
	Snake River Fall-Run	T	June 28, 2005 (70 FR 37160)	December 28 1993 (58 FR 68543)
Coho salmon *O. kisutch*	Lower Columbia River	T	June 28, 2005 (70 FR 37160)	March 24, 2016 (81 FR 9252)
Sockeye salmon *O. nerka*	Snake River	E	June 28, 2005 (70 FR 37160)	December 28 1993 (58 FR 68543)
Chum salmon *O. keta*	Columbia River	T	June 28, 2005 (70 FR 37160)	September 2, 2005 (70 FR 52630)
Steelhead *O. mykiss*	Lower Columbia River	T	January 5, 2006 (71 FR 834)	September 2, 2005 (70 FR 52630)
	Middle Columbia River	T	January 5, 2006 (71 FR 834)	September 2, 2005 (70 FR 52630)
	Upper Columbia River	T	January 5, 2006 (71 FR 834)	September 2, 2005 (70 FR 52630)
	Snake River Basin	T	January 5, 2006 (71 FR 834)	September 2, 2005 (70 FR 52630)
Eulachon (smelt) *Thaleichthys pacificus*	Southern DPS	T	March 18, 2010 (75 FR 13012)	October 20, 2011 (76 FR 65324)
Green sturgeon *Acipenser medirostris*	Southern DPS	T	April 7, 2006 (71 FR 17757)	October 9, 2009 (74 FR 52300)
Bull trout *Salvelinus confluentus*	Columbia River Interim Recovery Unit (IRU)	T	June 10, 1998 (63 FR 31647)	October 18, 2010 (75 FR 63898)

*Sources: NMFS 2017; StreamNet 2017; USFWS 2017
**E = Endangered; T = Threatened

2.0 EVALUATION METHODS

Factors considered in evaluating potential project impacts on these species, include the species' dependence on specific habitat components that will be removed or modified, the abundance and distribution of habitat components in the project vicinity, the distribution and population levels of the species (if known), the possibility of direct effects, the degree of effects to habitat, and the potential to mitigate the adverse effects. These factors are relevant both for the survival of individuals of the species and populations, and recovery prospects for the species.

The method of analysis used in this BE is to determine the environmental baseline for the action area, discuss how the proposed actions will affect the environmental baseline, and then use that information to arrive at a determination of effect. For analysis of potential project impacts to salmon and steelhead species, this BE utilizes methods outlined in *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996). These methods were also used to analyze project effects on bull trout given the similarities to the USFWS methods for determinations of effect to bull trout, as outlined in *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (USFWS 1998).

The information presented in this BE is based on a review of existing database information, existing information from GP, and discussions with the project design team and resource agency staff. Research on species presence within and near the project areas was conducted through a review of species lists and database information from the NMFS West Coast Region website (NMFS 2017), USFWS website (USFWS 2017), and StreamNet (2017).

Early coordination and pre-consultation with the Corps, NMFS, and the Washington Department of Fish and Wildlife (WDFW) was conducted during a series of phone conversations and electronic mailings.

3.0 PROJECT DESCRIPTION

3.1 Proposed Actions and Sequencing

As discussed above, the proposed project will dredge within the Camas Slough to maintain tug and barge access and ensure the functionality of the Mill's water intake structures. The footprint of the entire proposed dredging area is approximately 23.6 acres, divided into four dredged material management units (DMMUs) (Plan Sheet 1 of 9, Appendix A). The project will dredge up to 20,000 cubic yards of material annually for a period of 5 years following the project's approval. Material will be excavated by clamshell dredge and placed on a barge. The dredged material will be placed at a pre-existing disposal facility on Lady Island, which is adjacent to the dredge sites. The barge will be moored at the north shore of the landfill and the material will be moved with the clamshell crane. As materials are laid on the working face of the fill, the extraneous materials (such as metal bands, cables, trash, etc.) will be removed and the residual will be spread across the top of the pile in an even lift. This landfill has been approved by the U.S. Army Corps of Engineers (Permit No: NWS-2003-1135-CRS) and Clark County Public Health (Permit No: PT0006096).

All work conducted below the OHW of the Camas Slough will occur between November 1 and January 31, a period when juvenile salmonids are least likely to occur within the project area. The project team confirmed that this work window is acceptable with James Carsner (NMFS) and Chuck Stambaugh-Bowey (WDFW). The following general sequence of proposed project activities will occur each year dredging is necessary:

1) Conduct overall project mobilization and implement erosion control measures (i.e. straw bales on barge).

2) Dredge DMMU areas with a clamshell bucket operating from a floating barge.

3) Dredge material will partially dewatered on the barge in transit to Lady Island. Straw bales will be utilized to prevent sediment from entering the water column.

4) Transport dredge material from the barge to the disposal site on Lady Island for upland, confined disposal and final dewatering.

5) Re-seed disturbed upland areas if necessary.

3.2 Conservation Measures

Appropriate conservation measures have been incorporated into the proposed project design to minimize and avoid adverse effects to ESA-listed species, their designated Critical Habitat elements, and EFH. These measures will include the following:

In-water Work Period

- All work conducted below the OHW of the Camas Slough will occur during November 1 and January 31, a period when ESA-listed fish species are least likely to occur within the project area.

Heavy Equipment

- All heavy equipment will access the project site via existing roadway, parking area, disturbed upland area, or floating barge; therefore avoiding additional upland disturbance.
- Heavy equipment will be selected and operated as necessary to minimize adverse effects on the environment; and will be used as follows:
    - Inspected daily for fluid leaks before leaving the staging area.
    - Stationary equipment operated within 150 feet of any waterbody will be maintained and protected as necessary to prevent leaks and spills from entering the water.

Dredging

- When dredge operations commence, the contractor will utilize a slow drop of the clamshell to give species a chance to react and avoid the injury and a slow removal to minimize spillage and the chance of burial.
- All dredged sediment will be deposited at the Lady Island disposal facility. The disposal facility has been approved by the Corps (Permit No: NWS-2003-1135-CRS) and Clark County Public Health (Permit No: PT0006096).
- Proposed dredging will not alter the character, scope, size, or location of the project area.
- Straw bales on the work barge will prevent sediment from entering the water column as the dredge material partially dewaters in transit to Lady Island.

Pollution Control

- A Pollution Control Plan (PCP) will be prepared by the Contractor and carried out commensurate with the scope of the project that includes the following:
    - Best management practices to confine, remove, and dispose of construction waste.
    - Procedures to contain and control a spill of any hazardous material.
    - Practices to prevent construction debris from dropping into any waterbody.
    - Steps to cease work under high flow conditions, except for efforts to avoid or minimize resource damage.
- All conditions of Washington Department of Ecology's (WDOE) 401 Water Quality Certification will be followed.

3.3 Action Area

For the purposes of this analysis, the project action area includes all areas directly or indirectly affected by the proposed project (Figure 1). The action area is not limited to the footprint of the proposed project, but also includes all staging and access areas, as well as other areas that could experience temporary effects relative to water quality. As such, the action area includes the individual dredge site locations; upland disposal location; areas of Camas Slough between the dredge sites and the disposal location; and the dredge barge when it is operating in the project area and when it is dewatering dredge spoil material. The action area also extends approximately 500 feet upstream and 500 feet downstream to capture any potential hydraulic changes or water quality (mixing zone). Given the relative size of the river channel, substrate, de-watering BMPs and other environmental controls, and timing of in-water work, it is reasonably certain that this distance is far enough to account for any temporary effects on water quality.

4.0 NATURAL HISTORY AND SPECIES OCCURRENCE

4.1 Lower Columbia River Chinook Salmon

Chinook salmon of the Lower Columbia River (LCR) ESU were originally listed as threatened on March 24, 1999 (64 FR 14308) and were reaffirmed on June 28, 2005 (70 FR 37160). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. The LCR Chinook salmon ESU includes all naturally spawned populations of Chinook salmon from the Columbia River and its tributaries, upstream to a transitional point between Washington and Oregon east of the Hood River and White Salmon River. The LCR Chinook salmon ESU also includes the Willamette River to Willamette Falls, exclusive of spring-run Chinook salmon in the Clackamas River, as well as 17 artificial propagation programs (70 FR 37160).

Critical Habitat for the LCR Chinook salmon ESU was designated on September 2, 2005 (70 FR 52630) and became effective on January 2, 2006; it includes the Camas Slough within the action area. Primary constituent elements (PCEs) associated with LCR Chinook salmon within the action area include freshwater migration corridors (70 FR 52630). The physical and biological features identified by NMFS as essential for LCR Chinook salmon migration include water quality and quantity, natural cover, and corridors free of artificial obstructions (70 FR 52630).

LCR Chinook salmon utilize the Camas Slough and lower Washougal River within the vicinity of the action area primarily as a migratory route between upstream spawning areas and the Pacific Ocean (StreamNet 2017). Adult LCR Chinook salmon typically begin their spring migration into the lower Columbia River in March, with fall runs continuing through October (see Table 2). Juvenile LCR Chinook salmon may be found rearing in the lower Columbia River throughout the year, with peak emigration occurring between March and August (NMFS 2011). As such, given the proposed timing of in-water work (November 1 through January 31), it is possible that adult and/or juvenile LCR Chinook salmon may be present within the action area during proposed in-water activities.

For additional information on the general habitat requirements, life history, and limiting factors for recovery of the LCR Chinook salmon ESU see the Federal Register Notice published on June 28, 2005 (70 FR 37160).

Table 2. Presence of ESA-listed fish species in the lower Columbia River (NMFS 2011).

Species	Life Stage	peak occurrence / abundant / present — Calendar Year											
		J	F	M	A	M	J	J	A	S	O	N	D
LCR Chinook salmon	Adult migration/holding												
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing												
	Juvenile emigration												
UCR Spring-run Chinook salmon	Adult migration/holding												
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing												
	Juvenile emigration												
SR Spring/ Summer-run Chinook salmon	Adult migration/holding												
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing												
	Juvenile emigration												
SR Fall-run Chinook salmon	Adult migration/holding												
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing												
	Juvenile emigration												

Species	Life Stage	peak occurrence / abundant / present — Calendar Year											
		J	F	M	A	M	J	J	A	S	O	N	D
LCR Coho salmon	Adult migration/holding	■	■				▒	▒	▒	▒	■	■	■
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
	Juvenile emigration			▒	■	■	■	■	▒				
SR Sockeye salmon	Adult migration/holding				▒	■	■	▒					
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing												
	Juvenile emigration			▒	▒	■	■	▒					
CR Chum salmon	Adult migration/holding									■	■	■	■
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing	▒	▒	▒	▒	▒							
	Juvenile emigration		▒	▒	■	▒							
LCR Steelhead	Adult migration/holding				■	■	■						
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
	Juvenile emigration				■	■	■	▒					
MCR Steelhead	Adult migration/holding				■	■	■						
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing												
	Juvenile emigration				■	■	■	▒					
UCR Steelhead	Adult migration/holding				▒	■	■	▒					
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing												
	Juvenile emigration				■	■	■	▒					

Species	Life Stage	peak occurrence	abundant	present									
		Calendar Year											
		J	F	M	A	M	J	J	A	S	O	N	D
SRB Steelhead	Adult migration/holding												
	Adult spawning												
	Eggs and pre-emergence												
	Juvenile rearing												
	Juvenile emigration												
Eulachon	Adult migration/holding												
	Adult spawning												
	Eggs incubation												
	Larvae emigration												
Green sturgeon	Juvenile rearing												

4.2 Upper Columbia River Spring-Run Chinook Salmon

Chinook salmon of the Upper Columbia River (UCR) Spring-Run ESU were originally listed as endangered on March 24, 1999 (64 FR 14308) and reaffirmed as endangered on June 28, 2005 (70 FR 37160). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. The UCR Spring-Run Chinook salmon ESU includes all naturally spawned populations of spring Chinook salmon in all river reaches accessible to spring Chinook salmon in Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington, as well as six artificial propagation programs (70 FR 37160).

Critical Habitat for the UCR Spring-Run Chinook salmon ESU was designated on September 2, 2005, and became effective on January 2, 2006; it includes the lower Columbia River south of Lady Island (70 FR 52630). PCEs associated with UCR Spring-Run Chinook salmon Critical Habitat south of the action area include freshwater migration corridors. The physical and biological features identified by NMFS as essential for UCR Spring-Run Chinook salmon migration include water quality and quantity, natural cover, and corridors free of artificial obstructions (70 FR 52630).

UCR Spring-Run Chinook salmon migrate through the lower Columbia River as adults and juveniles, but do not utilize the mainstem of the lower Columbia for spawning or rearing (StreamNet 2017; NMFS 2011). Adult UCR Chinook salmon typically migrate through the lower Columbia River in May and June (Table 2). Juvenile emigration peaks between March and August, with some late emigration into November (NMFS 2011). Given the proposed timing of in-water work (November 1 through January 31), and location of the action area (Camas Slough) relative to the primary migration corridor through lower Columbia River, it is likely that adult and/or juvenile UCR Chinook salmon will not be present within the action area during proposed in-water activities.

For additional information on the general habitat requirements, life history, and limiting factors for recovery of the UCR Chinook salmon ESU see the Federal Register Notice published on June 28, 2005 (70 FR 37160).

4.3 Snake River Spring/Summer-Run Chinook Salmon

Chinook salmon of the Snake River (SR) Spring/Summer-Run ESU were originally listed as threatened on April 22, 1992 (57 FR 14653) and were reaffirmed as threatened on June 28, 2005 (70 FR 37160). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. The SR Spring/Summer-Run Chinook salmon ESU includes all naturally spawned populations of spring/summer-run Chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins, as well as fifteen artificial propagation programs (57 FR 14653).

Critical Habitat for the SR Chinook salmon ESU was designated on December 28, 1993 (58 FR 68543) and revised on October 25, 1999 (64 FR 57399); it includes the mainstem of the lower Columbia River south of Lady Island. The PCEs associated with SR Spring/Summer-Run Chinook salmon Critical Habitat south of the action area include juvenile and adult migration corridors. The physical and biological features identified by NMFS as essential for juvenile and adult SR Spring/Summer-Run Chinook salmon migration include substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space and safe passage (58 FR 68543).

SR Spring/Summer-Run Chinook salmon migrate through the lower Columbia River as adults and juveniles, but do not appear to utilize the lower Columbia for spawning or rearing (StreamNet 2017; NMFS 2011). Adult and juvenile SR Spring/Summer-Run Chinook salmon typically migrate through the lower Columbia River between March and September (Table 2). Given the proposed timing of in-water work (November 1 through January 31), and location of the action area (Camas Slough) relative to the primary migration corridor through lower Columbia River, it is likely that adult and/or juvenile SR Spring/Summer-Run Chinook salmon will not be present within the action area during proposed in-water activities.

For additional information on the general habitat requirements, life history, and limiting factors for recovery of the SR Spring/Summer-Run Chinook salmon ESU see the Federal Register Notice published on June 28, 2005 (70 FR 37160).

4.4 Snake River Fall-Run Chinook Salmon

Chinook salmon of the SR Fall-Run ESU were originally listed as threatened on April 22, 1992 (57 FR 14653) and were reaffirmed as threatened on June 28, 2005 (70 FR 37160). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. The SR Fall-Run Chinook salmon ESU includes all naturally spawned populations of fall-run Chinook salmon in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River subbasin, as well as four artificial propagation programs (70 FR 37160).

Critical Habitat for the SR Fall-Run Chinook salmon ESU was designated on December 28, 1993 (58 FR 68543); it includes the mainstem of the lower Columbia River south of Lady Island. The PCEs associated with SR Fall-Run Chinook salmon Critical Habitat south of the action area include juvenile and adult migration corridors. The physical and biological features identified by NMFS as essential for juvenile and adult SR Fall-Run Chinook salmon migration include substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space and safe passage (58 FR 68543).

Adult SR Chinook salmon typically begin their migration into the Columbia River in March, and continue through September (Table 2). Juvenile SR Chinook salmon can be found rearing in the lower Columbia River throughout the year, with peak emigration occurring between March and August (NMFS 2011). Given the location of the action area (Camas Slough) relative to the primary migration corridor through lower Columbia River, it is likely that adult and/or juvenile SR Fall-Run Chinook salmon will not be present within the action area during proposed in-water activities.

For additional information on the general habitat requirements, life history, and limiting factors for recovery of the SR Fall-Run ESU see the Federal Register Notice published on June 28, 2005 (70 FR 37160).

4.5 Lower Columbia River Coho Salmon

Coho salmon of the LCR ESU were listed as threatened on June 28, 2005 (70 FR 37160) and reaffirmed as threatened on August 15, 2011 (76 FR 50448). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. Originally part of the larger Lower Columbia River/Southwest Washington ESU, the LCR ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia River up to and including the Big White Salmon and Hood Rivers, and includes the Willamette River to Willamette Falls, as well as 25 artificial propagation programs (70 FR 37160).

Critical Habitat for the LCR coho salmon ESU was designated on March 25, 2016 (81 FR 9251); it includes the Camas Slough within the action area. PCEs associated with LCR coho salmon Critical Habitat within the action area include juvenile and adult migration corridors. The physical and biological features identified by NMFS as essential for juvenile and adult LCR coho salmon migration include water quality and quantity, floodplain connectivity, natural cover/shelter, food, and safe passage (81 FR 9251).

LCR coho salmon utilize the Camas Slough and lower Washougal River within the vicinity of the action area primarily as a migratory route between upstream spawning areas and the Pacific Ocean (StreamNet 2017). Adult LCR coho salmon typically begin their migration into the lower Columbia River in June, and continue through February (see Table 2). Juvenile LCR coho salmon can be found rearing in the lower Columbia River throughout the year, with peak emigration occurring between April and July (NMFS 2011). As such, given the proposed timing of in-water work (November 1 through January 31), it is possible that adult and/or juvenile LCR coho salmon may be present within the action area during proposed in-water activities.

For additional information on the general habitat requirements, life history, and limiting factors for recovery of the LCR coho salmon ESU see the Federal Register published on June 28, 2005 (70 FR 37160).

4.6 Snake River Sockeye Salmon

Sockeye salmon of the SR ESU were originally listed as endangered on November 20, 1991 (56 FR 58619) and reaffirmed as endangered on June 28, 2005 (70 FR 37160). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. The SR sockeye salmon ESU includes all anadromous and residual sockeye salmon from the Snake River Basin, Idaho, as well as artificially propagated sockeye salmon from the Redfish Lake captive propagation program (70 FR 37160).

Critical Habitat for the SR sockeye salmon ESU was designated on December 28, 1993 (58 FR 68543); it includes the mainstem of the lower Columbia River south of Lady Island. The PCEs associated with SR sockeye salmon Critical Habitat south of the action area include juvenile and adult migration corridors. The physical and biological features identified by NMFS as essential for juvenile and adult SR sockeye salmon migration include substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space and safe passage (58 FR 68543).

SR sockeye salmon migrate through the lower Columbia River as adults and juveniles, but do not appear to utilize the lower Columbia for spawning or rearing (StreamNet 2017; NMFS 2011). Adult and juvenile SR sockeye salmon typically migrate through the lower Columbia River between March and July (Table 2). Given the proposed timing of in-water work (November 1 through January 31), and location of the action area (Camas Slough) relative to the primary migration corridor through lower Columbia River, it is likely that adult and/or juvenile SR sockeye salmon will not be present within the action area during proposed in-water activities.

For additional information on the general habitat requirements, life history, and limiting factors for recovery of the SR sockeye salmon ESU see the Federal Register Notice published on June 28, 2005 (70 FR 37160).

4.7 Columbia River Chum Salmon

Chum salmon of the Columbia River (CR) ESU were originally listed as threatened on March 25, 1999 (64 FR 14508) and reaffirmed as threatened on June 28, 2005 (70 FR 37160). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. The CR chum salmon ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, as well as three artificial propagation programs: the Chinook River (Sea Resources Hatchery), Grays River, and Washougal River/Duncan Creek chum salmon hatchery programs.

Critical Habitat for the CR chum salmon ESU was designated on September 2, 2005 (70 FR 52630) and became effective on January 2, 2006; it includes the Camas Slough and lower Washougal River within the vicinity of the action area. PCEs associated with CR chum salmon within the action area include freshwater migration corridors (70 FR 52630). The physical and biological features identified by NMFS as essential for CR chum salmon migration include natural cover, water quality and quantity, and corridors free of artificial obstructions (70 FR 52630).

CR chum salmon utilize the Camas Slough and lower Washougal River within the vicinity of the action area primarily as a migratory route between upstream spawning areas and the Pacific Ocean (StreamNet 2017). Adult CR chum salmon typically begin their migration into the lower Columbia River in September, and continue through December (Table 2). Juvenile CR chum salmon can typically be found rearing in the lower Columbia River between January and May, with peak emigration occurring in April (NMFS 2011). As such, given the proposed timing of in-water work (November 1 through January 31), it is possible that adult LCR coho salmon may be present within the action area during proposed in-water activities. It is likely that juvenile CR chum salmon will not be present within the action area during proposed in-water activities.

For additional information on the general habitat requirements, life history, and limiting factors for recovery of the Columbia River chum salmon ESU see the Federal Register Notice published on June 28, 2005 (70 FR 37160).

4.8 Lower Columbia River Steelhead

The LCR steelhead Distinct Population Segment (DPS) was originally listed as threatened on March 19, 1998 (63 FR 13347) and reaffirmed on January 5, 2006 (71 FR 834). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive), as well as 10 artificial propagation programs. Excluded are steelhead populations in the upper Willamette River Basin above Willamette Falls, and from the Little and Big White Salmon Rivers, Washington (71 FR 834).

Critical Habitat for the LCR steelhead DPS was designated on September 2, 2005 (70 FR 52630) and became effective on January 2, 2006; it includes the Camas Slough and lower Washougal River within the vicinity of the action area. PCEs associated with LCR steelhead within the action area include freshwater migration corridors (70 FR 52630). The physical and biological features identified by NMFS as essential for LCR steelhead migration include natural cover, water quality and quantity, and corridors free of artificial obstructions (70 FR 52630).

LCR steelhead utilize the Camas Slough and lower Washougal River within the vicinity of the action area primarily as a migratory route between upstream spawning areas and the Pacific Ocean (StreamNet 2017). Adult LCR steelhead typically begin their spring migration into the Columbia River in April, and continue through June (Table 2). Juvenile LCR steelhead can be

found rearing in the lower Columbia River throughout the year, with peak emigration occurring between April and June (NMFS 2011). As such, given the proposed timing of in-water work (November 1 through January 31), it is possible that juvenile LCR steelhead may be present within the action area during proposed in-water activities. It is likely that adult LCR steelhead will not be present within the action area during proposed in-water activities.

For additional information on the habitat requirements, life history, and limiting factors for recovery of the LCR steelhead DPS see the Federal Register published on January 5, 2006 (71 FR 834).

4.9 Middle Columbia River Steelhead

The Middle Columbia River (MCR) steelhead Distinct Population Segment (DPS) was originally listed as threatened on March 25, 1999 (64 FR 14517), and reaffirmed on January 5, 2006 (71 FR 834). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. This DPS includes all naturally spawned anadromous steelhead populations below natural manmade impassable barriers in streams from above the Wind River in Washington, and the Hood River in Oregon, upstream to, and including, the Yakima River. The MCR steelhead DPS excludes steelhead from the Snake River Basin, as well as seven artificial propagation programs.

Critical Habitat for the MCR steelhead DPS was designated on September 2, 2005 (70 FR 52630) and became effective on January 2, 2006; it includes the mainstem of the lower Columbia River south of Lady Island. The PCEs associated with MCR steelhead Critical Habitat south of the action area include freshwater migration corridors. The physical and biological features identified by NMFS as essential for MCR steelhead migration include water quality and quantity, natural cover, and corridors free of artificial obstructions (70 FR 52630).

MCR steelhead migrate through the lower Columbia River as adults and juveniles, but do not appear to utilize the lower Columbia for spawning or rearing (StreamNet 2017; NMFS 2011). Adult and juvenile MCR steelhead typically migrate through the lower Columbia River between April and July, with some potential for juvenile presence into October (Table 2). Given the proposed timing of in-water work (November 1 through January 31), and location of the action area (Camas Slough) relative to the primary migration corridor through lower Columbia River, it is likely that adult and/or juvenile MCR steelhead will not be present within the action area during proposed in-water activities.

For additional information on the habitat requirement, life history, and limiting factors for recovery of the MCR steelhead DPS see the Federal Register Notice published on January 5, 2006 (71 FR 834).

4.10 Upper Columbia River Steelhead

The UCR steelhead DPS was originally listed as endangered on August 18, 1997 (62 FR 43937) and was downgraded to threatened on January 5, 2006 (71 FR 834). The threatened status was then reinstated to endangered per a U.S. District Court decision in June 2007, and was then again downgraded to threatened per a U.S. District Court order on June 18, 2009 (72 FR 42605).

The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. This DPS includes all naturally spawned anadromous steelhead populations below natural and man-made impassable barriers in streams in the Columbia River Basin upstream from the Yakima River to the U.S. - Canada border, as well as six artificial propagation programs.

Critical Habitat for the UCR steelhead DPS was designated on September 2, 2005 (70 FR 52630) and became effective on January 2, 2006; it includes the mainstem of the lower Columbia River south of Lady Island. The PCEs associated with UCR steelhead Critical Habitat south of the action area include freshwater migration corridors. The physical and biological features identified by NMFS as essential for UCR steelhead migration include water quality and quantity, natural cover, and corridors free of artificial obstructions (70 FR 52630).

UCR steelhead migrate through the lower Columbia River as adults and juveniles, but do not appear to utilize the lower Columbia for spawning or rearing (StreamNet 2017; NMFS 2011). Adult and juvenile UCR steelhead typically migrate through the lower Columbia River between April and July, with some potential for juvenile presence into October (Table 2). Given the proposed timing of in-water work (November 1 through January 31), and location of the action area (Camas Slough) relative to the primary migration corridor through lower Columbia River, it is likely that adult and/or juvenile UCR steelhead will not be present within the action area during proposed in-water activities.

For additional information on the habitat requirement, life history, and limiting factors for recovery of the UCR steelhead DPS see the Federal Register Notice published on January 5, 2006 (71 FR 834).

4.11 Snake River Basin Steelhead

The Snake River Basin (SRB) steelhead DPS was originally listed as a threatened species on August 18, 1997 (62 FR 43937) and was reaffirmed on January 5, 2006 (71 FR 834). The code of federal regulations for species under the jurisdiction of the NMFS was revised on April 14, 2014 (79 FR 20802), though the listing status of the species did not change. This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the SRB of southeast Washington, northeast Oregon, and Idaho, as well as six artificial propagation programs.

Critical Habitat for the SRB steelhead DPS was designated on September 2, 2005 (70 FR 52630) and became effective on January 2, 2006; it includes the mainstem of the lower Columbia River south of Lady Island. The PCEs associated with SRB steelhead Critical Habitat south of the action area include freshwater migration corridors. The physical and biological features identified by NMFS as essential for SRB steelhead migration include water quality and quantity, natural cover, and corridors free of artificial obstructions (70 FR 52630).

SRB steelhead migrate through the lower Columbia River as adults and juveniles, but do not appear to utilize the lower Columbia for spawning or rearing (StreamNet 2017; NMFS 2011). Adult and juvenile SRB steelhead typically migrate through the lower Columbia River between April and July, with some potential for juvenile presence into October (Table 2). Given the

proposed timing of in-water (November 1 through January 31), and location of the action area (Camas Slough) relative to the primary migration corridor through lower Columbia River, it is likely that adult and/or juvenile SRB steelhead will not be present within the action area during proposed in-water activities.

For additional information on the habitat requirement, life history, and limiting factors for recovery of the SRB steelhead DPS see the Federal Register Notice published on January 5, 2006 (71 FR 834).

4.12 Southern Eulachon

The Southern DPS of eulachon (Pacific smelt) was listed as threatened on March 18, 2010 (75 FR 13012). Eulachon of the Southern DPS are endemic to the northwest Pacific Ocean ranging south of the U.S./Canada border, with most production originating in the Columbia River basin. The most consistent spawning runs return to the main stem of the Columbia River (from just upstream of the estuary to immediately downstream of Bonneville Dam) and in the Cowlitz River (74 FR 10857). Spawning also occurs in the Grays, Skamokawa, Elochoman, Kalama, Lewis, and Sandy Rivers (tributaries of the Columbia River) (74 FR 10857).

Critical Habitat for the Southern DPS of eulachon was designated on October 20, 2011, and includes the lower Columbia River (76 FR 65324). In determining Critical Habitat, the physical or biological features identified by NMFS as essential for eulachon migration and spawning within the Columbia River include unobstructed migratory pathways, spring freshet flow regime, pollutant free waters, relatively low water temperatures (generally below 10° Celsius during spawning), suitable spawning substrates (pea gravel and coarse sand are preferred), and abundant prey items (copepod larvae) (76 FR 65324).

Eulachon likely utilize the Camas Slough and lower Washougal River within the vicinity of the action area primarily as a migratory route between upstream spawning areas and the Pacific Ocean. Nearly all known eulachon spawning occurs in the Cowlitz, Grays, Elochoman, Kalama, and Lewis Rivers downstream of the action area. Also, most eulachon spawning locations in the mainstem Columbia River are downstream of River Mile 91 and survey efforts have been limited to those areas (ODFW, 2002; ODFW and WDFW, 2014). However, eulachon eggs and/or larvae were reportedly found up to 6 miles upstream on the Washougal River in 2011-2012 (Cowlitz Indian Tribe 2014).

Eulachon spawn from November to April in the Columbia River (Gustafson et al. 2016), with peak adult abundance in the action area from March through April and peak larval abundance from April through May (NMFS WCR-2016-4812). Given the proposed timing of in-water work (November 1 through January 31), it is likely that adult and/or juvenile eulachon will not be present within the action area during proposed in-water activities.

For additional information on the general habitat requirement, life history, and limiting factors for recovery of the Southern eulachon DPS see the Federal Register Notice published on March 18, 2010 (75 FR 13012) and October 20, 2011 (76 FR 65324). NMFS is currently in the process of evaluating protective regulations for the Southern DPS of eulachon pursuant to Section 4(d) of the ESA. As such, a "take" prohibition for Southern eulachon has not yet been issued.

4.13 Southern Green Sturgeon

The Southern green sturgeon DPS was listed as threatened on April 7, 2006 (71 FR 17757). The Southern DPS includes all naturally spawned populations originating from coastal watersheds south of the Eel River in California, with the only known spawning population in the Sacramento River. The distribution of Southern green sturgeon outside of natal water generally overlaps with that of the Northern green sturgeon DPS (71 FR 17757). Both the Northern and Southern green sturgeon DPS's occupy coastal estuaries and coastal marine waters from southern California to Alaska, including the Lower Columbia River estuary and main stem Columbia River. Green sturgeon observed outside of natal rivers may belong to either DPS (71 FR 17757). The Northern DPS is not ESA-listed.

Critical Habitat for the Southern green sturgeon DPS was designated on October 9, 2009, and occurs approximately 70 miles downstream of the project action area in the lower Columbia River estuary (74 FR 52300). The PCEs associated with Southern green sturgeon Critical Habitat below the action area include freshwater riverine systems and estuarine areas. The physical and biological features identified by NMFS as essential for Southern green sturgeon include available food resources, migratory corridors, sediment quality, substrate type, water depth, water flow, and water quality (74 FR 52300).

Southern green sturgeon occur in the lower Columbia River from June through October, however, they mainly concentrate in the lower reaches of the estuary below river mile 37 (NMFS 2009; NMFS 2011). Given the location of the action area (Camas Slough) relative to the lower Columbia River estuary (approximately 75 miles downstream), it is likely that adult and/or juvenile Southern green sturgeon will not be present within the action area during proposed in-water activities.

For additional information on the general habitat requirement, life history, and limiting factors for recovery of the Southern green sturgeon DPS see the Federal Register Notice published on April 7, 2006 (71 FR 17757).

4.14 Bull Trout

Bull trout were first listed as threatened under the ESA on June 10, 1998 (63 FR 31647). This original listing included the Columbia River and Klamath River DPS's. The USFWS later added the Jarbridge River, Coastal-Puget Sound, and St. Mary-Belly River DPS's to the listing. A final ruling was issued on November 1, 1999, that assigned threatened status to all populations of bull trout within the coterminous United States (64 FR 58910/58933). This final ruling consolidated the previous DPSs into a single DPS coterminous listing. The USFWS considers bull trout threatened because of habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, impoundments, dams, water diversions, and the introduction of non-native species (63 FR 31647).

A majority of Columbia River bull trout occur in isolated, fragmented habitats that support low numbers of fish and are inaccessible to migratory bull trout (63 FR 31647). The Recovery Plan for the Coterminous U.S. Population of Bull Trout (USFWS 2015a) identifies six recovery units for bull trout. The project area is within the Coastal Recovery Unit, which includes the Olympic

Peninsula, Puget Sound, and Lower Columbia River major geographic regions in western Washington and Oregon. Although the project area is not within a bull trout core area (i.e. does not have a combination of core habitat and a core population), the mainstem Columbia River is considered an important foraging, migration, and overwintering area for the species (USFWS 2015b).

Critical Habitat for bull trout was originally designated on October 6, 2004 (69 FR 59996), and was revised on October 18, 2010 (75 FR 63898). In total, the USFWS designated approximately 19,729 miles of streams and 488,252 acres of lakes and reservoirs in Idaho, Oregon, Washington, Montana, and Nevada, and 754 miles of marine shoreline (75 FR 63898). The PCEs identified by USFWS as essential for conservation of Columbia River bull trout within Critical Habitat include springs, seeps, groundwater sources, migratory habitats, abundant food base, complex aquatic environments, water temperature, substrates, natural hydrograph, permanent water quality and quantity, and non-native predatory species presence (75 FR 63898).

Bull trout migrate through the lower Columbia River as adults and juveniles, but do not appear to utilize the lower Columbia or Washougal River for spawning or rearing (StreamNet 2017). In addition, the action area does not appear to support preferable habitat conditions for bull trout refugia (i.e natural overwater structures, favorable substrates, and cool water temperatures). As such, given the proposed timing of in-water work (November 1 through January 31), and location of the action area (Camas Slough) relative to the primary migration corridor through lower Columbia River, it is likely that adult and/or juvenile bull trout will not be present within the action area during proposed in-water activities.

For additional information on the habitat requirements, life history, and limiting factors for recovery of bull trout see the Federal Register published on June 10, 1998 (63 FR 31647) and the final recovery plan (USFWS 2015a).

5.0 ENVIRONMENTAL BASELINE

5.1 Lower Columbia River Basin

The Columbia River flows for more than 1,200 miles and is one of the largest rivers in North America. The river originates in British Columbia, Canada, and enters the U.S. in the northeastern corner of Washington State. From there it flows south towards the Snake River confluence, and then heads westward forming the Oregon-Washington border before flowing into the Pacific Ocean. The Columbia River basin drains an area of approximately 260,000 square miles, and is the most hydroelectrically developed river system in the world. More than 400 dams (11 run-of-the-river dams on the mainstem) and hundreds of major and modest structures on tributaries tap a large portion of the Columbia River's generating capacity (CCRH 2012).

In general, the quality and quantity of freshwater habitats in much of the Columbia River basin have declined dramatically in the last 150 years. Forestry, farming, grazing, road construction, hydrosystem development, mining, and urbanization have radically changed the historical conditions of the basin.

The lower Columbia River basin includes all tributaries and their watersheds that drain into the Columbia River from Bonneville Dam (river mile 146) to its confluence with the Pacific Ocean. Major tributaries of the lower Columbia River include the Clatskanie River, Cowlitz River, Grays River, Lewis River, Sandy River, Washougal River, Willamette River, and Youngs River. The lower 46 miles of the Columbia River is considered estuary (LCREP 1999). Within the lower estuary, the river has been channelized to facilitate development to the water's edge.

In general, the water quality throughout the lower Columbia River basin has been significantly affected by human activities such as dams and diversion structures, water withdrawals, farming and grazing, road construction, mining activities, and urbanization. Increased stream temperatures have occurred throughout the basin and have a significant effect on salmonid metabolism, growth rate, disease resistance, timing of adult migrations, fry emergence, and smoltification. In addition, excess nutrients, low levels of dissolved oxygen, heavy metals, and changes in pH have all directly affected the water quality for salmon, steelhead, and bull trout both as adults and juveniles as these fish migrate upstream and downstream between spawning grounds and rearing areas

5.2 Baseline Conditions of Pathways and Indicators

In *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996), NMFS defines a properly functioning condition (PFC) for salmonids as the sustained presence of natural habitat-forming processes that are necessary for the long-term survival and recovery of the species. This includes those essential physical features that support spawning, incubation, rearing, feeding, sheltering, migration, and other necessary behaviors. Such physical features generally include adequate stream flow, appropriate water temperature, loose gravel for spawning, unimpeded fish passage, deep pools, and abundant large tree trunks and root wads.

NMFS has developed an analytical framework for evaluating the baseline conditions of the "pathways and indicators" by which an action can have potential effects on those essential physical features that support anadromous salmonids and their habitats. This framework is referred to as the *Matrix of Pathways and Indicators* (NMFS 1996). The pathways and indicators for ESA-listed salmonid species addressed in this consultation were evaluated for the Camas Slough (Table 3).

Table 3. Baseline condition of Pathways and Indicators for ESA-listed salmonid species within Camas Slough.

PATHWAYS AND INDICATORS	ENVIRONMENTAL BASELINE
Water Quality	
Temperature	**Not Properly Functioning** – 303(d) listed for year-around temperature exceedance, TMDL needed (ODEQ 2017, WDOE 2016)
Sediment/Turbidity	**Not Properly Functioning** – >17% fines (URS 2007 and 2009)
Chemical Contamination/Nutrients	**Not Properly Functioning** – 303(d) listed for pH, DDE, dioxin, PCBs, PAHs, total dissolved gas and dissolved oxygen (ODEQ 2017, WDOE 2016).
Habitat Access	
Physical Barriers	**At Risk** – man made barriers present upstream.
Habitat Elements	
Substrate	**Not Properly Functioning** – sand and silt is dominant (URS 2007 and 2009)
Large Wood	**Not Properly Functioning** – does not meet standards and lacks potential wood recruitment.
Pool Frequency	**Not Properly Functioning** – does not meet standards and large woody debris recruitment is lacking.
Pool Quality	**Not Properly Functioning** – inadequate cover and temperature, and pool reduction by fine sediments.
Off-Channel Habitat	**Not Properly Functioning** – few backwaters and no off-channel ponds.
Refugia	**Not Properly Functioning** – lacks adequate refugia.
Channel Conditions and Dynamics	
Width/Depth Ratio	**Not Properly Functioning** – likely greater than 12
Streambank Condition	**At Risk** – likely 80-90% stable
Floodplain Connectivity	**Not Properly Functioning** – severe reduction in hydrologic connection between off-channel, wetland, floodplain, and riparian areas.

PATHWAYS AND INDICATORS	ENVIRONMENTAL BASELINE
Flow/Hydrology	
Peak/Base Flows	**Not Properly Functioning** – pronounced changes in peak flow relative to undisturbed watershed
Drainage Network Increase	**Not Properly Functioning** – significant increases in drainage network density due to roads
Watershed Conditions	
Road Density and Location	**Not Properly Functioning** – >3 miles/square mile
Disturbance History	**Not Properly Functioning** – greater than 15% equivalent clear-cut area, and disturbance concentrated in refugia and riparian areas
Riparian Reserves	**Not Properly Functioning** – riparian reserve system is fragmented and poorly connected

6.0 ANALYSIS OF EFFECTS

This section addresses direct, indirect, and interrelated/interdependent effects on ESA-listed species and their designated Critical Habitat elements that may result from proposed project actions given the conservation measures to be employed. In addition, this section describes anticipated cumulative effects from non-federal actions that may take place within or near the project action area. Factors considered in the analysis include: proximity of the action, distribution, timing and nature of the effect, duration, disturbance frequency, intensity, and severity. This effects analysis is based on the best scientific data available concerning the impact of the proposed project on ESA-listed species and their designated Critical Habitat elements.

6.1 Direct Effects

Direct effects include all immediate impacts (adverse and beneficial) resulting from project-related actions. Potential project-related direct effects to ESA-listed fish species may result from *fish injury* associated with clamshell dredging, temporary degraded *water quality* associated with in-water work, and the temporary loss of *benthic invertebrate productivity*. Potential project-related direct effects to ESA-listed salmon Critical Habitat elements include minor alteration of in-water *substrates*.

6.1.1 Fish Injury

The use of a clamshell dredge has the potential to directly injure species potentially present in the project area where active dredge operations are occurring. Such interactions could result in mortality or injury from contact with the clamshell dredge, barge anchoring, entrainment in the clamshell, or burial in sediments cast off from the clamshell. Several factors exist which will likely minimize the potential of injury or mortality: dredging operational BMPs, disturbance from dredge mobilization and staging, and construction timing.

As discussed above in Section 3.2 Conservation Measures, dredge operations will be conducted using a slow drop and slow removal to allow fish to leave the work site and avoid injury. Noise generated during dredging activity including barge maneuvering, anchoring, and equipment operation will likely further induce fish to avoid the immediate area. In addition, as previously stated, any in-water work would be conducted November 1 through January 31, a period when ESA-listed fish species are less likely to be present within the action area. As such, the proposed dredging is not expected to result in any significant effect on ESA-listed fish species.

6.1.2 Water Quality

Sediment/Turbidity

Increases in turbidity from suspension of fine sediments can adversely affect fish and filter-feeding macro-invertebrates within the vicinity of the project site. In the short-term, elevated turbidity levels can reduce forage quantity and disrupt behavioral patterns of juvenile salmonids, including feeding and sheltering. Exposure duration is a critical determinant of physical or behavioral turbidity effects. Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such seasonal high pulse exposures (NMFS 2011).

Short-term, localized project-related increases in background turbidity levels will likely occur as a result of activities associated with in-water excavation. However, given the proposed timing of in-water work, use of a clamshell dredge, and proposed dewatering BMPs, it is anticipated that temporary increases in background turbidity will be relatively short in duration and highly localized. As such, short-term increases in background turbidity resulting from temporary work below the OHW are not expected to result in any significant effect on ESA-listed fish species, or any net change in function of the in-stream or downstream habitat.

Chemical Contamination

Sediment evaluations have been conducted within the project area (URS 2007 and 2009). Based on the results of these sediment evaluations, it is assumed that suspended sediments in the water column during clamshell dredging, generated residuals at the dredge areas, and undisturbed residuals pose an insignificant risk to the aquatic environment. As described above, the dredged material will be placed at a pre-existing upland disposal facility on Lady Island. As such, it is assumed that the disposal material also poses an insignificant risk to the aquatic environment. Equipment operating near and over the river channel within the action area represent potential sources of chemical contamination. Accidental spills of construction materials and/or petroleum products would adversely affect water quality and potentially impact ESA-listed species. Development and implementation of a Pollution Control Plan (PCP) that will include containment measures and spill response for construction-related chemical hazards will significantly reduce the likelihood for chemical releases within the action area. As such, potential effects to ESA-listed species from chemical contamination are unlikely to occur.

6.1.3 Benthic Invertebrate Productivity

The proposed project will remove and/or disturb benthic habitat within the Camas Slough. As such, benthic macroinvertebrate assemblages that form a component of salmon, steelhead, eulachon, and green sturgeon diets may be disrupted and/or removed. The dredge footprint,

however, contains a fraction of available benthic habitat in the slough and benthic prey would still be available from surrounding river margins occupied by juvenile salmonids. As such, potential effects to ESA-listed species are unlikely to occur.

6.1.4 Alteration of Substrates

The proposed project will result in the alteration of in-water substrates within designated Critical Habitat for ESA-listed salmonids. As discussed above, the project will dredge up to 20,000 cubic yards of sediment annually from 23.6 acres within the Camas Slough for a period of 5 years following the project's approval. Sediment will be excavated by clamshell dredge and placed on a barge. The dredged material will be placed at a pre-existing disposal facility on Lady Island, which is adjacent to the dredge site. Given that the bed and banks of the Camas Slough within the action area have been modified by industrial development, and given the lack of large wood and overhead cover, it is unlikely that area below OHW currently provides preferred foraging or refugia habitat for juvenile and/or adult salmonids. As such, it is reasonably certain that the alterations to existing in-stream substrates will not result in any long-term, significant effect to ESA-listed salmonids or their Critical Habitat.

6.2 Indirect Effects

Indirect effects of a proposed action are those that are reasonably certain to occur later in time (after construction of the project is complete). The proposed project is for continued access and operations at GP's Camas Mill and is not intended to provide for facility expansion, new operations, or increased vessel traffic. The dredging detailed in this BE will occur entirely within the previously authorized dredge prism (Corps reference: NWS-2003-1135; NMFS Tracking No: 2011/03717). As such, indirect effects to ESA-listed species beyond those already associated with mill operations are not anticipated.

6.3 Interrelated and Interdependent Effects

Interrelated actions include actions that are a part of a larger action and depend on the larger action for justification. Interdependent actions are defined as actions with no independent utility apart from the proposed action. The proposed project includes the continuation of a previously authorized dredging program at the Camas Mill. As such, no interrelated or interdependent effects are anticipated as a result of the proposed project. The proposed project will insure continued access to and operation of the existing Camas Mill.

6.4 Cumulative Effects

Cumulative effects are defined as the effects of all "non-federal" actions (i.e., state, local, private, or tribal) that are reasonably certain to occur within the foreseeable future. Additional maintenance projects associated with operation of the Camas Mill are anticipated within the vicinity of the action area in the near future. In addition, infrastructure projects within the lower Columbia River basin such as road, residential, commercial, and agricultural development, as well as maintenance and upgrading of existing infrastructure are likely in the foreseeable future as population growth continues. The influence of these activities cannot be quantified in this document, but have been incorporated qualitatively in the environmental baseline for the impacted watershed.

6.5 Summary of Effects

Based on the actions described above, existing site conditions, and proposed conservation measures, it is reasonably certain that potential project impacts to ESA-listed fish species will be negligible. Potential short-term, localized project-related increases in background turbidity and alteration of in-water substrates resulting from work below the OHW are not expected to result in any long term, significant effects to ESA-listed fish species or their designated Critical Habitat. The timing of in-water work (November 1 through January 31), will significantly minimize the potential for direct impacts to ESA-listed fish. In addition, it is anticipated handling of fish will not be required, therefore reducing the potential for harm or harassment.

The potential effects of the proposed action on the environmental baseline conditions for ESA-listed salmonids are summarized below (Table 4).

Table 4. Checklist for documenting environmental baseline and effects of proposed actions on relevant indicators for ESA-listed salmonids within the action area.

PATHWAYS AND INDICATORS	ENVIRONMENTAL BASELINE	EFFECTS OF PROPOSED ACTION
Water Quality		
Temperature	Not Properly Functioning	Maintain
Sediment/Turbidity	Not Properly Functioning	Maintain (-)
Chemical Contamination	Not Properly Functioning	Maintain
Habitat Access		
Physical Barriers	At Risk	Maintain
Habitat Elements		
Substrate	Not Properly Functioning	Maintain (-)
Large Wood	Not Properly Functioning	Maintain
Pool Frequency	Not Properly Functioning	Maintain
Pool Quality	Not Properly Functioning	Maintain
Off-Channel Habitat	Not Properly Functioning	Maintain
Refugia	Not Properly Functioning	Maintain
Channel Conditions and Dynamics		
Width/Depth Ratio	Not Properly Functioning	Maintain
Streambank Condition	At Risk	Maintain
Floodplain Connectivity	Not Properly Functioning	Maintain

PATHWAYS AND INDICATORS	ENVIRONMENTAL BASELINE	EFFECTS OF PROPOSED ACTION
Flow/Hydrology		
Peak/Base Flows	Not Properly Functioning	Maintain
Drainage Network Increase	Not Properly Functioning	Maintain
Watershed Conditions		
Road Density/Location	Not Properly Functioning	Maintain
Disturbance History	Not Properly Functioning	Maintain
Riparian Reserves	Not Properly Functioning	Maintain

Maintain = no localized, temporary, or system-wide effect
Maintain (-) = localized, temporary effect, no system-wide effect
Maintain (+) = localized benefit, no system-wide effect
Restore = system-wide benefit

6.5.1 Primary Constituent Elements

Table 5 provides a summary of the potential effects of the proposed action on Critical Habitat PCEs located within the action area.

Table 5. Summary of effects to Critical Habitat PCEs within the action area.

Species	PCEs within the Action Area	Essential Physical and Biological Features	Effects of the Proposed Action
LCR Chinook salmon, coho salmon, and steelhead; and CR chum salmon	Freshwater migration corridors	Free of obstruction, natural cover, and water quality/quantity	Minor alteration of substrates, and potential short-term suspension of sediments

7.0 FINDING OF EFFECT

7.1 LCR Chinook Salmon, UCR Spring-Run Chinook Salmon, SR Spring/Summer-Run Chinook Salmon, SR Fall-Run Chinook Salmon, LCR Coho Salmon, SR Sockeye Salmon, CR Chum Salmon, LCR Steelhead, MCR Steelhead, UCR Steelhead, SRB Steelhead, Southern Eulachon, Southern Green Sturgeon, and Bull Trout.

Evaluation of the potential effects of the proposed action indicates that the project will result in a negligible probability of "take" for LCR Chinook salmon, UCR Spring-Run Chinook salmon, SR Spring/Summer-Run Chinook salmon, SR Fall-Run Chinook salmon, LCR coho salmon, SR sockeye salmon, CR chum salmon, LCR steelhead, MCR steelhead, UCR steelhead, SRB steelhead, Southern eulachon, Southern green sturgeon, and bull trout. As stated above, given the existing site conditions and proposed conservation and restoration measures, it is reasonably certain that potential project impacts to ESA-listed fish species will be negligible.

Potential short-term, localized project-related increases in background turbidity and alteration of in-water substrates resulting from work below the OHW are not expected to result in any long term, significant effects to ESA-listed fish species. The timing of in-water work (November 1 through January 31), will significantly minimize the potential for direct impacts to ESA-listed fish. In addition, it is anticipated handling of fish will not be required, therefore reducing the potential for harm or harassment. Therefore, the Corps makes a determination of **may affect, not likely to adversely affect (NLAA)** with regard to the aforementioned species.

7.1.1 Designated Critical Habitat

The proposed action **may affect, but will not adversely modify** designated Critical Habitat for LCR Chinook salmon, LCR coho salmon, CR chum salmon, and LCR steelhead. Minor, temporary alterations to existing in-stream substrates are not expected to result in any long term, significant effects on migratory corridors, natural cover, water quality/quantity, or other Critical Habitat PCE's within the action area.

The proposed action will have **no effect** on designated Critical Habitat UCR Spring-Run Chinook salmon, SR Spring/Summer-Run Chinook salmon, SR Fall-Run Chinook salmon, SR sockeye salmon, MCR steelhead, UCR steelhead, SRB steelhead, Southern eulachon, Southern green sturgeon, and bull trout.

8.0 ESSENTIAL FISH HABITAT CONSULTATION

The Sustainable Fisheries Act of 1996 (Public Law 104-267) amended the Magnuson-Stevens Act to establish new requirements for EFH descriptions in federal fishery management plans and to require federal agencies to consult with NMFS on activities that may adversely affect EFH. As defined in Magnuson-Stevens Act, "Essential fish habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Pacific Fisheries Management Council (PFMC) has recommended an EFH designation for the Pacific salmon fishery that would include those waters and substrate necessary to ensure the production needed to support a long-term sustainable fishery (*i.e.*, properly functioning habitat conditions necessary for the long-term survival of the species through the full range of environmental variation).

The Magnuson-Stevens Act requires consultation for all actions that may adversely affect EFH, and it does not distinguish between actions in EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities that may have an adverse effect on EFH.

Therefore, EFH consultation with NMFS is required by federal agencies undertaking, permitting, or funding activities that may adversely affect EFH, regardless of its location. The consultation requirements of section 305(b) of the Magnuson-Stevens Act (16 U.S.C. 1855(b)) provide that:

1. Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;
2. NMFS shall provide conservation recommendations for any federal or state activity that may adversely affect EFH;

3. Federal agencies shall within 30 days after receiving conservation recommendations from NMFS provide a detailed response in writing to NMFS regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NMFS, the federal agency shall explain its reasons for not following the recommendations.

8.1 Identification of Essential Fish Habitat

Salmon fishery EFH includes all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except above the impassable barriers identified by PFMC (PFMC 1999). Chief Joseph Dam, Dworshak Dam, and the Hells Canyon Complex (Hells Canyon, Oxbow, and Brownlee Dams) are among the listed man-made barriers that represent the upstream extent of the Pacific salmon fishery EFH. Salmon EFH excludes areas upstream of longstanding naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years). In the estuarine and marine areas, proposed designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception (PFMC 1999).

8.2 Analysis of Effects

Section 6.0 of this BE provides an analysis of effects to the habitat elements that make up EFH for Chinook, coho, sockeye, and chum salmon.

8.3 Conclusion

This project has been designed with several conservation measures to minimize and avoid potential adverse effects to EFH. The conservation measures described in this BE (Section 3.2) are considered adequate to prevent adverse effects on EFH for Pacific salmon. The Corps believes that the proposed action **will not adversely affect EFH** for Pacific salmon.

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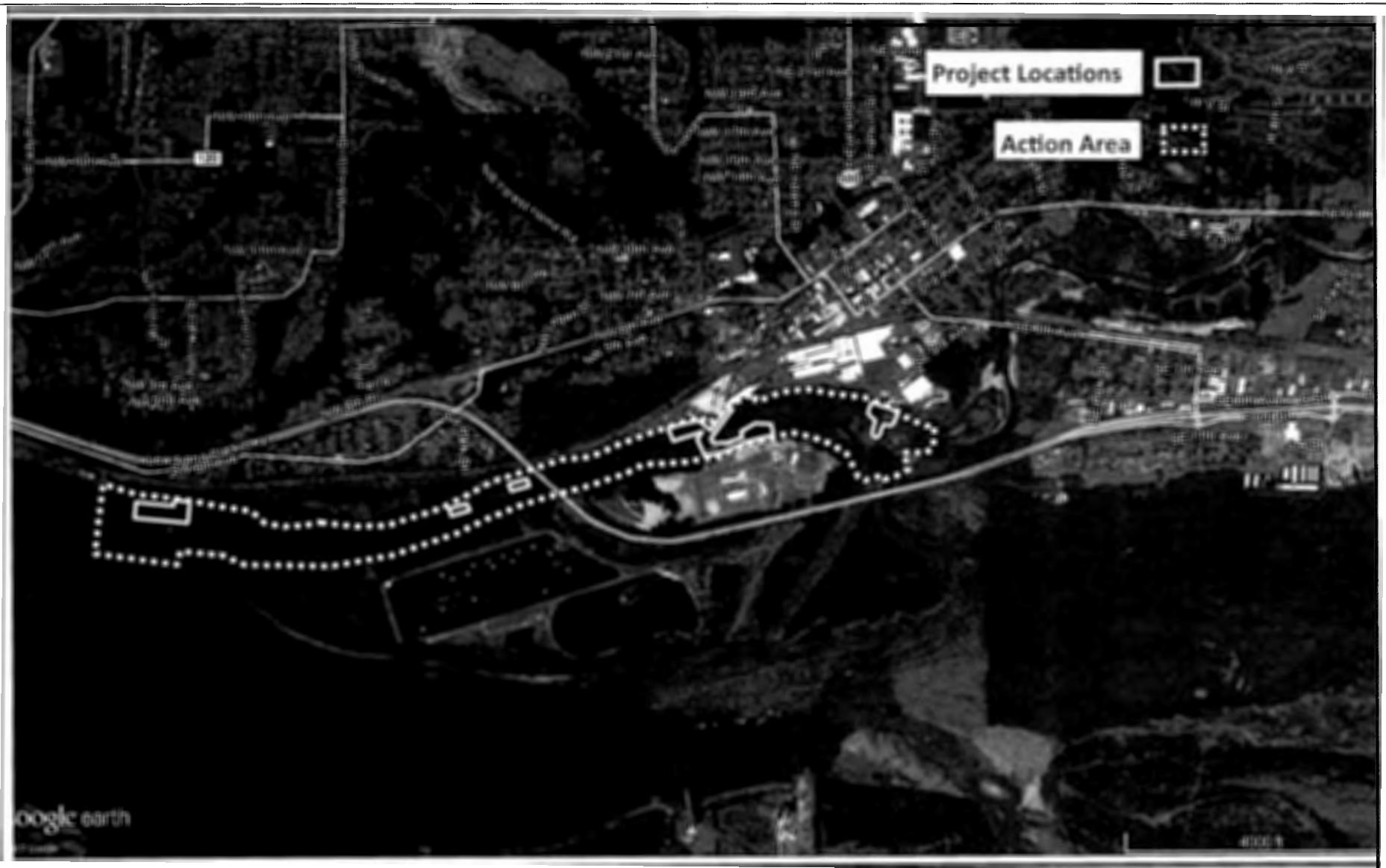
Appendix A

Project Plan Sheets



6201
10/20/16

PHS

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Project Location Map
GP - Camas Mill Maintenance Dredging Project
GoogleEarth (2016)

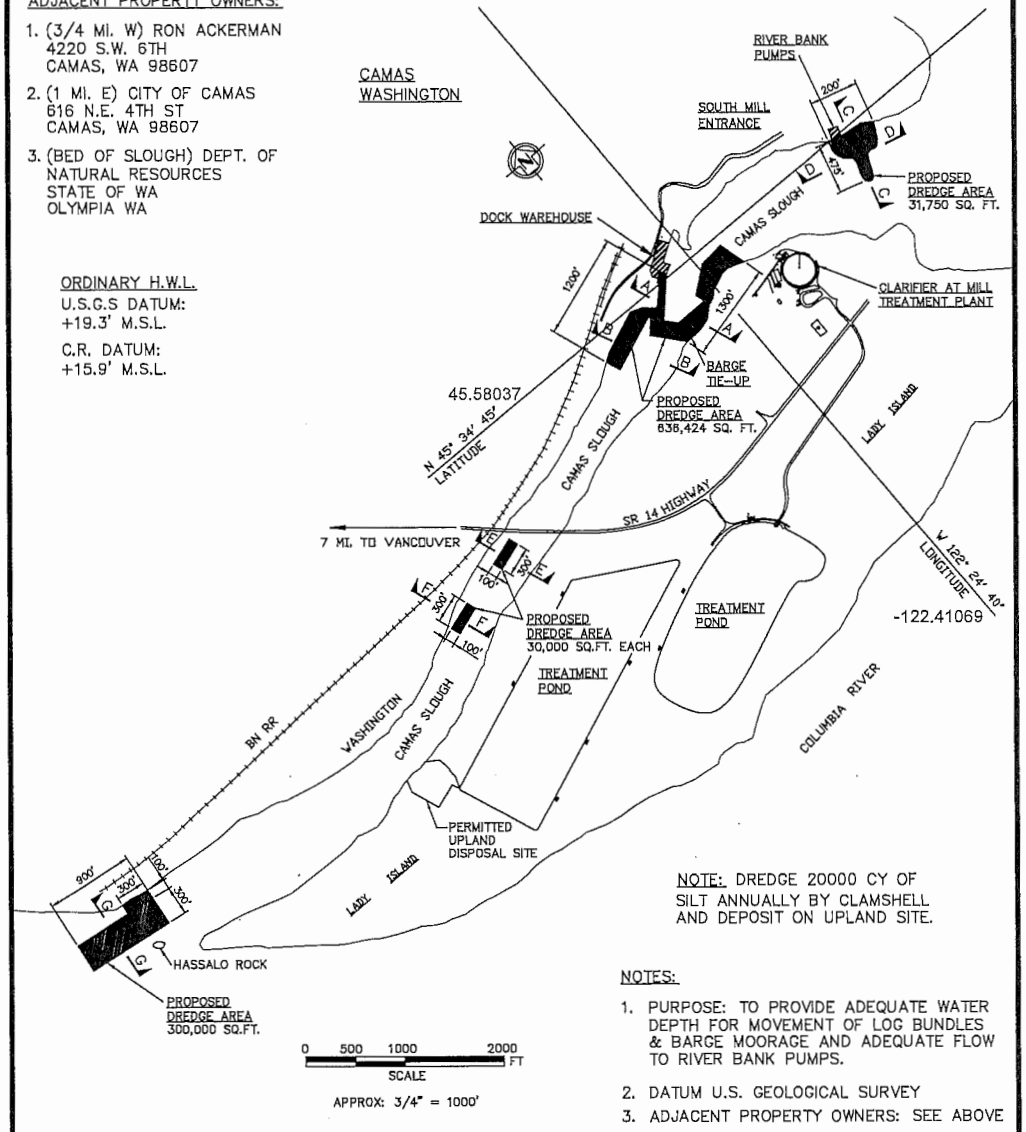
FIGURE
1

ADJACENT PROPERTY OWNERS:

1. (3/4 Mi. W) RON ACKERMAN
   4220 S.W. 6TH
   CAMAS, WA 98607
2. (1 Mi. E) CITY OF CAMAS
   616 N.E. 4TH ST
   CAMAS, WA 98607
3. (BED OF SLOUGH) DEPT. OF
   NATURAL RESOURCES
   STATE OF WA
   OLYMPIA WA

ORDINARY H.W.L.
U.S.G.S DATUM:
+19.3' M.S.L.

C.R. DATUM:
+15.9' M.S.L.



NOTE: DREDGE 20000 CY OF SILT ANNUALLY BY CLAMSHELL AND DEPOSIT ON UPLAND SITE.

NOTES:

1. PURPOSE: TO PROVIDE ADEQUATE WATER DEPTH FOR MOVEMENT OF LOG BUNDLES & BARGE MOORAGE AND ADEQUATE FLOW TO RIVER BANK PUMPS.
2. DATUM U.S. GEOLOGICAL SURVEY
3. ADJACENT PROPERTY OWNERS: SEE ABOVE

REF. DWGS	NO	REVISION	PROPOSED MAINTENANCE DREDGING PLAN SHT. 1 of 9				
	1	ADD DREDGE SQ. FT.	SCALE 3/4"=1K'	CAMAS MILL Camas, Washington			
			WO 341-71410	DSGN SC	DWN TD	DATE 10/01/03	APVD
EWO –	IP/AR/ACCT. 0116		DEPT. ENV	SECT. _	SUB-SECT. _	SKLO-21600	REV. 1

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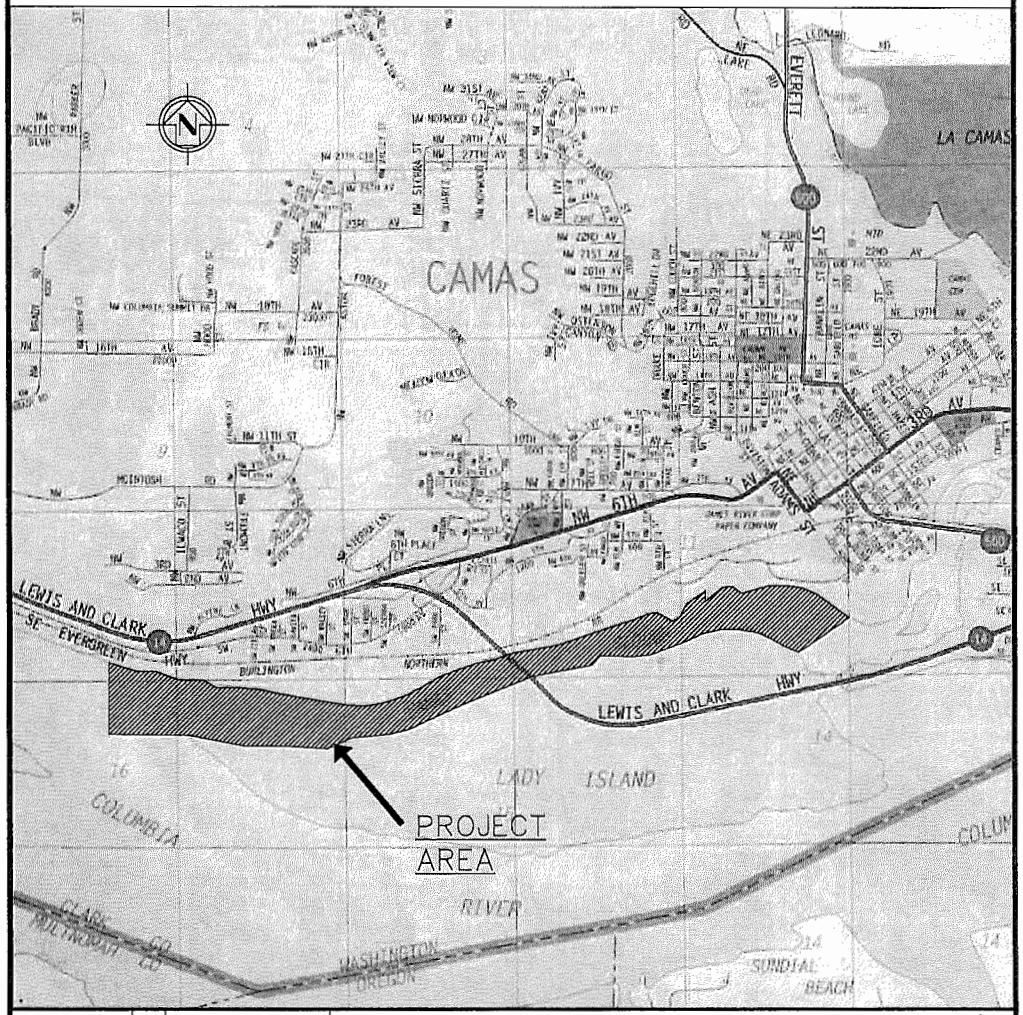
LONGITUDE: 122° 24' 40" W

SECTION: S10, 11
TOWNSHIP: T1N
RANGE: R3E



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EWO _	IP/AR/ACCT. 0116		DEPT. ENV	SECT. _	SUB-SECT. _	SKLO-21601	REV. 0

DATE: OCTOBER 6, 2003
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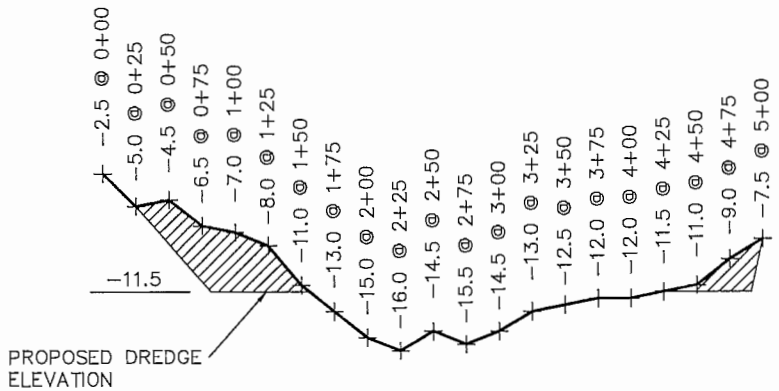
1"=10' VERTICAL
DATUM: U.S.G.S. MSL
ORDINARY HIGH WATER = 19.3' MSL



DMMU 2

SECTION A
SKL021601

THIS LINE TAKEN AT LADDER UP BULKHEAD AT BARGE UNLOADER APPROXIMATELY 100' DOWNSTREAM FROM DOCK WAREHOUSE

REF. DWGS	NO	REVISION	SECTION A SHT. 3 of 9				
			SCALE NOTED	CAMAS MILL		Camas, Washington	
			WO 341-71410	DSGN SC	DWN TD	DATE 10/01/03	APVD
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1"=10' VERTICAL
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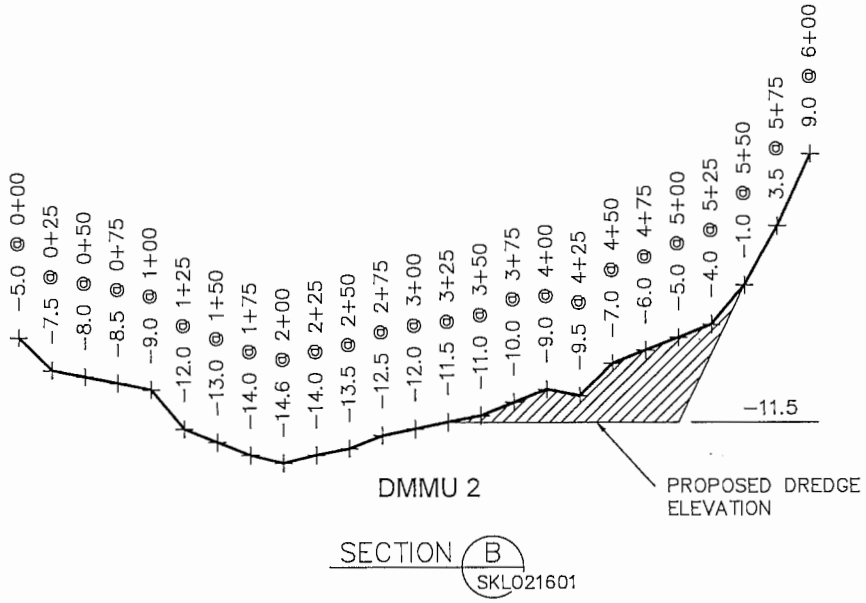

SECTION B
SKL021601

THIS LINE TAKEN AT 2ND 3 PILE DOLPHIN UPSTREAM FROM LOG CHIPPER

REF. DWGS	NO	REVISION	SECTION B SHT. 4 of 9					
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			WO 341-71410	DSGN SC	DWN TD	DATE 10/01/03	APVD	
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DATE: OCTOBER 6, 2003
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1"=10' VERTICAL
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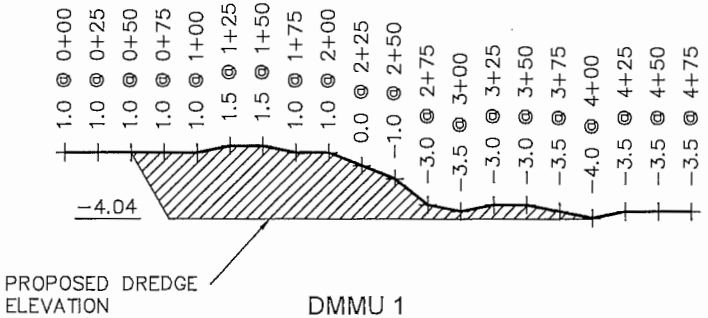

DMMU 1

SECTION C
SKL021601

0+00 IS 50' WEST OF WEST SIDE OF INTAKE STRUCTURE AND PROCEEDS TOWARD BRIDGE ON HWY. "14"

REF. DWGS	NO	REVISION	SECTION C SHT. 5 of 9				
	1	Chg Depth 8/12	SCALE NOTED	CAMAS MILL		Camas, Washington	
			WO 341-71410	DSGN SC	DWN TD	DATE 10/01/03	APVD
EWO _	IP/AR/ACCT. 0116		DEPT. ENV	SECT. _	SUB-SECT. _	SKLO-21604	REV. 1

DATE: OCTOBER 6, 2003
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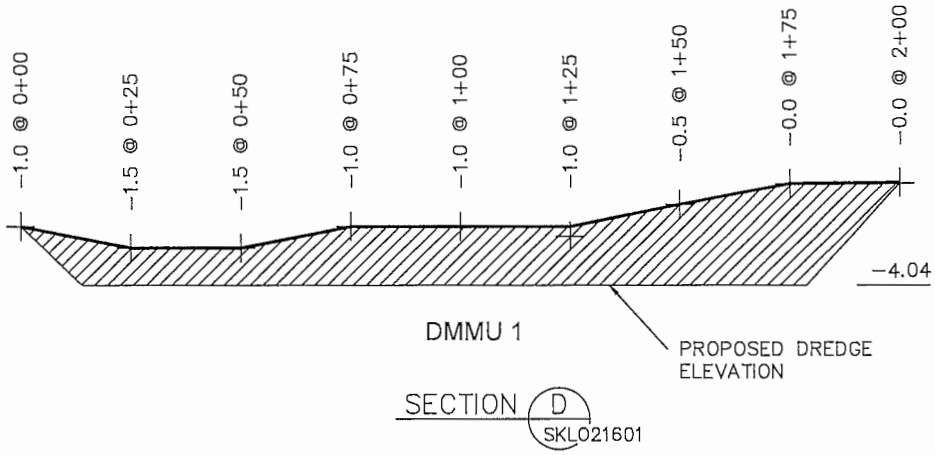
DATUM: U.S.G.S. MSL
ORDINARY HIGH WATER = 19.3' MSL



SECTION D
SKLO21601

0+00 IS 150' WEST OF WEST SIDE OF INTAKE STRUCTURE AND APPROXIMATELY 75' INTO THE RIVER THE LINE THEN RUNS EAST PARALLEL TO SHORE LINE.

REF. DWGS	NO	REVISION	SECTION D SHT. 6 of 9				
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			WO 341-71410	DSGN SC	DWN TD	DATE 10/01/03	APVD
EWO _	IP/AR/ACCT. 0116		DEPT. ENV	SECT. _	SUB-SECT. _	SKLO-21605	REV. 0

DATE: OCTOBER 6, 2003
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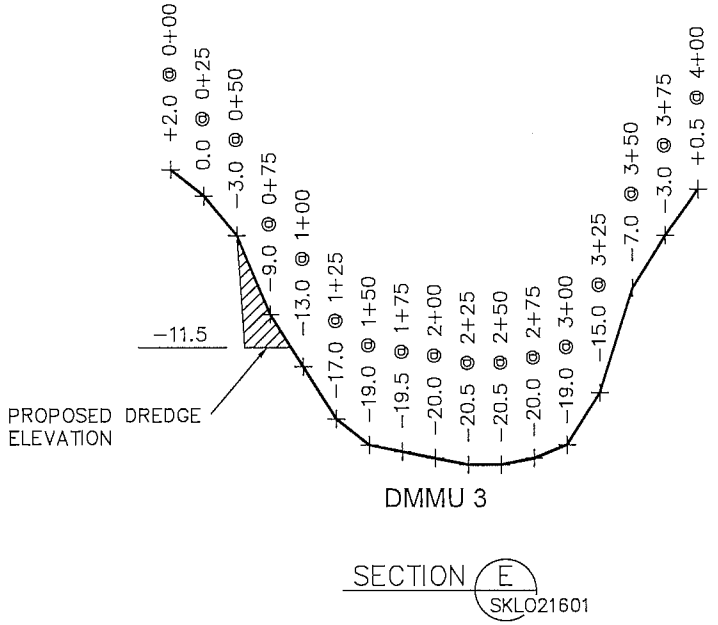

DMMU 3

SECTION E
SKLO21601

THIS LINE TAKEN AT CAMAS MILL PILE STATION 3
APPROXIMATELY 150' DOWNSTREAM OF SR 14

REF. DWGS	NO	REVISION	SECTION E SHT. 7 of 9				
			SCALE NOTED	CAMAS MILL		Camas, Washington	
			WO 341-71410	DSGN SC	DWN TD	DATE 10/01/03	APVD
EWO _	IP/AR/ACCT. 0116		DEPT. ENV	SECT. _	SUB-SECT. _	SKLO-21606	REV. 0

DATE: OCTOBER 6, 2003
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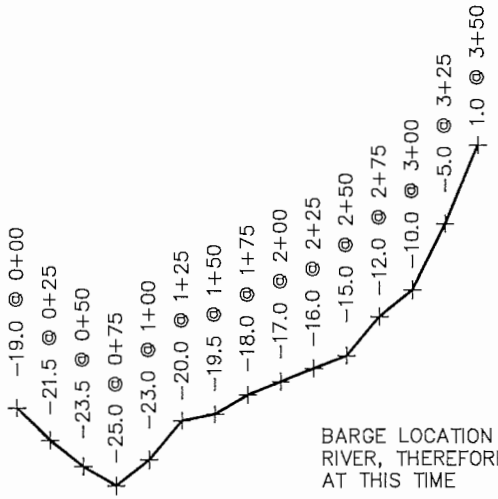
ORDINARY HIGH WATER = 19.3' MSL



BARGE LOCATION IS ON NORTH SIDE OF RIVER, THEREFORE NO DREDGING REQUIRED AT THIS TIME

SECTION F
SKLO21601

THIS LINE TAKEN AT CAMAS MILL PILL STATION 4
APPROXIMATELY 900' DOWNSTREAM OF SR 14
STARTING POINT FOR SECTION IS APPROXIMATELY 50'
SOUTH OF THE SHORELINE

REF. DWGS	NO	REVISION	SECTION F SHT. 8 of 9					
			SCALE NOTED	CAMAS MILL Camas, Washington				
			WO 341-71410	DSGN SC		DWN TD	DATE 10/01/03	APVD
EWO _	IP/AR/ACCT. 0116		DEPT. ENV	SECT. _	SUB-SECT. _	SKLO-21607		REV. 0

DATE: OCTOBER 6, 2003
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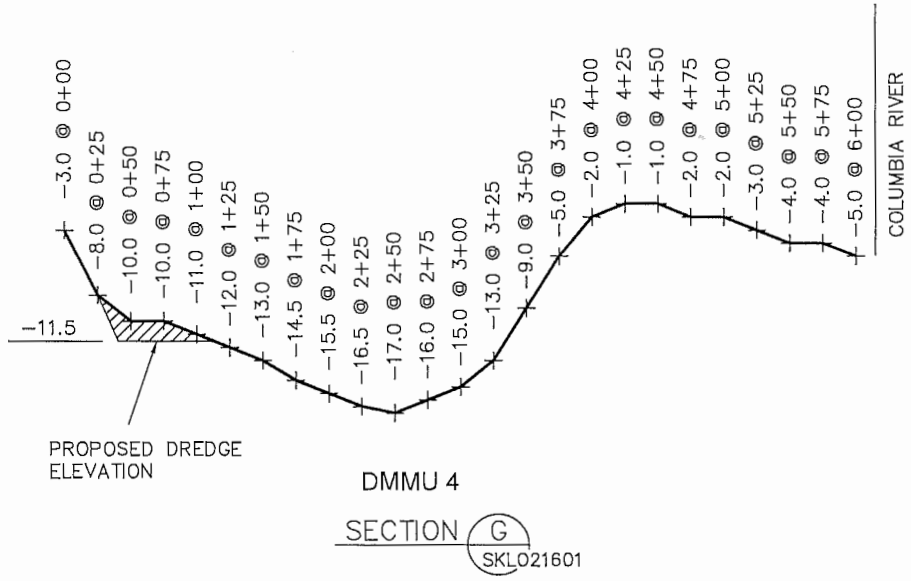

DMMU 4

SECTION G
SKLO21601

THIS LINE TAKEN AT THE DOWNSTREAM END OF THE CAMAS SLOUGH AT THE WEST END OF LADY ISLAND

REF. DWGS	NO	REVISION	SECTION G SHT. 9 of 9				
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			WO 341-71410	DSGN SC	DWN TD	DATE 10/01/03	APVD
EWO _	IP/AR/ACCT. 0116		DEPT. ENV	SECT. _	SUB-SECT. _	SKLO-21608	REV. 0