# APPENDIX A

## Project Photos

Figure A-1. Modrow Trap Upgrade upland project site on the left hydraulic bank of the Kalama River.

Figure A-2. Hydraulic right bank of the Kalama River across from the existing Modrow Trap.

Figure A-3. Hydraulic left bank of the Kalama River immediately upstream of the existing Modrow Trap.

Figure A-4. Hydraulic left bank of the Kalama River downstream of the existing Modrow Trap.

Figure A-5. Hydraulic left bank of the Kalama River immediately downstream of the existing Modrow Trap.

# APPENDIX B

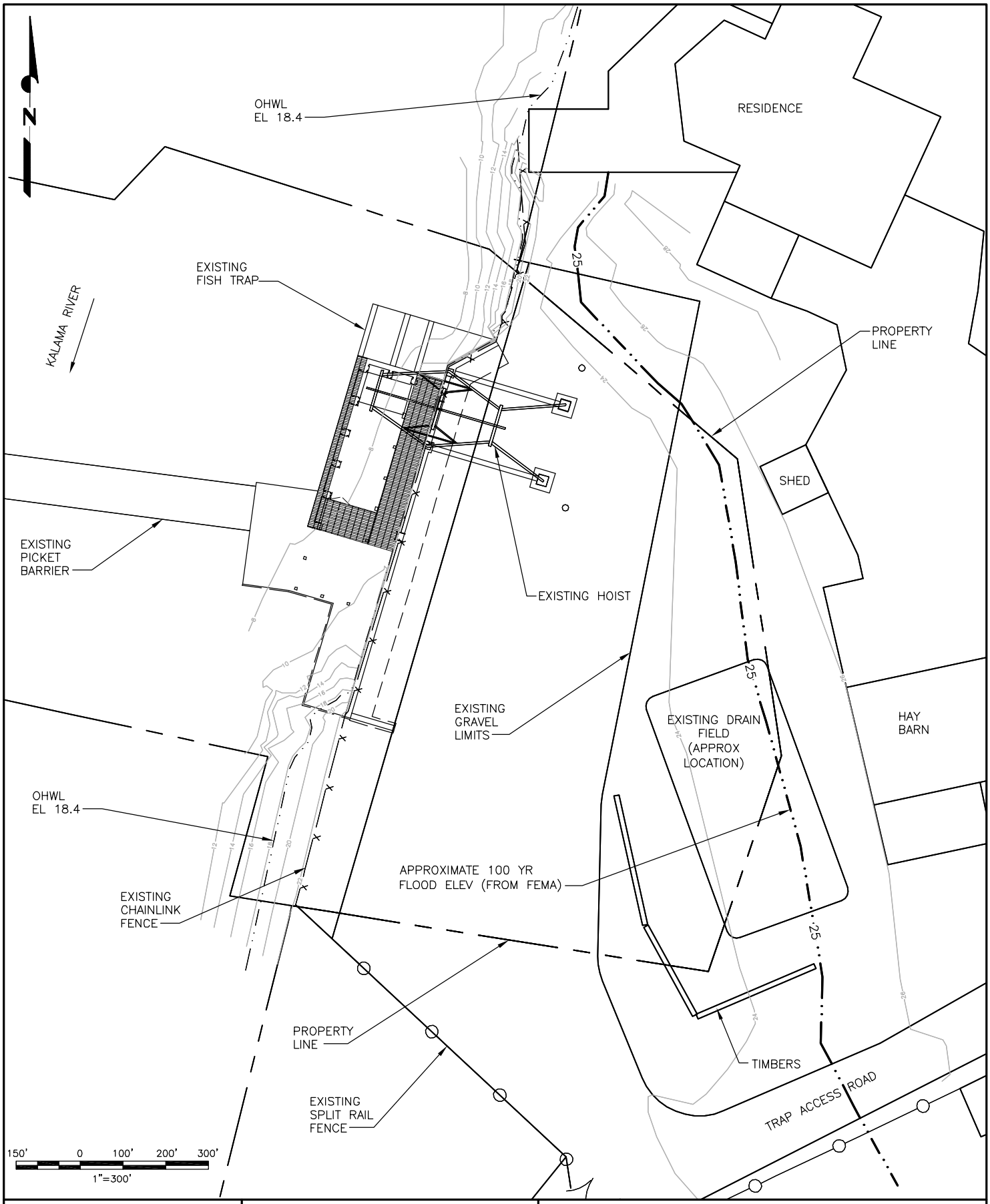
## Project Figures

# VICINITY MAP

NOT TO SCALE

46.04626 N LAT. / −122.83844 W LONG. (NAD83)
SW QUARTER OF SECTION **, TOWNSHIP **N, RANGE **

| | | |
|---|---|---|
| Resource Consultants, Inc.<br>REDMOND, WA. | APPLICANT:<br>WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE<br><br>PROPOSED:<br>AT KALAMA, WA | KALAMA FALLS HATCHERY<br>MODROW TRAP MODIFICATIONS<br><br>VICINITY MAP<br>FIGURE – 1<br>SHEET 1 OF 5 |

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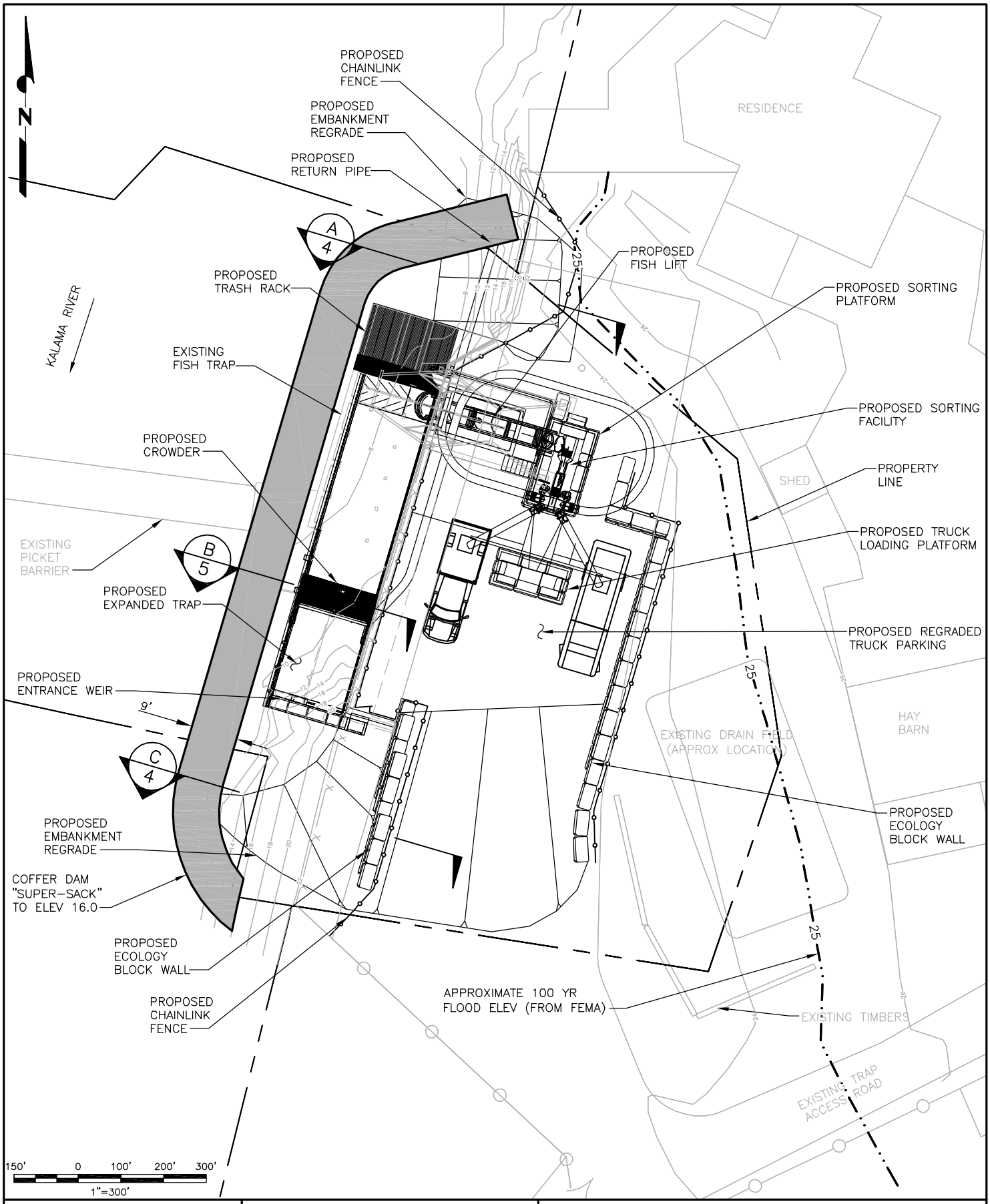
WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE

PROPOSED:
AT KALAMA, WA

KALAMA FALLS HATCHERY
MODROW TRAP MODIFICATIONS

EXISTING SITE PLAN
FIGURE – 2
SHEET 2 OF 5

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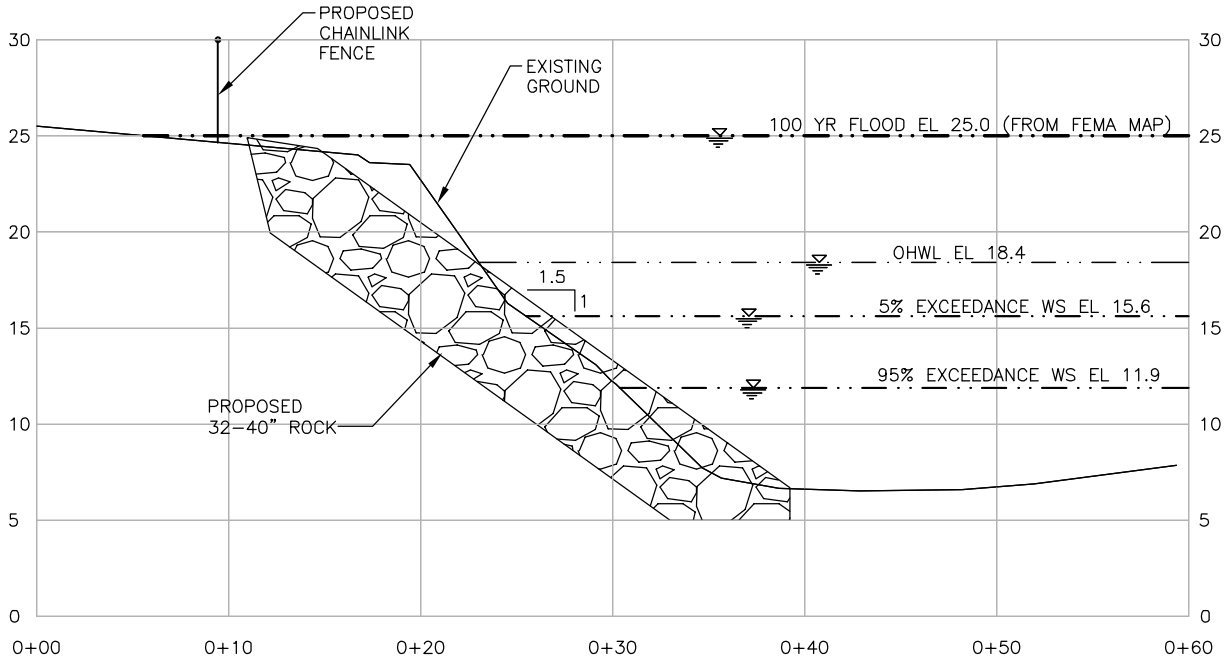
APPLICANT:
WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE

PROPOSED:
AT KALAMA, WA

KALAMA FALLS HATCHERY
MODROW TRAP MODIFICATIONS

PROPOSED SITE PLAN
FIGURE – 3
SHEET 3 OF 5

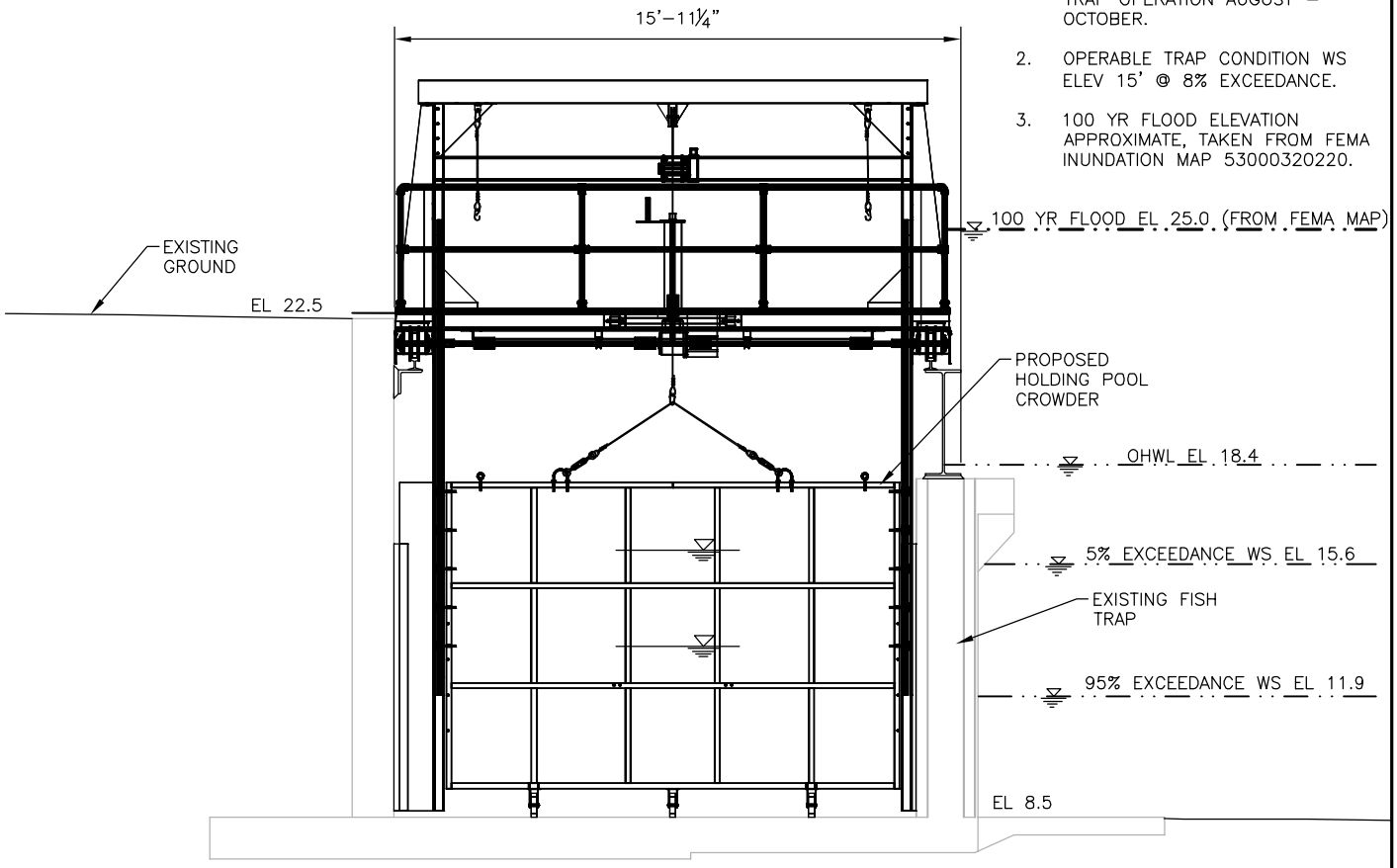



0 2' 4' 10'
1"=10'

SECTION A/3
SCALE: 1" = 10'–0"

NOTES:

1. EXCEEDANCE CONDITIONS DURING TRAP OPERATION AUGUST – OCTOBER.
2. OPERABLE TRAP CONDITION WS ELEV 15' @ 8% EXCEEDANCE.
3. 100 YR FLOOD ELEVATION APPROXIMATE, TAKEN FROM FEMA INUNDATION MAP 53000320220.




6' 4' 2' 0 5' 10'
3/16"=1'–0"

SECTION B/3
SCALE: 3/16" = 1'–0"

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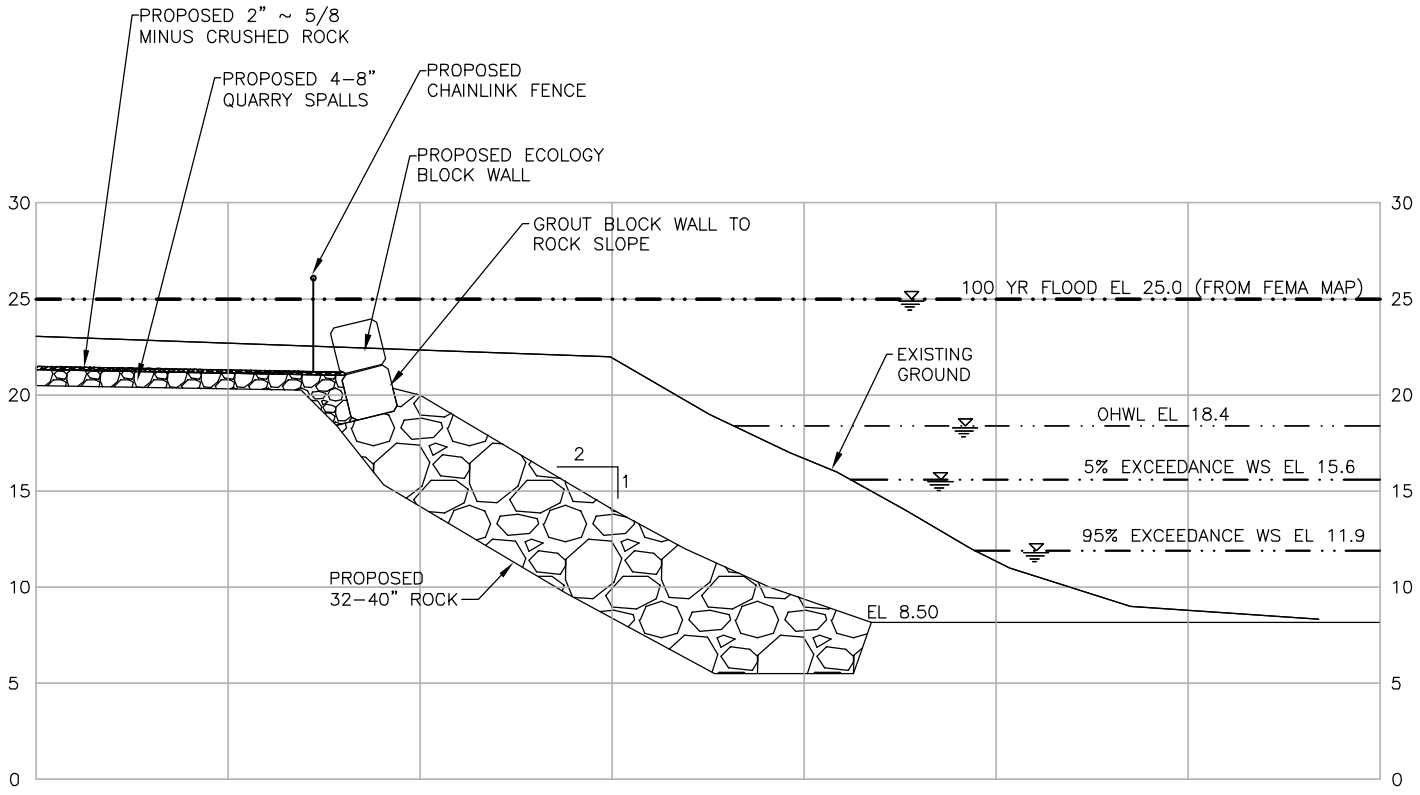
WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE

PROPOSED:
AT KALAMA, WA

KALAMA FALLS HATCHERY
MODROW TRAP MODIFICATIONS

CROSS SECTIONS
FIGURE – 4
SHEET 4 OF 5




SECTION C/3

SCALE: 1" = 10'–0"

0 2' 4' 10'

1"=10'

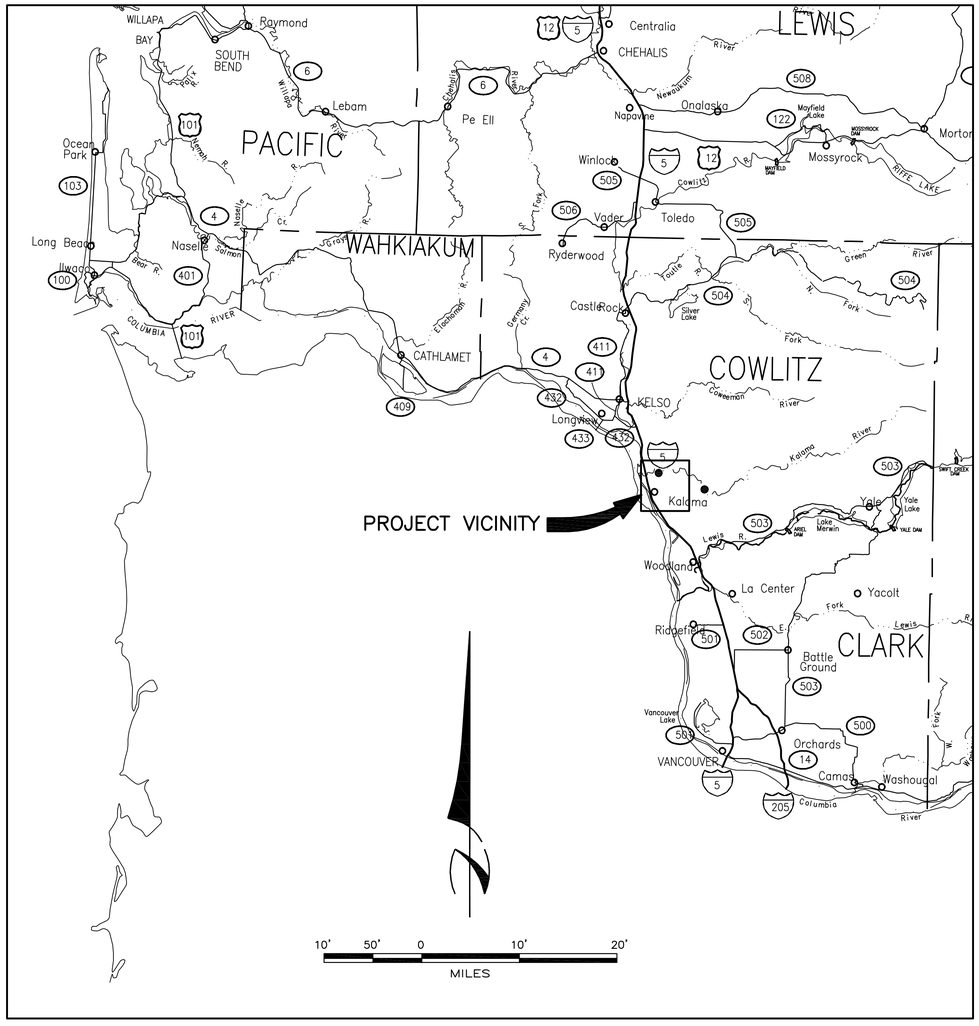
NOTES:

1. EXCEEDANCE CONDITIONS DURING TRAP OPERATION AUGUST – OCTOBER.
2. OPERABLE TRAP CONDITION WS ELEV 15' @ 8% EXCEEDANCE.
3. 100 YR FLOOD ELEVATION APPROXIMATE, TAKEN FROM FEMA INUNDATION MAP 53000320220.

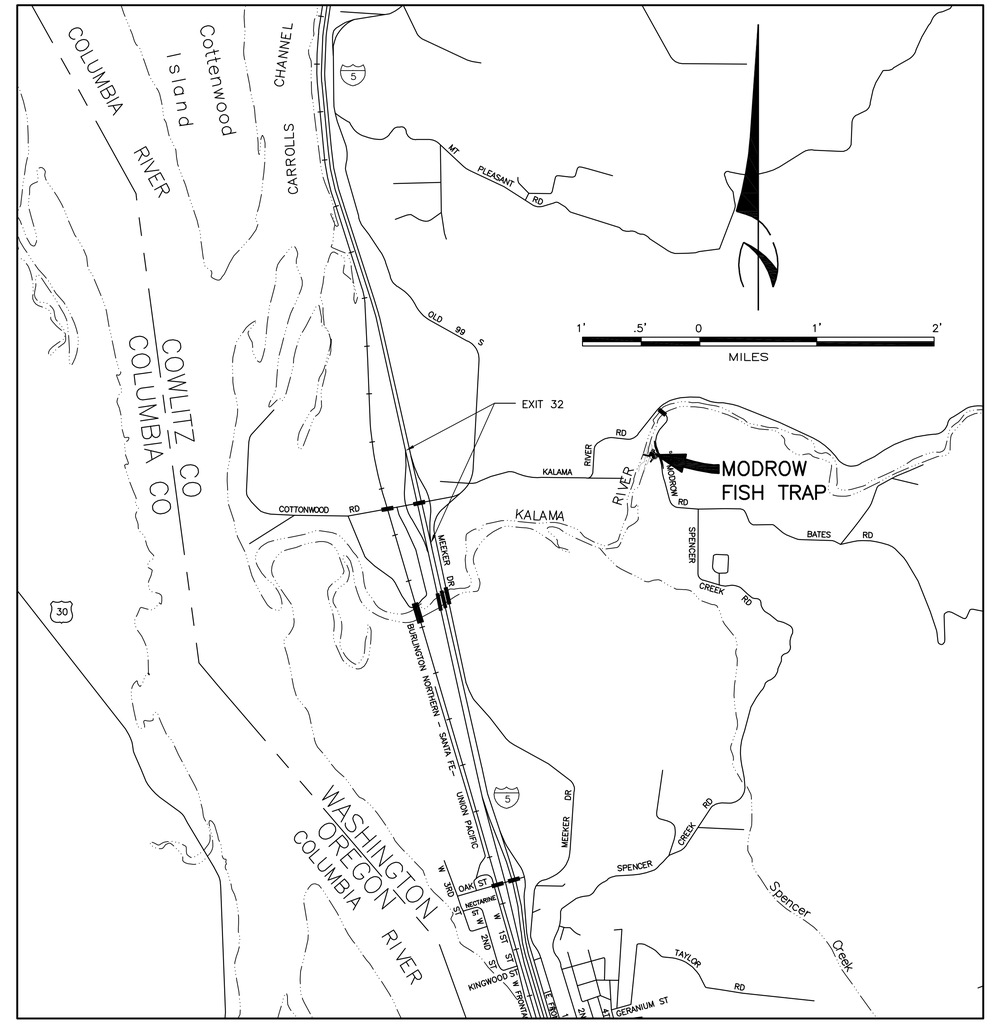
| | | |
|---|---|---|
| Resource Consultants, Inc.<br>REDMOND, WA. | APPLICANT:<br>WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE<br><br>PROPOSED:<br>AT KALAMA, WA | KALAMA FALLS HATCHERY<br>MODROW TRAP MODIFICATIONS<br><br>CROSS SECTIONS<br>FIGURE – 5<br>SHEET 5 OF 5 |

# APPENDIX C

## Additional Drawings




LOCATION MAP




VICINITY MAP

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*DEPARTMENT OF FISH AND WILDLIFE*

| SYM | DATE | REVISION DESCRIPTION | BY |
|---|---|---|---|

APPROVED AND RELEASED FOR CONSTRUCTION

CHIEF ENGINEER ..... DATE: .....
PROGRAM ..... DATE: .....

0 ——— 1"
BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS

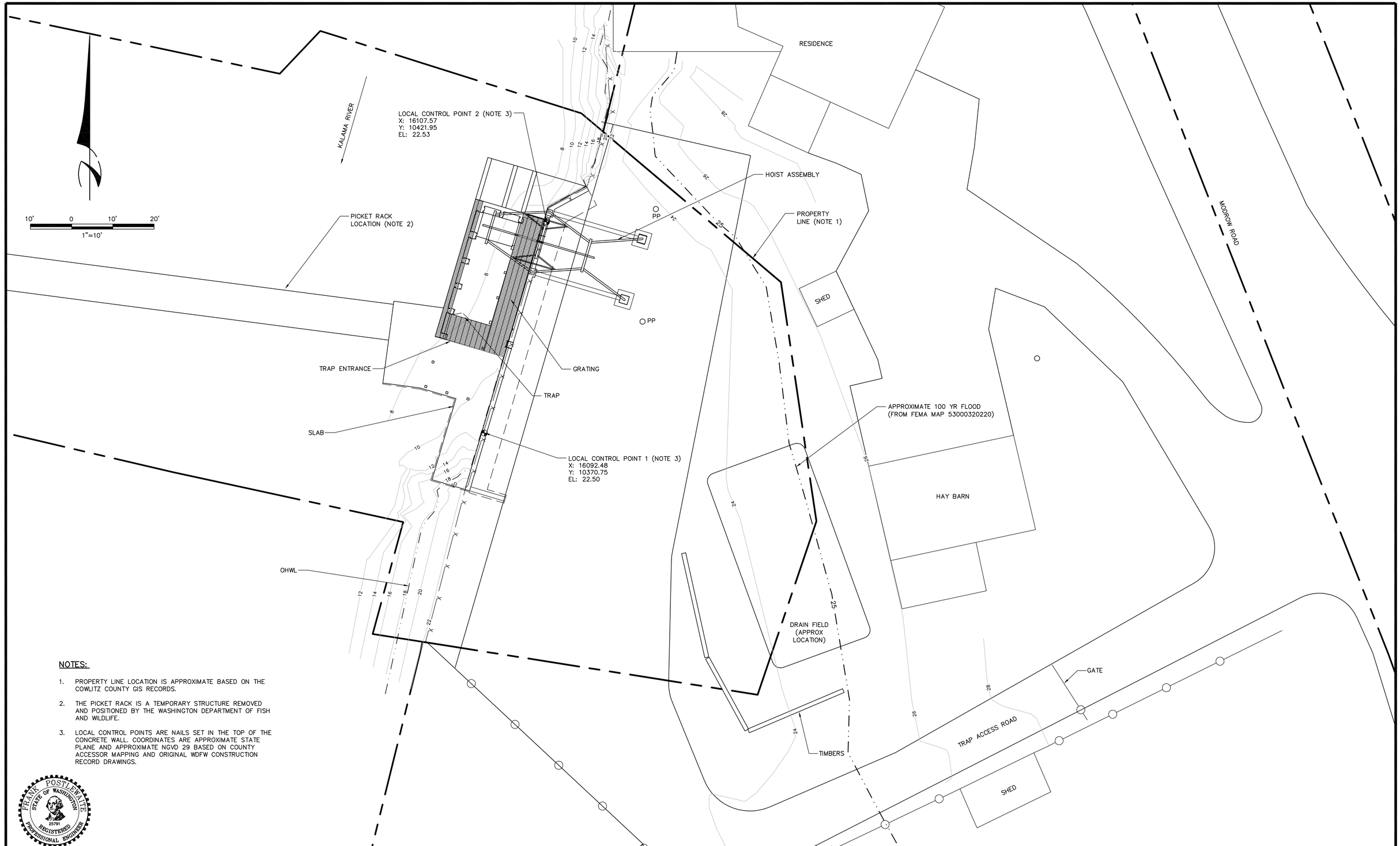
DESIGNED BY F. POSTLEWAITE
CHECKED BY D. TURNER
DRAWN BY J. SCHULZ
DATE 10/2011

KALAMA FALLS HATCHERY

MODROW TRAP MODIFICATIONS
GENERAL
LOCATION AND VICINITY MAPS

PROJECT NO. CZ:H28:11-1

SHEET 2 OF




NOTES:

1. PROPERTY LINE LOCATION IS APPROXIMATE BASED ON THE COWLITZ COUNTY GIS RECORDS.
2. THE PICKET RACK IS A TEMPORARY STRUCTURE REMOVED AND POSITIONED BY THE WASHINGTON DEPARTMENT OF FISH AND WILDLIFE.
3. LOCAL CONTROL POINTS ARE NAILS SET IN THE TOP OF THE CONCRETE WALL. COORDINATES ARE APPROXIMATE STATE PLANE AND APPROXIMATE NGVD 29 BASED ON COUNTY ACCESSOR MAPPING AND ORIGINAL WDFW CONSTRUCTION RECORD DRAWINGS.

FRANK POSTLEWAITE
STATE OF WASHINGTON
25791
REGISTERED
PROFESSIONAL ENGINEER

Resource Consultants, Inc.
REDMOND, WA.

WASHINGTON STATE
DEPARTMENT OF FISH AND WILDLIFE

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PROGRAM ..... DATE: .....

0 — 1"
BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS

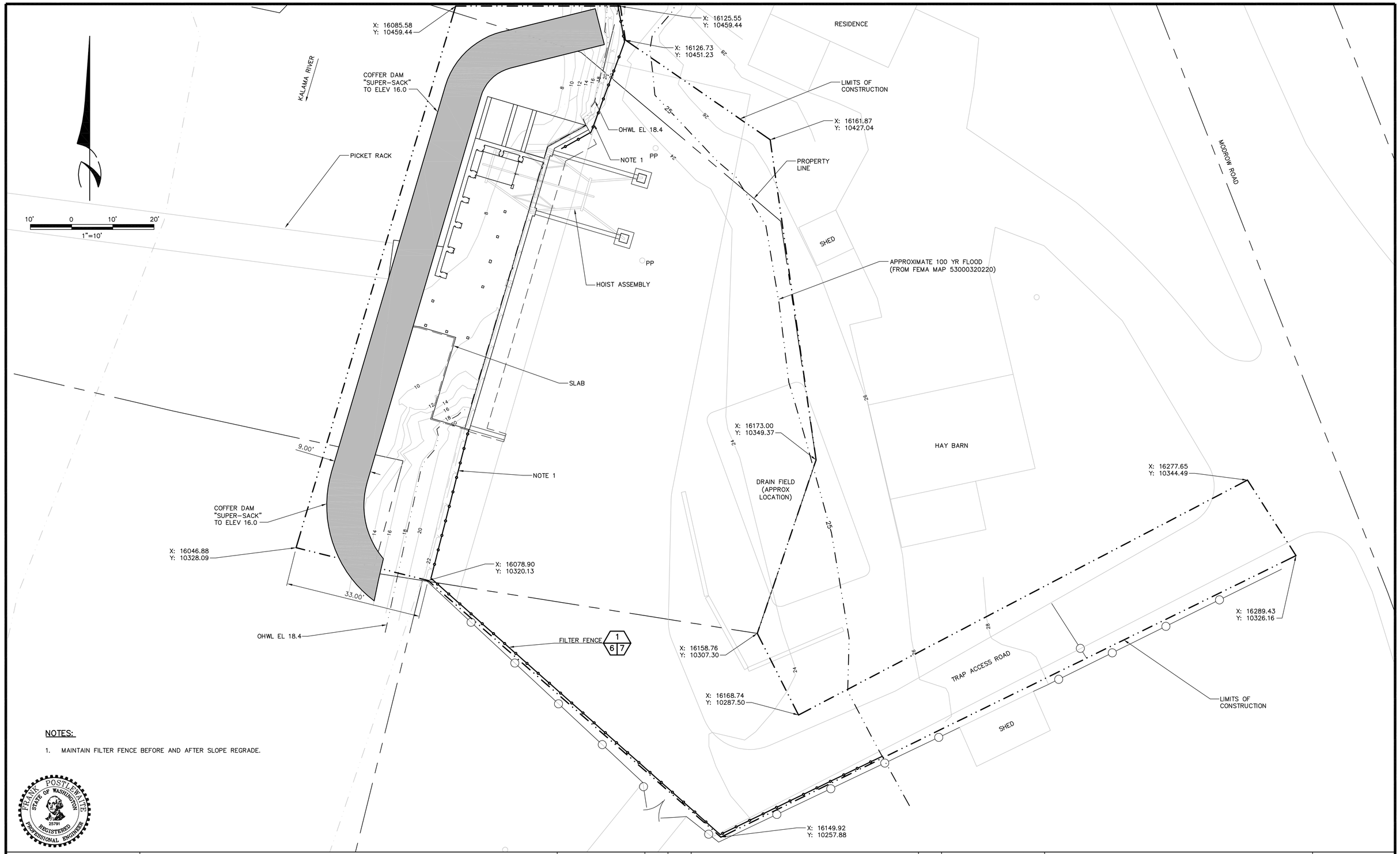
DESIGNED BY F. POSTLEWAITE
CHECKED BY D. TURNER
DRAWN BY J. SCHULZ
DATE 10/2011

KALAMA FALLS HATCHERY

MODROW TRAP MODIFICATIONS
GENERAL
EXISTING SITE PLAN

PROJECT NO. CZ:H28:11-1

SHEET 5 OF




NOTES:

1. MAINTAIN FILTER FENCE BEFORE AND AFTER SLOPE REGRADE.

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CHIEF ENGINEER ..... DATE: .....

PROGRAM ..... DATE: .....

0 ——— 1"
BAR MEASURES
ONE INCH ON
ORIGINAL DRAWINGS

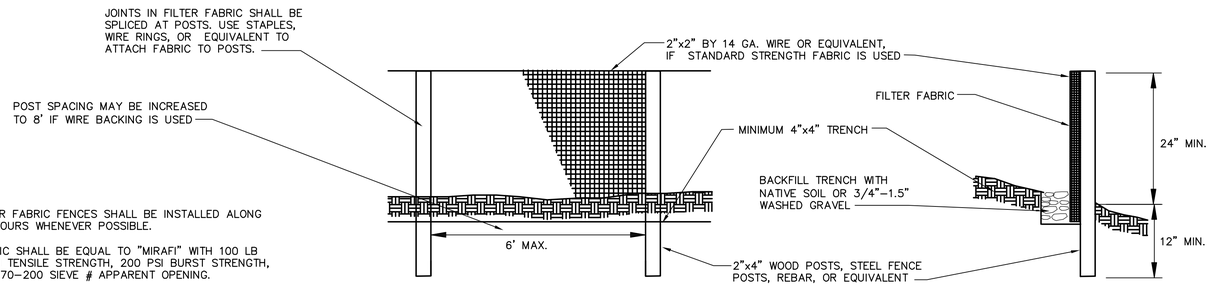
DESIGNED BY F. POSTLEWAITE
CHECKED BY D. TURNER
DRAWN BY J. SCHULZ
DATE 10/2011

KALAMA FALLS HATCHERY

MODROW TRAP MODIFICATIONS
EROSION & SEDIMENT CONTROL
PLAN

PROJECT NO.
CZ:H28:11-1

SHEET 6 OF




NOTES:
1. FILTER FABRIC FENCES SHALL BE INSTALLED ALONG CONTOURS WHENEVER POSSIBLE.
2. FABRIC SHALL BE EQUAL TO "MIRAFI" WITH 100 LB GRAB TENSILE STRENGTH, 200 PSI BURST STRENGTH, AND 70-200 SIEVE # APPARENT OPENING.

FILTER FENCE (1 / 6 7)
NOT TO SCALE

## TEMPORARY EROSION AN SEDIMENT CONTROL NOTES

1. IN WATER COFFERDAM CONSTRUCTION WORK ON THE PROJECT SHALL NOT BEGIN UNTIL APRIL 1st AND SHALL BE COMPLETED BY JULY 31st.
2. THE WDFW AREA HABITAT BIOLOGIST ASSIGNED TO THIS PROJECT, SHALL RECEIVE WRITTEN NOTIFICATION (FAX, EMAIL, MAIL) NO LESS THAN THREE WORKING DAYS PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
3. THE TESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED PRIOR TO OR IN CONJUNCTION WITH ALL CLEARING AND GRADING SO AS TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEM, AND ADJACENT PROPERTIES IS MINIMIZED.
4. THE TESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR THE ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD THESE TESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND MODIFIED TO ACCOUNT FOR CHANGING SITE CONDITIONS
5. THE TESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/TESC SUPERVISOR AND MAINTAINED TO ENSURE CONTINUED PROPER FUNCTIONING. WRITTEN RECORDS SHALL BE KEPT OF WEEKLY REVIEWS OF THE TESC FACILITIES DURING CONSTRUCTION.
6. ANY AREAS OF EXPOSED SOILS, INCLUDING ROADWAY EMBANKMENTS, THAT WILL NOT BE DISTURBED FOR TWO DAYS DURING THE WET SEASON OR SEVEN DAY DURING THE DRY SEASON SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED TESC METHODS (E.G. SEEDING, MULCHING, PLASTIC COVERING. ETC.).
7. THE TESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN 48 HOURS OF FOLLOWING A STORM EVENT.
8. WHERE STRAW MULCH FOR TEMPORARY EROSION CONTROL IS REQUIRED, IT SHALL BE APPLIED AT A MINIMUM 2-INCH THICKNESS.
9. THE COFFERDAMS SHALL BE COMPLETELY SEALED TO PREVENT CONCRETE OR OTHER DELETERIOUS PRODUCTS FROM LEACHING INTO THE RIVER. UPON COMPLETION OF THE PROJECT, ALL COFFERDAM MATERIALS SHALL BE REMOVED.
10. ALL WASTE MATERIAL SUCH AS CONSTRUCTION DEBRIS, SILT, EXCESS DIRT OR OVERBURDEN RESULTING FROM THIS PROJECT SHALL BE DEPOSITED ABOVE THE LIMITS OF FLOODWATER IN AN APPROVED UPLAND DISPOSAL SITE.
11. WASTEWATER FROM PROJECT ACTIVITIES AND WATER REMOVED FROM IN THE WORK AREA SHALL BE ROUTED TO AN AREA UPLAND OF THE ORDINARY HIGH WATER LINE TO ALL REMOVAL OF FINE SEDIMENT AND OTHER CONTAMINANTS PRIOR TO DISCHARGE INTO THE RIVER.
12. MAINTENANCE AND FUELING OF CONSTRUCTION EQUIPMENT SHALL BE PERFORMED IN SUCH A MANNER TO MINIMIZE THE POTENTIAL CONTAMINATION OF STORMWATER RUNOFF AND ADJACENT WATERWAYS. SPILL CONTAINMENT AND CLEANUP KITS SHALL BE MAINTAINED ONSITE AND ANY SPILLS OF FUELS, HYDRAULIC FLUID, LUBRICANTS, OR OTHER HAZARDOUS MATERIAL SHALL BE CLEANED UP AND IMMEDIATELY AND PROPERLY DISPOSED OF.
13. EQUIPMENT USED FOR THIS PROJECT SHALL BE FREE OF EXTERNAL PETROLEUM-BASED PRODUCTS WHILE WORKING NEAR THE RIVER. ACCUMULATION OF SOIL AND DEBRIS SHALL BE REMOVED FROM THE DRIVE MECHANISMS AND THE UNDERCARRIAGE OF EQUIPMENT PRIOR TO ITS WORKING INSIDE THE COFFERDAMS. EQUIPMENT SHALL BE CHECKED DAILY FOR LEAKS AND ANY NECESSARY REPAIRS SHALL BE COMPLETED PRIOR TO COMMENCING WORK ACTIVITIES NEAR THE RIVER.
14. EXCAVATION EQUIPMENT WILL WORK FROM ABOVE THE EXCAVATION AND DIG UPSLOPE TOWARDS THEM. EXCAVATED MATERIAL WILL BE PLACED DIRECTLY INTO TRUCKS AND HAULED OFFSITE.
15. RESTORE UNDEVELOPED DISTURBED AREAS ON THE BANK OF THE KALAMA RIVER WITH WEIGHTED JUTE MATTING.
16. BAKER TANKS WILL BE USED FOR THE COLLECTION OF WATER FROM THE COFFERDAMS AND DEEP EXCAVATIONS.

## RECOMMENDED CONSTRUCTION SEQUENCE:

1. PRE-CONSTRUCTION MEETING.
2. FLAG OR FENCE CONSTRUCTION LIMITS.
3. INSTALL PERIMETER PROTECTION (SILT FENCE, BRUSH BARRIER, ETC.)
4. GRADE AND STABILIZE CONSTRUCTION ROADS.
5. MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE REQUIRED TECHNIQUES AND FREQUENCY.
6. JUST PRIOR TO THE PROJECT COMPLETION, ENSURE ALL DISTURBED AREAS ARE STABILIZED AND REMOVE TESC FEATURE IF APPROPRIATE (PERIMETER MARKING, FILTER FENCING, SEDIMENT TRAPS, ETC.).

FRANK POSTLEWAITE — STATE OF WASHINGTON — 25791 — REGISTERED PROFESSIONAL ENGINEER

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|---|---|---|---|

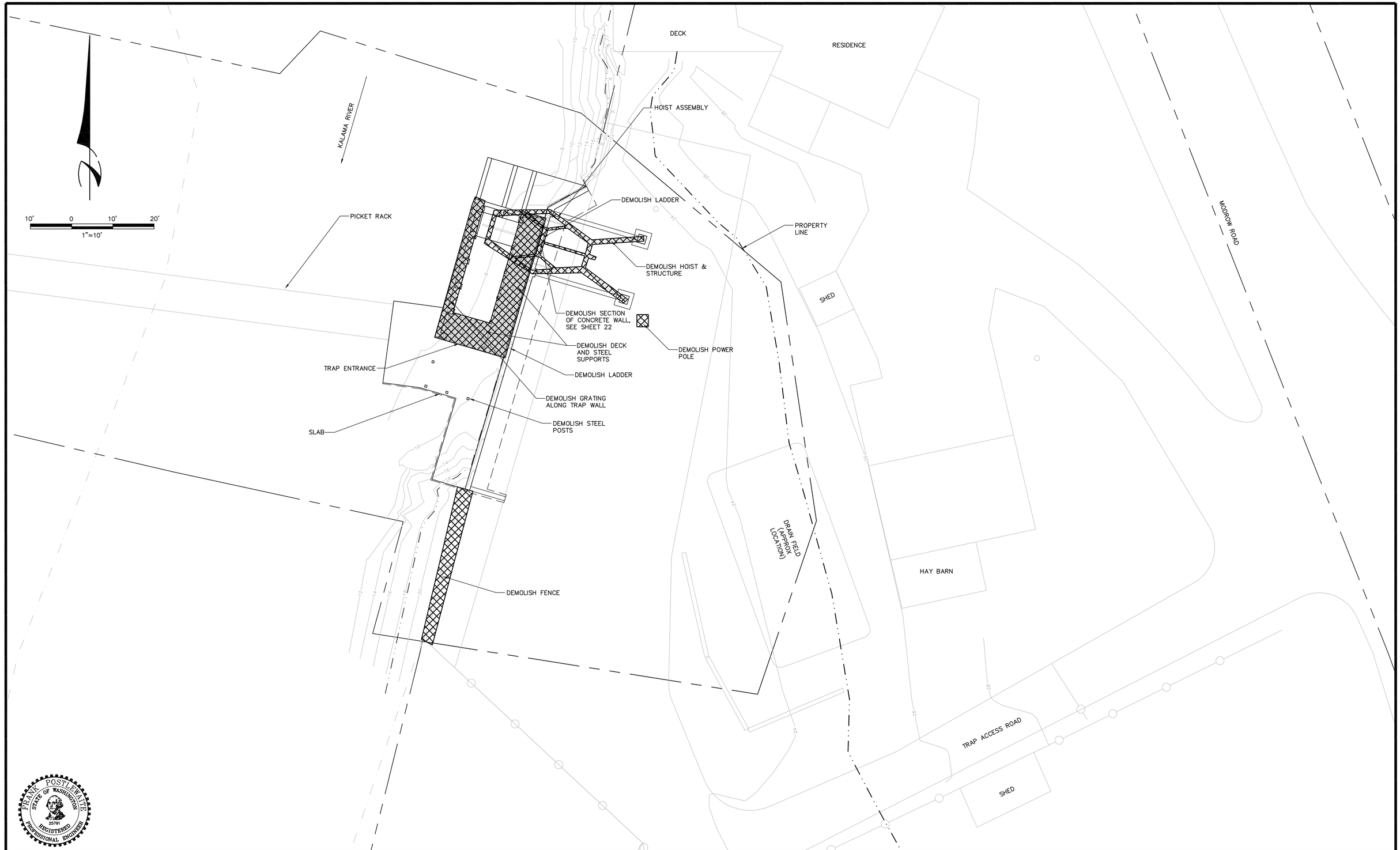
APPROVED AND RELEASED FOR CONSTRUCTION
CHIEF ENGINEER ..... DATE: .....
PROGRAM ..... DATE: .....

0 — 1"
BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS

DESIGNED BY F. POSTLEWAITE
CHECKED BY D. TURNER
DRAWN BY J. SCHULZ
DATE 10/2011

KALAMA FALLS HATCHERY
MODROW TRAP MODIFICATIONS
EROSION & SEDIMENT CONTROL NOTES

PROJECT NO. CZ:H28:11-1
SHEET 7 OF

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CHIEF ENGINEER ..... DATE: .....

PROGRAM ..... DATE: .....

0 — 1"
BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS

DESIGNED BY F. POSTLEWAITE
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DRAWN BY J. SCHULZ
DATE 10/2011

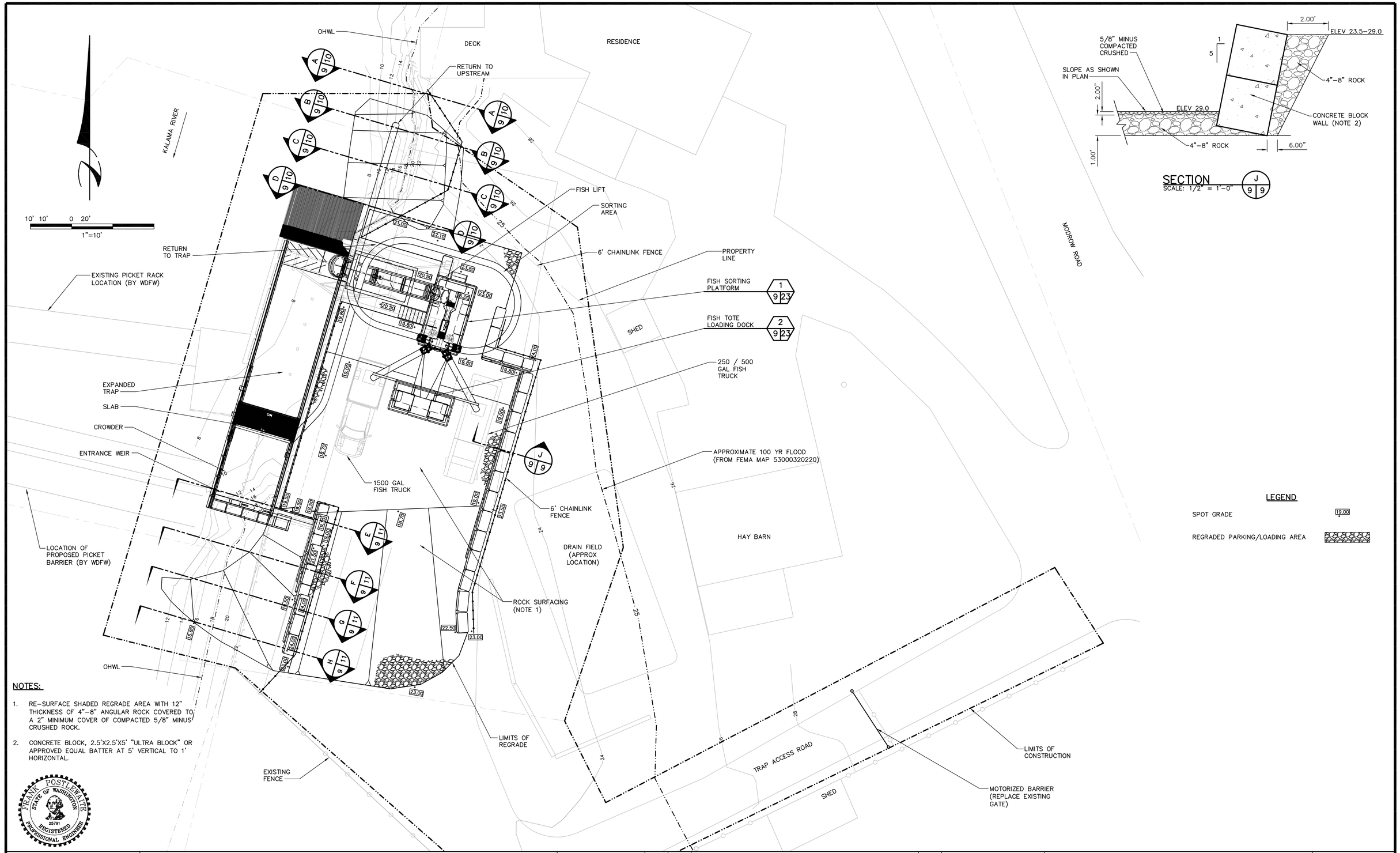
KALAMA FALLS HATCHERY

MODROW TRAP MODIFICATIONS

DEMOLITION PLAN

PROJECT NO. CZ:H28:11–1

SHEET 8 OF




NOTES:

1. RE-SURFACE SHADED REGRADE AREA WITH 12" THICKNESS OF 4"–8" ANGULAR ROCK COVERED TO A 2" MINIMUM COVER OF COMPACTED 5/8" MINUS CRUSHED ROCK.
2. CONCRETE BLOCK, 2.5'X2.5'X5' "ULTRA BLOCK" OR APPROVED EQUAL BATTER AT 5' VERTICAL TO 1' HORIZONTAL.

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CHIEF ENGINEER ..... DATE: .....
PROGRAM ..... DATE: .....

0 —— 1"
BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS

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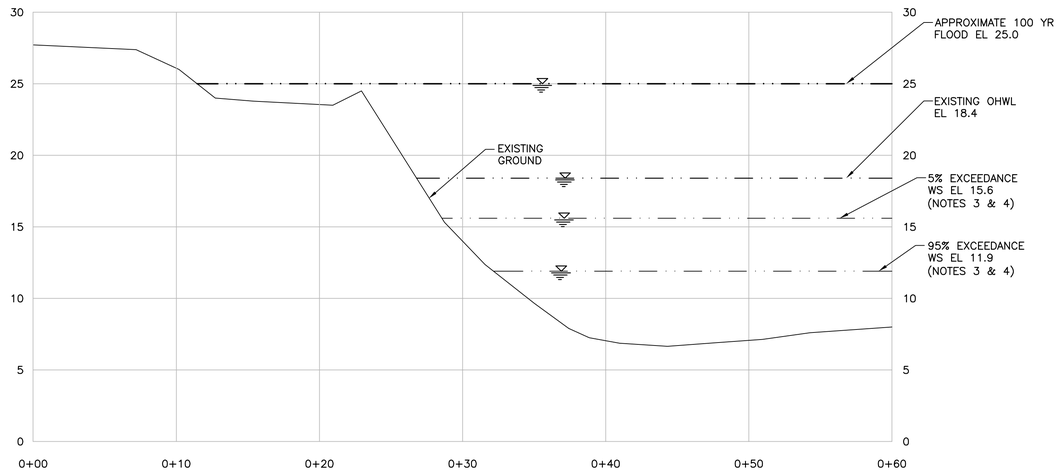
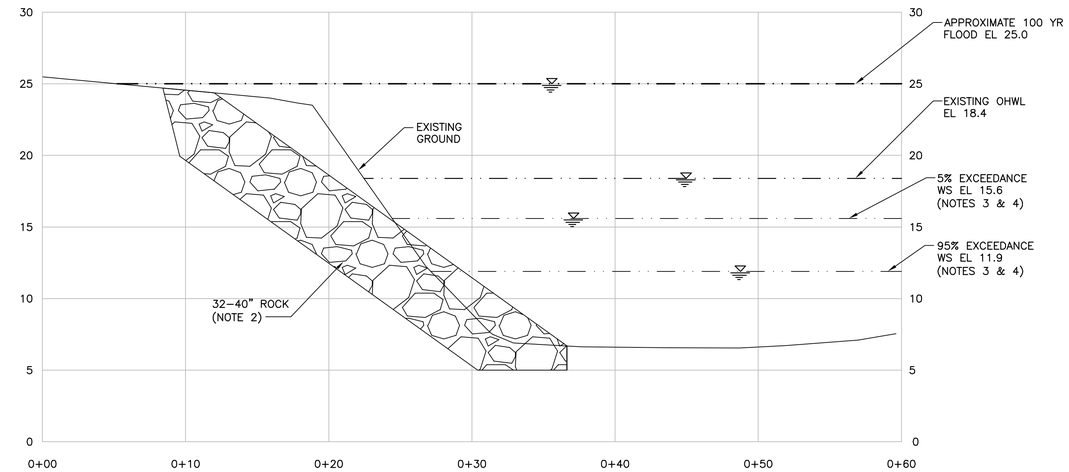
CHECKED BY D. TURNER
DRAWN BY J. SCHULZ
DATE 10/2011

KALAMA FALLS HATCHERY
MODROW TRAP MODIFICATIONS
CIVIL
SITE 1 (GRADING AND PAVING)

PROJECT NO. CZ:H28:11–1
SHEET 9 OF




SECTION A 9 10
SCALE: 1" = 5'-0"




SECTION C 9 10
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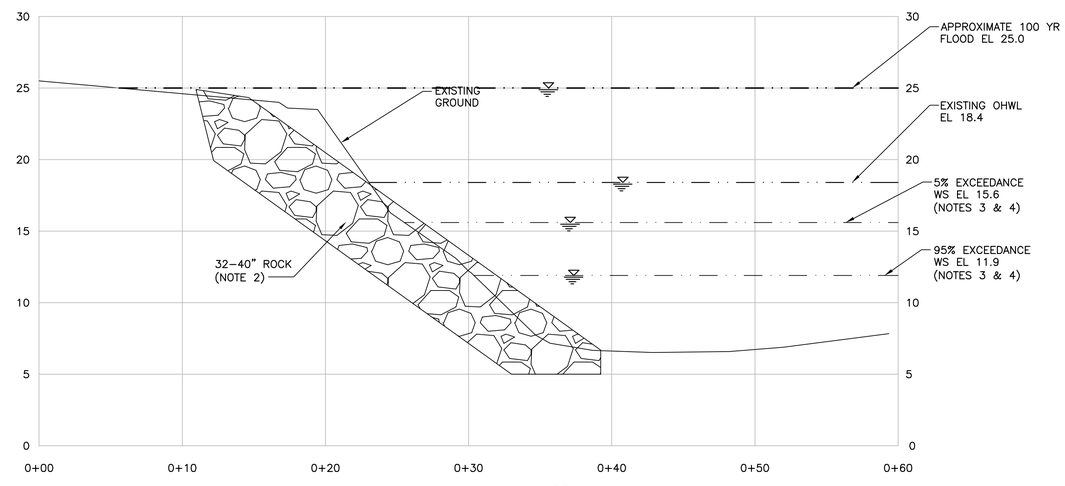
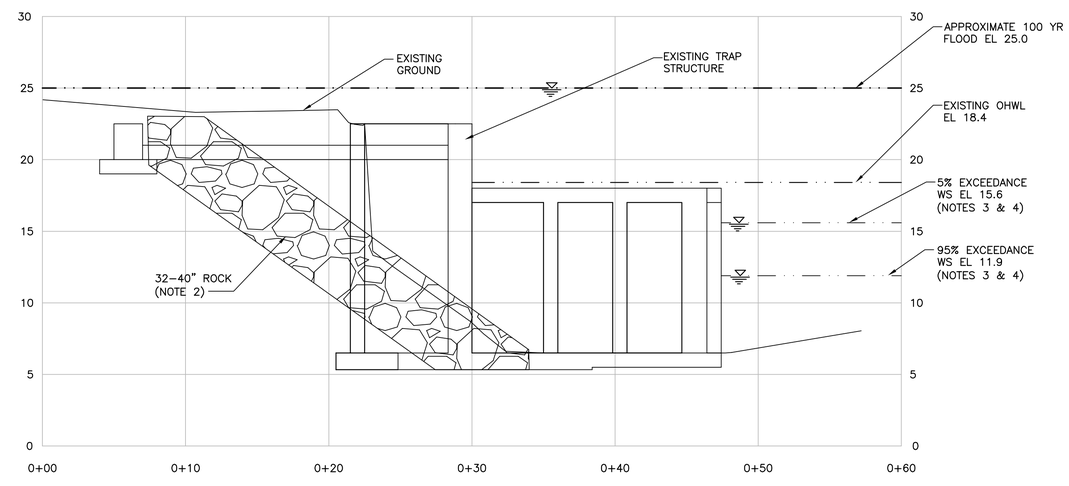



SECTION B 9 10
SCALE: 1" = 5'-0"




SECTION D 9 10
SCALE: 1" = 5'-0"

NOTES:

1. 4-8" BROKEN ROCK, DIMENSION IS AVERAGE SIZE OF ROCK.
2. 32-40" BROKEN ROCK, DIMENSION IS AVERAGE SIZE OF ROCK. SET ROCK AT 1.35 HORIZONTAL TO 1 VERTICAL SLOPE.
3. EXCEEDANCE CONDITIONS DURING TRAP OPERATION AUGUST - OCTOBER.
4. OPERABLE TRAP CONDITION WS ELEV 15' @ 8% EXCEEDANCE.

FRANK POSTLEWAITE STATE OF WASHINGTON 25791 REGISTERED PROFESSIONAL ENGINEER

Resource Consultants, Inc.
REDMOND, WA.

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APPROVED AND RELEASED FOR CONSTRUCTION

CHIEF ENGINEER ..... DATE: .....
PROGRAM ..... DATE: .....

0 — 1"
BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS

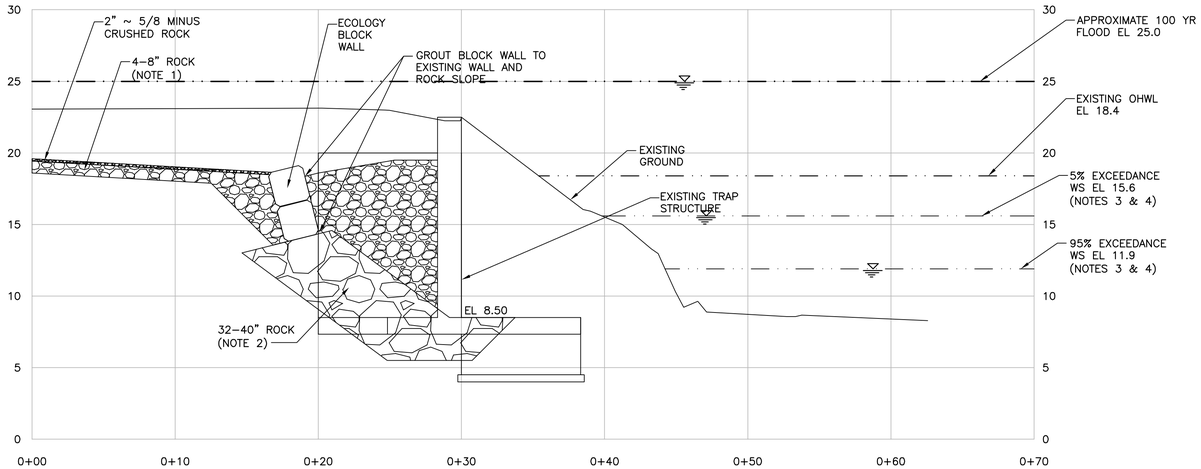
DESIGNED BY F. POSTLEWAITE
CHECKED BY D. TURNER
DRAWN BY B. GOCHENOUR
DATE 10/2011

KALAMA FALLS HATCHERY

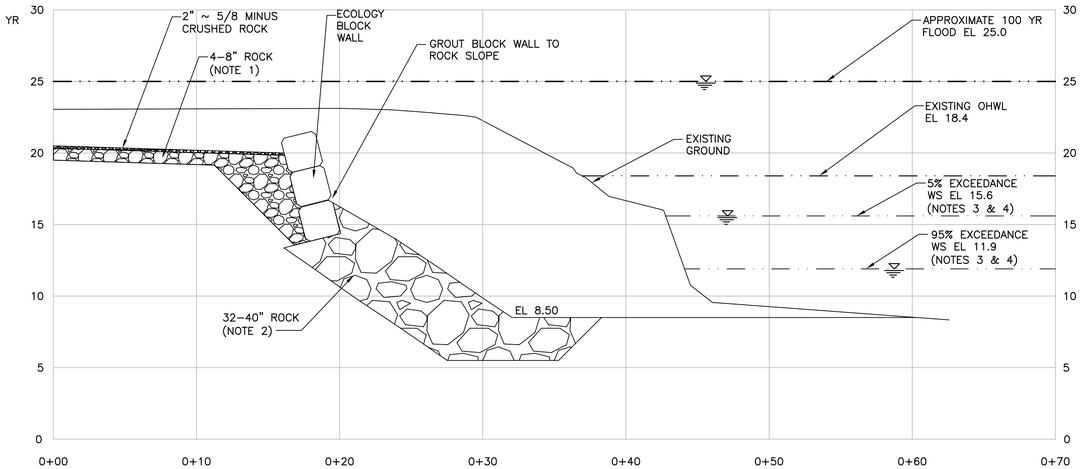
MODROW TRAP MODIFICATIONS
CIVIL
UPSTREAM CROSS SECTIONS

PROJECT NO. CZ:H28:11-1

SHEET 10 OF




SECTION E 9 11
SCALE: 1" = 5'-0"




SECTION F 9 11
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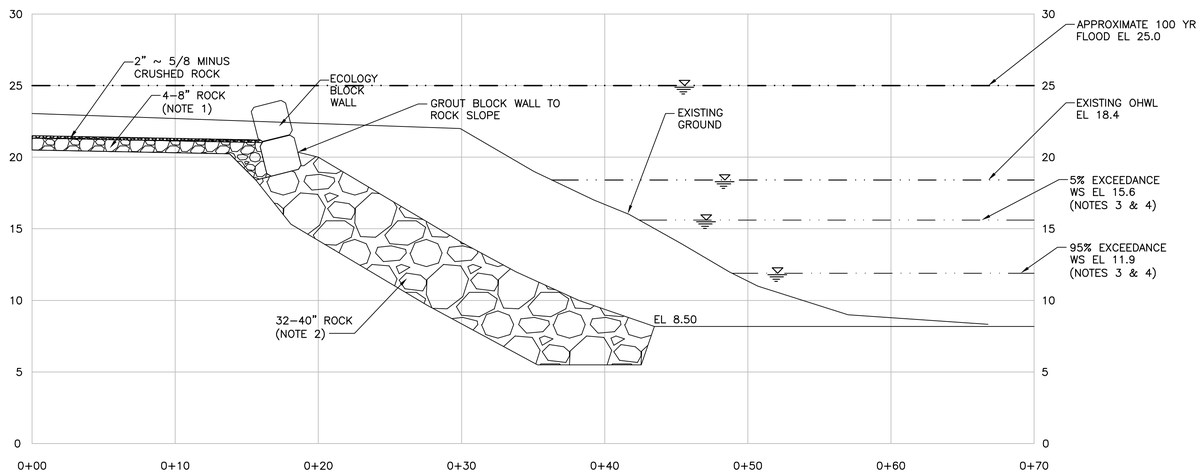
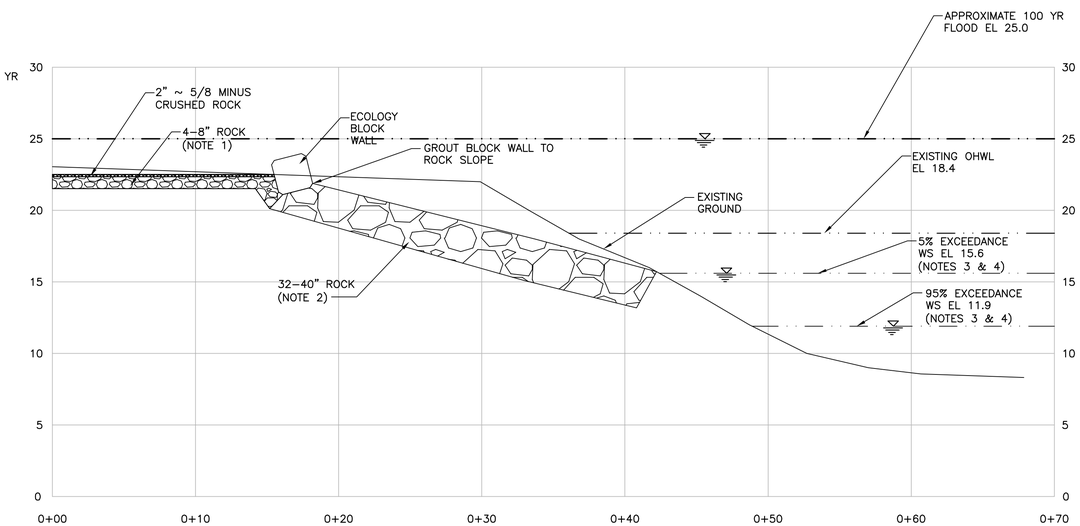



SECTION G 9 11
SCALE: 1" = 5'-0"




SECTION H 9 11
SCALE: 1" = 5'-0"

NOTES:

1. 4-8" BROKEN ROCK, DIMENSION IS AVERAGE SIZE OF ROCK.
2. 32-40" BROKEN ROCK, DIMENSION IS AVERAGE SIZE OF ROCK. SET ROCK AT 1.35 HORIZONTAL TO 1 VERTICAL SLOPE.
3. EXCEEDANCE CONDITIONS DURING TRAP OPERATION AUGUST – OCTOBER.
4. OPERABLE TRAP CONDITION WS ELEV 15' @ 8% EXCEEDANCE.

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|---|---|---|---|
| | | APPROVED AND RELEASED FOR CONSTRUCTION | |

CHIEF ENGINEER ..... DATE: .....
PROGRAM ..... DATE: .....

0 —— 1"
BAR MEASURES ONE INCH ON ORIGINAL DRAWINGS

DESIGNED BY F. POSTLEWAITE
CHECKED BY D. TURNER
DRAWN BY B. GOCHENOUR
DATE 10/2011

KALAMA FALLS HATCHERY

MODROW TRAP MODIFICATIONS
CIVIL
DOWNSTREAM CROSS SECTIONS

PROJECT NO. CZ:H28:11-1

SHEET 11 OF

# APPENDIX D

## Biological Assessment

- DRAFT -

# Biological Assessment for Lower Columbia River Chinook Salmon, Lower Columbia River Coho Salmon, Columbia River Chum Salmon, Lower Columbia River Steelhead, and Eulachon, Southern DPS

## - Modrow Fish Trap Upgrade -

*Prepared for:*

**Washington Department of Fish and Wildlife**

*Prepared by:*

**R2 Resource Consultants, Inc.**
**15250 N.E. 95th Street**
**Redmond, Washington 98052**

**November 7, 2011**

**- DRAFT -**

# Biological Assessment

# Modrow Fish Trap Upgrade

*Prepared for:*

**Washington Department of Fish and Wildlife**

*Prepared by:*

**R2 Resource Consultants, Inc.**
**15250 N.E. 95th Street**
**Redmond, Washington 98052**

November 7, 2011

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1.2 LOCATION ..... 1
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# 1. INTRODUCTION

## 1.1 BACKGROUND

The purpose of this Biological Assessment (BA) is to address the effects of upgrades to the Modrow Fish Trap, Kalama River, Washington on species listed as threatened or endangered under the federal Endangered Species Act (ESA) of 1973 (50 CFR Part 17, 1999) and in accordance with legal requirements set forth under Section 7 of the ESA (16 U.S.C. 1536 [c]). This BA also addresses the essential fish habitat provisions of Public Law 104-297, the Sustainable Fisheries Act of 1996.

## 1.2 LOCATION

The Modrow Fish Trap is located in Cowlitz County along the southeast bank of the Kalama River near RM 2.5 (S 32, T 7N, R 1W). The Kalama River is a tributary to the Columbia River near RM 73.0. The Modrow Fish Trap collects broodstock for the Fallert Creek Hatchery located near RM 5.0 and the Kalama Falls Hatchery located near RM 10.5. Both the Modrow Fish Trap and the hatcheries are owned and operated by the Washington Department of Fish and Wildlife (WDFW). Photographs of the Modrow Trap vicinity are provided in Appendix A, Figures A-1 through A-5.

## 1.3 PURPOSE AND NEED

The Modrow Fish Trap is operated annually from August 1st to October 15th for the attraction and collection of hatchery broodstock. Under current operation hatchery and wild fish from the fall Chinook salmon, coho salmon, and summer steelhead runs are captured in the trap, handled, and transported to Kalama Hatchery where they are held for sorting. At the time of sorting, broodstock are moved to holding ponds, and fish in excess of broodstock needs are transported back to the Kalama River for release. Surplus hatchery fish are sacrificed for nutrient enrichment of streams or food bank donations.

The existing trap is undersized with respect to broodstock collection needs; thus, up to five trips per day are needed to remove the fish from the trap and transport them to the hatchery. This has resulted in overcrowding both in the trap and in the hopper. Under these conditions fish may be delayed from entering the trap and some fish may jump or fall from the hopper during transition to the fish truck. In addition, resident fishes that are not to be held for broodstock may be inadvertently collected, handled, and transported to the hatchery and back to the river prior to release. These events are undesirable and have potentially negative impacts on fish.

The purpose of the Modrow Trap Upgrade is to improve holding, sorting, and transport conditions for both hatchery and wild fish entering Modrow Trap. Specifically, the new facility will reduce impacts to both hatchery and wild fish associated with fish collection, handling, and transport. The expanded Modrow Trap will result in more optimal holding conditions. Trap upgrades also include an automated crowder with a vertical crowder floor that will encourage fish into a pescalator. Fish exiting the pescalator pass into a simple sorting facility that combines a DC electro-anesthesia system with hand-wand coded wire tag (CWT) detection and manual sorting. This onsite fish sorting facility eliminates the need for transporting all captured fish to the Kalama Falls Hatchery. Instead only fish intended for the hatchery are transported, thereby reducing unnecessary negative impacts associated with fish transport. Sorting tubes will be used to: 1) move fish from the sorting platform to fish transport trucks, 2) return fish back to the Kalama River immediately upstream of Modrow Trap, 3) return fish back to the trap for additional holding if necessary, and 4) move excess hatchery fish into totes for surplus. Final destinations for the surplus fish include nutrient enrichment and food bank donation. The habitat available to upstream migrating wild salmon and steelhead will be increased by quickly releasing wild fish upstream of the trap. The Modrow Trap and sorter upgrades were developed based on WDFW hatchery protocols for handling and sorting, and using NMFS guidelines and criteria published in 2008.

## 1.4 EVALUATION METHOD

The initial step in determining potential effects of the trap upgrade on listed species was to identify which species could potentially occur in the action area. Species lists for the general area were obtained from the U.S. Fish and Wildlife Service (USFWS) Washington Fish and Wildlife Office, National Marine Fisheries Service (NMFS) Northwest Regional Office, and WDFW. In addition, the Federal Register was reviewed to identify species for which designations of critical habitat included the Kalama River. Terrestrial and avian species included on the USFWS species list for Cowlitz County (as of August 2, 2011) were Columbian whitetailed deer *(Odocoileus virginianus leucurus)*, gray wolf *(Canis lupus)*, Marbled murrelet *(Brachyramphus marmoratus)*, and Northern spotted owl *(Strix occidentalis caurina)*. However, given the limited terrestrial footprint of the action area, preexisting development in the vicinity, and the lack of any anticipated impact on upland or forested habitat, these species are not included in this BA. Rather, this document focuses on listed fish species that potentially or are known to occur in the action area: Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), chum Salmon (*O. keta*), steelhead (*O. mykiss*), and eulachon *(Thaleichthys pacificus)*. Bull trout *(Salvelinus malma)* were also included on the USFWS species list for Cowlitz County. However, because no portion of the Kalama River watershed was included in critical habitat designations for this species (75 FR 63898), because the only known population

of bull trout in the Lower Columbia is in the Lewis River (NMFS 2000), and because there are no known records of bull trout in the Kalama River, bull trout were not included in this BA.

For the select species listed above, factors considered in evaluating project impacts included the species' dependence on specific habitat components that would be removed or modified, the abundance, distribution, and quality of habitat, species distribution and population levels, the possibility of direct impacts to present species, the degree of impact to habitat, and the potential to mitigate the adverse effect. The strategy outlined in this document is to determine the environmental baseline for the watershed, discuss how the proposed action would affect the environmental baseline, and then use that information to arrive at a determination of effect.

The information presented in this BA is based upon a review of documents describing the Kalama River watershed and its biota, meetings and discussions with WDFW staff, and communications with the US Fish and Wildlife Service. The primary literature sources used in this document are the Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan for the Kalama River (LCFRB 2004), the Limiting Factors Report for WRIA 27 (Wade 2000), the Kalama, Washougal and Lewis River Habitat Assessments commissioned by the Lower Columbia Fish Recovery Board (R2 and MBI 2004), various species status reviews conducted by NMFS, the Columbia River Hatchery Reform System-Wide Report (HSRG 2009), and WDFW's most recent Salmonid Stock Inventory (WDFW 2002).

# 2. PROJECT DESCRIPTION

## 2.1 PROJECT SUMMARY

The proposed Modrow Trap upgrade would use the existing footprint, but include an expanded trap with increased holding capacity, a new crowder, an elevated sorting platform, a pescalator for moving fish from the trap to the sorting platform, and fish sorting tubes that deliver fish to the Kalama River upstream of the trap, back to the trap for holding, or into transportation trucks. The parking area for the trucks will be surfaced with crushed rock. The site is owned by WDFW. A temporary picket fence weir is installed seasonally by WDFW to guide upstream migrating fish into the trap. A drawing of the site and trap upgrades is provided in Appendix B.

### 2.1.1 Live Trap Holding Pool

The pool volume of the trap will be increased by extending the outside wall of the trap to match the existing concrete slab. In addition, a small section of steel floor would be added to square off the footprint. The resulting pool volumes would be approximately 3,100 cubic ft at low river flow, and 5,400 cubic ft at the maximum high flow operation which provides 1 day holding for an equivalent of 620 to 1,080 fall Chinook at low and high water levels respectively. Fish will enter the reconfigured entrance, passing over a finger weir into the holding pool.

The head drop across the trap and barrier will increase relative to the existing trap due to the closer spacing of the picket trap panel bars, the use of a resistance board, and less open area due to likely debris clogging. The drop through the trap will be approximately 1.3 ft at high flow, and 0.6 ft at low flow operation. An inclined trash rack, with 1.38-inch openings, would be located across the upstream end of the trap, which will be manually cleaned. Flow through the trap will be distributed initially by a row of baffle panels downstream of the trash rack, then through a diffuser panel. The diffuser panel will consist of a series of parallel vertical bars (or pipe) with 1.5-inch clear openings. The purpose of distributing the flow through the pool is to maintain an attraction to fish toward the upstream end of the holding pool without creating any high velocity hotspots, and to orient fish toward the entrance to the pescalator.

### 2.1.2 Fish Lift

The pescalator entrance will be placed at the opposite corner from the pond entrance, oriented at 90 degrees to the pond. The pescalator will lift fish from the river to elevation 29.5 for a maximum height of 17.5 ft at low water conditions. A manual hoist would be used to raise the pescalator as the river lever rises in order to maintain the water level at the center of the pescalator inlet.

### 2.1.3 Fish Sorting

The sorting system has been designed to provide visual sorting of fish. The sorting platform will be constructed of structural steel with either grip-strut or bar grating. The sorting table will be constructed from stainless steel. Stairway access will be located at the northeast and southwest corners of the platform. Fish exiting the pescalator will pass into an anesthesia tank outfitted with a DC voltage electro-narcosis system. This system results in minimal adverse effects on fish relative to other systems and also provides a rapid recovery time of a few seconds.

This sorting system requires two operators on either side of the sorting table. Either operator will be able to control the operation of the pescalator to manage the rate at which fish pass into the anesthesia tank. After the fish has been anesthetized, either operator will raise a brail and transfer fish onto the sorting table. Once on the table the fish are identified for fish species and origin (natural origin or hatchery origin) then directed into the appropriate sorting pipe.

The sorting system will use five pipes directing fish to the desired location. Two 18-inch diameter PVC flume inlets are directly next to each operator. The one heading west routes fish to the river upstream of the picket weir. The one heading east bends around and directs fish back to the holding pool. The other three flumes on the south side of the sorting chamber route fish to either the 1,500 gallon truck or smaller transport tanks (250 or 500 gallon flat bed truck mounted), or to the surplus totes.

Surplus fish are checked for coded wire tags (CWT) with a hand wand prior to passing through a stunner. A manually actuated gate is positioned to route the surplus fish into the appropriate tote, one tote for fish with CWTs and one tote for fish without. The totes will be placed on a concrete loading dock, which is positioned to accommodate handling with an all-terrain forklift.

### 2.1.4 Bank Stabilization

There will be excavation of the bank upstream and downstream of the trap for placement of the bank stabilization measures, all within the coffer cell dewatered area. The embankment work will most likely be completed by a tracked excavator with a reach sufficient to excavate and place material from the top of slope.

### 2.1.5 Construction, Dewatering, and Fish Salvage Technique

Construction of the fish trap and fish lift vault will occur mostly below the ordinary high water (OHW) line (elevation of 18 ft) within an area dewatered within a coffer cell constructed by the use of “super sacks.” The super sacks will be placed by a mobile crane with a boom length

adequate to construct the coffer cell from the top of the bank. The top of the super sack coffer cell system will be at a minimum elevation of 14 ft, and the area dewatered within the coffer cell area will be approximately 2,700 square ft (i.e., 20-ft wide by 135-ft long).

Any remaining water or seepage within the coffer cell impoundment will be pumped out of the dewatered area to a sediment settling facility on the adjacent property or to a portable storage tank for offsite disposal at an approved facility. The fish lift vault is a precast concrete vault designed to be attached perpendicularly to the landside wall of the trap. The opening in the trap wall will align with the open end of the concrete vault. The excavation for and the placement of the vault will occur before the wall opening is constructed. Excavation for the vault will be completed using an excavator, front end loader, and dump truck. The perimeter of the trap wall opening will be saw cut, and the concrete removed and deposited in an approved facility. The fish trap expansion will be conducted by installing a large steel plate over the existing slab that extends downstream from the existing trap. Concrete will be pumped into the void below the plate and above the stream bed through holes in the plate after it is installed, and will be retained within the perimeter of the steel plate footprint. The fish sorting facility will be constructed on the landside of the concrete trap wall. The work will most likely be completed with a mobile crane, track hoe, front end loader, and dump truck. All construction activities are within the 100-year floodplain.

Fish salvage efforts will be conducted inside the coffer cell system following installation and prior to any construction activity. Fish collected will be conducted by seining and, if necessary, electrofishing. If water depths preclude effective seining, then a fish screen meeting NMFS criteria will be placed on the upstream end of the pump before dewatering occurs. Fish salvage efforts will continue during the dewatering process until all reasonable efforts have been made to ensure the removal all fish.

### 2.1.6 Trap Operations

No change in the period of trap operations is proposed. However, trap operation protocols will be modified due to improvements in the trap design. The existing trap does not have on-site sorting facilities. Consequently, current trap operations include transportation of all captured fish to the Kalama Hatchery for sorting. Captured fish not needed for hatchery brood stock are currently either transported back to the trap location or released upstream of the trap. With the capabilities of the on-site sorting facility that will be available following the trap upgrade, fish that are not needed as broodstock can be immediately released upstream of the trap without being transported to and from the hatchery.

## 2.2 MITIGATION AND MONITORING

Impacts to the Kalama River that may occur as a result of project construction will be avoided and minimized by working within the existing facility footprint, by conducting all project work in the dry, and through the use of Temporary Erosion and Sediment Control (TESC) measures and other best management practices. A coffer cell will be used to isolate the action area in the river. The coffer cell, which will have a minimum elevation of 14 ft, will be completely sealed to prevent deleterious materials from leaching into the river, and all coffer cell materials will be removed upon project completion. In addition, all waste materials (e.g., construction debris, silt) shall be deposited above the limits of floodwater in an approved upland disposal site.

Wastewater from the project activities and water removed from the work area will be routed to an upland area above the OHW line to allow for the removal of fine sediment and contaminants from the water prior to discharge. Maintenance and fueling of construction equipment shall be performed in a manner that will minimize potential contamination of stormwater and adjacent waterways. Cranes and excavators will work from the upland area on the land side of the existing trap. Excavators will work above the excavation with upslope digging. Excavated material that will not be used for fill will be placed directly into trucks and hauled offsite. Additional measures include requirements for control of runoff from the project site, proper treatment and disposal of the runoff, protection of existing facilities, design of erosion control barrier, and other best management practices.

Fish salvage will be conducted following installation of the coffer cell and prior to dewatering, as described above. Total dissolved solids (TDS) will also be monitored prior to, during, and following installation and removal of the coffer cell to ensure that activities do not lead to any prolonged periods of potential sedimentation during the construction period or immediately thereafter. In addition, prior to deployment of the coffer cell, substrates in the closest upstream section of the stream channel that is readily wadeable will be inspected for adhered eulachon eggs that would indicate spawning has occurred upstream of the action area. To the extent possible, the action area will be inspected for the presence of steelhead redds prior to deployment of the coffer cell.

In the long-term, the completed project will have beneficial impacts on the aquatic environment. The bank stabilization element of the project will prevent stream bank erosion from occurring in the project vicinity, and operation of the upgraded trap will minimize impacts to fish utilizing the Kalama River, as described below.

## 2.3 PROJECT ACTION AREA

The property at the trap location is characterized by two distinct areas: the Kalama River and an upland area on the hydraulic left bank of the river. The riverine habitat is characterized by cobble and gravel substrates and moderate depth and flow conditions and serves as a migration route for several salmonid species including: hatchery and wild spring and fall Chinook salmon, hatchery and wild early- and late-run coho salmon, hatchery and wild summer and winter steelhead, wild chum salmon, wild coastal cutthroat trout, and eulachon The upland area consists primarily of a gravel and dirt lot with relatively sparse grasses and herbaceous vegetation (Figure A-1). There is a single deciduous tree (Oregon ash) located in the upland area within the property boundary. There is also vegetative cover on the steep, rocky hydraulic left bank of the river upstream and downstream of the existing trap. On the downstream side of the trap, bank vegetation consists of two deciduous trees (a willow and a big leaf maple) and herbaceous plants, such as willow shrubs, grasses, thistle, and blackberry (Figure A-4 and Figure A-5). On the upstream side of the trap, the small amount of bank vegetation consists primarily of blackberry and other herbaceous grasses and plants (Figure A-3). The hydraulic right bank of the Kalama River within the property boundary is characterized by cobble, gravel, and silt substrates with sparse herbaceous vegetation, such as grasses, willow shrub, and thistle (Figure A-2).

All structures on the property are associated with the operation of Modrow Trap. The structures include a picket weir, the trap, and hoist assembly system, as shown on Sheet X in the design drawings packet. The picket weir, which is installed annually by WDFW from August 1 to October 15, is approximately 135 ft in length and extends from the trap entrance on the hydraulic left bank of the Kalama River to the opposite bank. The fixed portion of the weir is composed of wooden pickets (2x4's) supported by a timber frame and weighted by precast concrete blocks. A 20-ft long floating weir section, consisting of parallel 1-inch diameter PVC pipes with 1-inch clear spacing, is positioned in the center of the channel. The floating weir is referred to as a “resistance barrier.” It is hinged and anchored to the river bed at the upstream edge, allowing enough resistance and buoyancy to prevent fish passage upstream while at the same time allowing boats to pass downstream. The weir directs upstream migrants to the trap entrance. The base of the trap is concrete, which supports concrete columns and steel panels on the outside wall (45 ft in length, 16 ft in width). Fish enter into the trap and remain in the trap until they are crowded into a fish hopper located at the upstream end of the trap. Crowding is conducted using a manually operated steel crank system, which is mounted to the top of the concrete walls of the trap. The hoist framework assembly is constructed of steel. An electrically powered hoist lifts the fish hopper from the upstream end of the trap to the truck loading area.

# 3. ENVIRONMENTAL BASELINE CONDITIONS

The Kalama River begins along the southwest slope of Mt. St. Helens and flows for roughly 44 miles before meeting the Columbia River near RM 73. The majority (99 percent) of the 205 square-mile watershed is located in Cowlitz County while a small portion of the headwaters lies in Skamania County (Wade 2000). Roughly 96 percent of the watershed is commercial forest land that is owned and managed by private companies for timber production (Wade 2000). Road density in the watershed is high (5.75 miles/square mile) primarily as a result of timber harvest activities (LCFRB 2004). Mudflows from the eruption of Mt St. Helens traveled down many drainages in the watershed and left unconsolidated volcanic deposits that erode along steep slopes and increase the likelihood of mass wasting in the upper watershed (Wade 2000). Fish habitat in much of the watershed has also been heavily degraded from timber harvest operations which can adversely affect water quality, sediment load, and substrate composition (NMFS 2010). In the lower Kalama River, most of the floodplain has been disconnected from the river by the construction of dikes and levees, the construction of U.S. Interstate-5, and development on Port of Kalama property (LCFRB 2004, NMFS 2010). The high degree of channelization in the lower reach may affect water flow and quality as well as substrate quality.

Water temperatures in the upper and middle portions of the Kalama River are generally considered suitable from a fisheries standpoint (LCFRB 2004). However, portions of the lower Kalama River and Hatchery Creek are listed on the Washington State's 303(d) list of impaired water bodies because they exceed water temperature standards (WDOE 1998). A wide, shallow channel created at the mouth of the Kalama River by sediment accumulations is thought to cause elevated temperatures and potentially harmful conditions for fish migrating during summer low flows (LCFRB 2004). Nutrient levels are thought to be low upstream of Kalama Falls due to limited marine-derived nutrients although the planting of carcasses may mitigate this deficiency (Wade 2000).

Substrates required for salmonid spawning and incubation appear to be limited in the Kalama Basin. Embeddedness ratings were high in the lower river and several mainstem tributaries (R2 and MBI 2004). Substrate fines are a concern throughout the watershed, primarily from highly erodible soils, logging activity, and high road densities (LCFRB 2004). Likewise, sediment accumulations at the mouths of some tributaries are a concern that, along with culverts and log jams, create potential barriers on several tributaries (Wade 2000).

The overall LWD recruitment potential of riparian stands in the Kalama basin is relatively poor due to small size of riparian trees and human encroachment in the riparian zone (R2 and MBI

2004, Wade 2000). However some large pieces are present in the mainstem, typically as part of log jams (LCFRB 2004). Although some tributaries were found to have limited pool habitat, pool availability in most of the basin is considered adequate (R2 and MBI 2004, LCFRB 2004, Wade 2000).

With only a small portion of the watershed located above the usual snowline, flow in the Kalama River is primarily derived from rainfall (LCFRB 2004). Peak flows generally correspond with mid-winter rains and occur in December (mean flow 2,157 cfs) or January (mean flow 2,152 cfs). Low flows typically occur in August (mean flow 306 cfs). From 1953-67, mean annual flow was 1,219 cfs.

# 4. NATURAL HISTORY AND SPECIES OCCURRENCE

Five fish species known to occur in the Kalama River watershed are listed under the Endangered Species Act. These species are Chinook, coho, and chum salmon, steelhead, and eulachon. Critical habitat for each of these species has been designated in the Kalama River watershed. Therefore, these species are addressed in this BA and their natural history and occurrence are described below. Bull trout do not occur in the Kalama River watershed (LCFRB 2004) and the USFWS' final rule on critical habitat for bull trout in the coterminous United States (75 FR 63898) does not include the Kalama River or any of its tributaries. Therefore, bull trout are not addressed in this BA.

## 4.1 LOWER COLUMBIA RIVER CHINOOK SALMON

### 4.1.1 Status

Chinook salmon (*Oncorhynchus tshawytscha*) in the lower Columbia River and its tributaries are classified as either spring-run or fall-run, depending on when they enter freshwater. Both runs are considered part of the Lower Columbia River Chinook Salmon Evolutionarily Significant Unit (ESU). NMFS initially listed the Lower Columbia ESU as threatened on March 24, 1999 (64 FR 14308) and reaffirmed this status on June 28, 2005 (70 FR 37160). More recently, on August 15, 2011, NMFS issued the results of a five-year review concluding that the ESU should remain listed as threatened (76 FR 50448). This ESU includes all naturally spawned populations of Chinook salmon from the Columbia River and its tributaries, including the Kalama River, from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the White Salmon and Hood rivers. The Kalama Tule Fall Chinook Program and the Kalama River Spring Chinook Program, as well as fifteen other artificial propagation programs, were excluded from this listing. NMFS published a final critical habitat designation on September 2, 2005 with an effective date of January 2, 2006 (70 FR 52630). Within the Kalama River watershed, the mainstem Kalama River up to upper Kalama Falls (approximately RM 37) and portions of several of its tributaries (Arnold Creek, Burris Creek, Elk Creek, Gobar Creek, Hatchery Creek, Little Kalama River, North Fork Kalama River, and Wild Horse Creek) have been designated as critical habitat for the Lower Columbia River Chinook Salmon ESU.

### 4.1.2 Life History

For fall Chinook returning to spawn, upstream migration occurs from mid August to mid September with peak entry into the Kalama River from late August to early September (LCFRB 2004). Natural spawning occurs in late September and October, peaking around mid-October (LCFRB 2004), though spawning also reportedly occurs as late as mid-November (WDFW

2002). For spring Chinook, entry into the Kalama River occurs from March through July and spawning takes place between late August and early October with a peak in September (LCFRB 2004, WDFW 2002). For both fall and spring Chinook, the age of returning adults ranges from 2-year old jacks to 6-year old adults. However, the dominant ages for fall Chinook (Myers et al. 1998) are age-3 (34 percent) and age-4 (55 percent) while the dominant ages for spring Chinook (LCFRB 2004) are age-4 (48 percent) and age-5 (38 percent).

Fall Chinook fry in the Kalama River emerge around early March and April and remain in fresh water for only a short time before migrating to sea in the late spring or summer as sub-yearlings (LCFRB 2004). Spring Chinook fry emerge between November and March, depending on time of egg deposition and water temperature, and spend one full year in fresh water before migrating to sea in their second spring as age-2 smolts (LCFRB 2004).

With an early migration and spawn timing, fall Chinook in the Kalama River display characteristics of tule fall Chinook, though their ocean distribution is typically farther north than most tule stocks (LCFRB 2004).

### 4.1.3 Distribution

The natural limit to upstream migration for Chinook salmon is Lower Kalama Falls (RM 10.5). The spawning distribution for fall Chinook primarily occurs in the mainstem from the Interstate 5 Bridge (RM 1.2) upstream to Italian Creek (RM 9.9) (WDFW 2002). The majority of spring Chinook spawning is concentrated between Kalama Falls hatchery (RM 10.5) and Fallert Creek (Lower Kalama) hatchery (RM 4.8) (WDFW 2002). However, since 1959, spring Chinook are also passed above Lower Kalama Falls. Most of the habitat for spring Chinook production is located upstream of the lower Kalama Falls and spawners have been observed up to upper Kalama Falls (RM 36.8) (LCFRB 2004). There are conflicting reports as to whether surplus hatchery fall Chinook are released below (WDFW 2002) or above (LCFRB 2004) lower Kalama Falls. Juvenile Chinook rearing occurs near and downstream of the aforementioned spawning areas.

### 4.1.4 Abundance

Historically, the Kalama River fall Chinook population was estimated to be from 3,800-20,000 adults (LCFRB 2004). Recent spawning escapements from 1964-2001 are similar, ranging annually from 1,055 to 24,297 (average 5,514; Figure 1). However, the majority of these returns are hatchery fall Chinook released as juveniles from the Kalama River hatchery program. Adult returns from 1997 to 2001 were, on average, comprised of 67 percent hatchery-origin spawners, or fish whose parents spawned in a hatchery (Good et al. 2005). Releases of hatchery fall

Chinook into the Kalama River began in 1895 (LCFRB 2004). As of 2004, Fallert Creek Hatchery (2.5 million) and Kalama Falls Hatchery (2.6 million) release a combined total of 5.1 million juvenile fall Chinook per year into the Kalama River (LCFRB 2004). The Kalama River fall Chinook stock was rated as "healthy" by WDFW in 2002 based on escapements that usually exceeded the escapement goal of 2,000 adults (WDFW 2002).

The historical Kalama River spring Chinook population was estimated to be from 6,000-15,000 adults though reports of such large numbers have not been verified (LCFRB 2004). Recent spawning escapements from 1980-2001 are less than 9,000 adults (Good et al. 2005; Figure 2). However, hatchery strays account for most spawners and current natural spawning numbers range from less than 50 to 600, with the majority of the natural spawners originating from the Kalama hatcheries (LCFRB 2004). Releases from Kalama Falls and Fallert Creek hatcheries began in the 1960s and averaged 378,280 fish from 197-2002 (LCFRB 2004). The Kalama River spring Chinook stock was rated as "depressed" by WDFW in 2002 due to chronically low escapements (WDFW 2002). WDFW concluded that a natural spawning escapement of 24,549 fall Chinook in 1988 only produced an estimated 522,312 to 964,439 juvenile fall Chinook in 1989 (LCFRB 2004). A smolt density model predicted the natural production potential of spring Chinook for the Kalama River below Kalama Falls of 111,192 smolts plus 465,160 smolts above Kalama Falls (LCFRB 2004). Actual juvenile production from natural spawning is presumed to be low

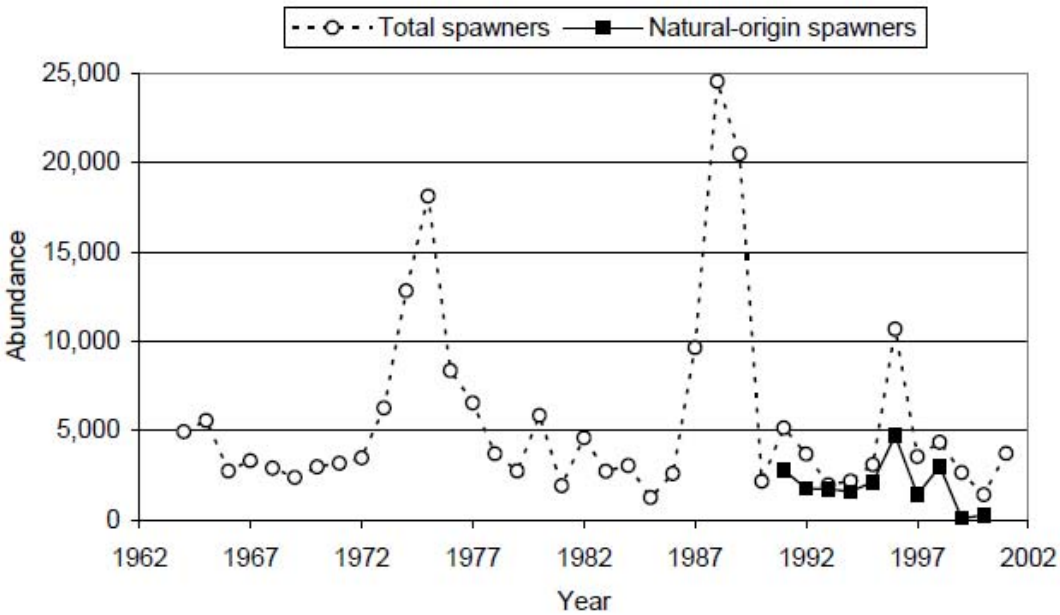


Figure 1. Fall Chinook salmon spawner abundance in the Kalama River, 1964-2001 (from Good et al. 2005).

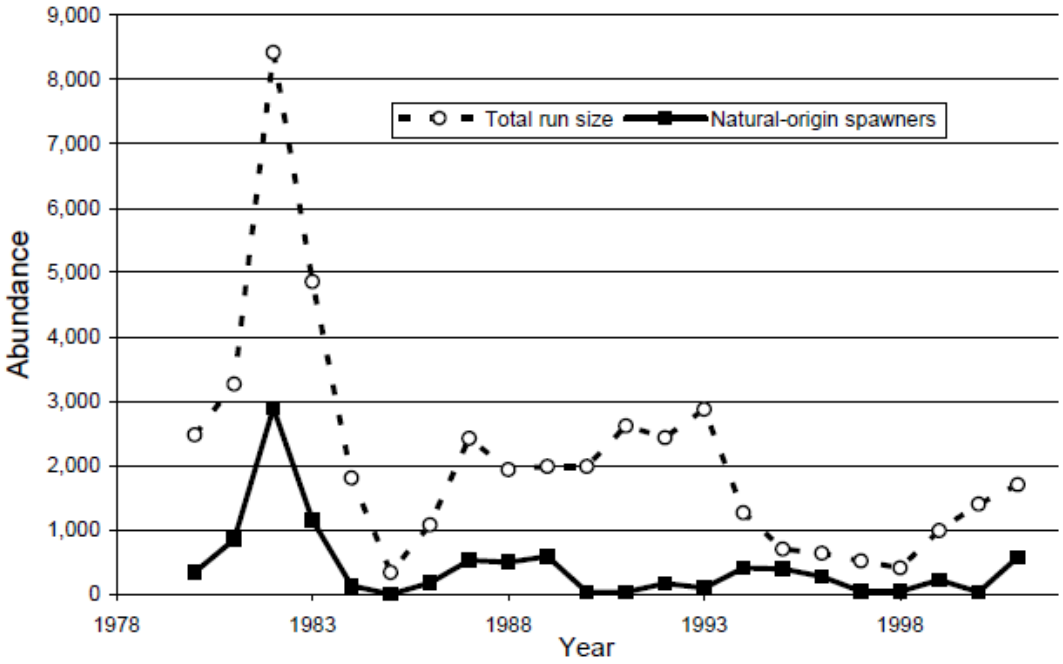


Figure 2. Spring Chinook salmon spawner abundance in the Kalama River, 1980-2001 (from Good et al. 2005).

## 4.2 LOWER COLUMBIA RIVER COHO SALMON

### 4.2.1 Status

Coho salmon (*O. kisutch*) in the lower Columbia River and its tributaries are classified as either early-run or late-run, depending on when they enter freshwater. Both runs are considered part of the Lower Columbia River Coho Salmon Evolutionarily Significant Unit (ESU). Originally part of a larger Lower Columbia River/Southwest Washington ESU, Lower Columbia River Coho Salmon were identified as a separate ESU and listed as threatened on June 28, 2005 (70 FR 37160). On August 15, 2011, NMFS issued the results of a five-year review concluding that the Lower Columbia River Coho Salmon ESU should remain listed as threatened (76 FR 50448). This ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries, including the Kalama River, from the mouth of the Columbia River up to and including the Big White Salmon and Hood rivers. The Kalama River Type-N and Kalama River Type-S Coho Programs, as well as 23 other artificial propagation programs, were excluded from this listing. A designation of critical habitat has not yet been proposed for the Lower Columbia River Coho ESU but is under development.

### 4.2.2 Life History

As with stocks elsewhere in the Lower Columbia River ESU, coho in the Kalama River occur as early-run and late-run fish. Early-run coho are also referred to as Type S(outh) and late-run coho are referred to as Type N(orth) based on their ocean distribution south or north of the Columbia River. Early-run coho typically enter the Kalama River from mid-August to September and spawn primarily in November, while late-run coho enter from late September to November and spawn during a more prolonged period from late November to March (LCFRB 2004). Peak spawning is in late October for early-run fish and December to early January for late-run fish. Adults return either as jacks at age-2 or as age-3 fish (LCFRB 2004). After fry emerge in the spring, they spend one year in freshwater before migrating to sea as age-1 smolts during the following spring. Peak smolt outmigration in the Kalama River occurs in May (Weitkamp et al. 1995).

### 4.2.3 Distribution

While natural spawning in the Kalama River has been reported in tributaries such as Fallert Creek, Arnold Creek, and the Little Kalama River (WDFW 2002), spawning is thought to be generally limited to the mainstem and accessible tributaries downstream of lower Kalama Falls (RM 10) (LCFRB 2004). A fish ladder at Kalama Falls built in 1936 provides access to upstream reaches, but a survey in 1951 indicated that most fish remained below the falls (LCFRB 2004).

### 4.2.4 Abundance

The historical population of adult coho in the Kalama River was estimated to be 2,000-26,000 and included both early- and late-run stocks (LCFRB 2004). While some hatchery-produced fish spawn naturally, current returns are unknown and assumed to be very low. Past surveys observed 1,422 coho in the late 1930s and 3,000 coho in 1951. The wild Kalama River coho run is thought to be a fraction of its historical size and hatchery production currently accounts for most returns (LCFRB 2004). Hatchery coho from the Fallert Creek Hatchery have been released to the Kalama River since 1942 and mixing with wild fish likely began with the first releases (WDFW 2002). Hatchery releases increased in 1967 but were recently reduced to the release of about 700,000 smolts that are half early-run (reared Fallert Creek Hatchery) and half late-run (reared at Kalama Falls Hatchery) (LCFRB 2004). While the Kalama River coho stock was rated as “depressed” by WDFW in 1992, the status was changed to “unknown” in 2002 because there was no longer adequate abundance trend data to make a status determination (WDFW 2002). Natural coho production is thought to be very low in the Kalama River (LCFRB 2004). Juvenile electrofishing in the Little Kalama River in 1994 and 1995 did not find any coho.

## 4.3 COLUMBIA RIVER CHUM SALMON

### 4.3.1 Status

NMFS initially listed the Columbia River Chum Salmon (*O. keta*) ESU as threatened on March 24, 1999 (64 FR 14508) and reaffirmed this status on June 28, 2005 (70 FR 37160). More recently, on August 15, 2011, NMFS issued the results of a five-year review concluding that the ESU should remain listed as threatened (76 FR 50448). This ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, including the Kalama River, as well as three artificial propagation programs (the Chinook River, Grays River, and Washougal River/Duncan Creek chum hatchery programs). NMFS published a final critical habitat designation on September 2, 2005 with an effective date of January 2, 2006 (70 FR 52630). Within the Kalama River watershed, a portion of the lower Kalama River mainstem from its mouth to approximately RM 5.0 has been designated as critical habitat for the Columbia River Chum Salmon ESU.

### 4.3.2 Life History

Adult chum salmon return to the Columbia River beginning in late September to as late as mid-November (Johnson et al. 1997). Returning adults are primarily age-3 and age-4 (LCFRB 2004). Spawning generally takes place from mid-November to December with peak spawner abundance in late November (LCFRB 2004). In the Kalama River, chum salmon have been observed as early as October (Johnson et al. 1997). As no hatchery chum salmon are released in the area, Kalama River fish are all naturally produced (LCFRB 2004). Fry emerge in early spring and spend little time rearing in freshwater before outmigrating as age-0 smolts.

### 4.3.3 Distribution

Chum salmon spawning in the Kalama River occurs in the lower reaches of the mainstem between the Modrow Bridge and lower Kalama Falls (LCFRB 2004).

### 4.3.4 Abundance

Historically, the population of chum salmon in the Kalama River was estimated to be between 15,000 and 40,000 adults (LCFRB 2004). Based on WDFW analysis using the EDT (Ecosystem and Diagnosis Treatment) model, the historical abundance in the Kalama River was 9,953 adults at equilibrium under historical habitat conditions (Good et al. 2005). However, subsequent escapement is considerably reduced; a 1951 estimate was 600 adults and current natural spawning is less than 50 adults (LCFRB 2004, HSRG 2009). The recovery goal for the natural chum population abundance is 150 adults (HSRG 2009). Neither the Fallert Creek Hatchery nor the Kalama Falls Hatchery produce or release chum salmon and no releases from other

hatcheries have been documented. Straying of hatchery-produced chum to the Kalama River population is considered negligible (HSRG 2009).

## 4.4 LOWER COLUMBIA RIVER STEELHEAD

### 4.4.1 Status

NMFS initially listed the Lower Columbia River Steelhead (*O. mykiss*) Distinct Population Segment (DPS) as threatened on March 19, 1998 (63 FR 13347) and reaffirmed this status on January 5, 2006 (71 FR 834). More recently, on August 15, 2011, NMFS issued the results of a five-year review concluding that the DPS should remain listed as threatened (76 FR 50448). This DPS includes all naturally spawned anadromous populations of *O. mykiss* 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 the Kalama River Wild (winter- and summer-run) steelhead hatchery programs and nine other artificial propagation programs. NMFS published a final critical habitat designation on September 2, 2005 with an effective date of January 2, 2006 (70 FR 52630). Within the Kalama River watershed, the mainstem Kalama River up to Kalama Falls (approximately RM 37) and portions of several of its named and unnamed tributaries have been designated as critical habitat for the Lower Columbia River Steelhead DPS.

### 4.4.2 Life History

Both summer and winter steelhead runs occur in the Kalama River. Adult summer steelhead generally migrate upstream into the Kalama River from June through October whereas winter steelhead migrate during December through April (Busby et al. 1996). Summer steelhead spawn in the Kalama River from January to April with a peak in February (LCFRB 2004), while winter steelhead spawn from March to June, with a peak in April and May (Busby et al. 1996). Summer steelhead fry emerge between March and May while winter steelhead fry emerge between April and early July (LCFRB 2004). For both summer (89 percent) and winter (87 percent) steelhead, the majority of juveniles rear in the Kalama River for two years before outmigrating (Busby et al. 1996), though small numbers reside for one or three years before outmigrating (LCFRB 2004). Smolt outmigration occurs from March to June, with peak outmigration from mid-April to mid-May (LCFRB 2004). Most Kalama River steelhead (74 percent for summer and 76 percent for winter steelhead) spend two years in the ocean before returning to spawn for the first time (Busby et al. 1996). Like other steelhead stocks, Kalama River steelhead are iteroparous. However, repeat spawners only make up a small proportion of the summer (6 percent) and winter (7 percent) runs (Busby et al. 1996).

### 4.4.3 Distribution

Summer and winter steelhead spawning occurs primarily in the mainstem and tributaries upstream of Kalama Falls Hatchery, including Gobar, Elk, Fossil, and Wild Horse creeks (LCFRB 2004, WDFW 2002, HSRG 2009). Upper Kalama Falls (RM 36.8) precludes further upstream migration. Juvenile steelhead rearing occurs both downstream and upstream of the areas where spawning occurs.

### 4.4.4 Abundance

LCFRB (2004) cites historical Kalama adult population estimates of 1,300-7,000 summer steelhead and 1,000-8,000 winter steelhead. Using EDT modeling, WDFW estimated historical abundances, at equilibrium, of 3,165 summer steelhead and 554 winter steelhead under historical habitat conditions (Good et al. 2005). Currently, natural spawning returns typically range from 200-2,300 summer steelhead and 500-2,300 winter steelhead (LCFRB 2004). Total and natural-origin spawner abundance dating back to 1977 are shown in Figure 3 for summer steelhead and Figure 4 for winter steelhead.

Steelhead hatchery programs in the Kalama River consist of the following (HSRG 2009):

- 30,000 smolt segregated summer steelhead program (Skamania origin),
- 30,000 smolt integrated summer steelhead program from 100 percent natural-origin broodstock,
- 45,000 smolt segregated winter steelhead program (early winter Chambers origin), and
- 45,000 smolt integrated winter steelhead program from 100 percent natural-origin broodstock.

WDFW estimated potential summer and winter steelhead smolt production was 34,850 and observed naturally-produced steelhead smolts migrating annually from 1978-1984 ranged from 11,175 to 46,659 (LCFRB 2004).

All hatchery-origin adults are collected at Kalama Falls and returned to the lower river to provide additional harvest opportunity while only natural-origin adults are passed upstream (HSRG 2009). In-breeding with non-native hatchery stocks is thought to be minimal due to differences in spawn timing (LCFRB 2004) though the estimated number of hatchery strays from the in-basin segregated program and out-of-basin hatchery programs is 32 summer steelhead and 30 winter steelhead (HSRG 2009).

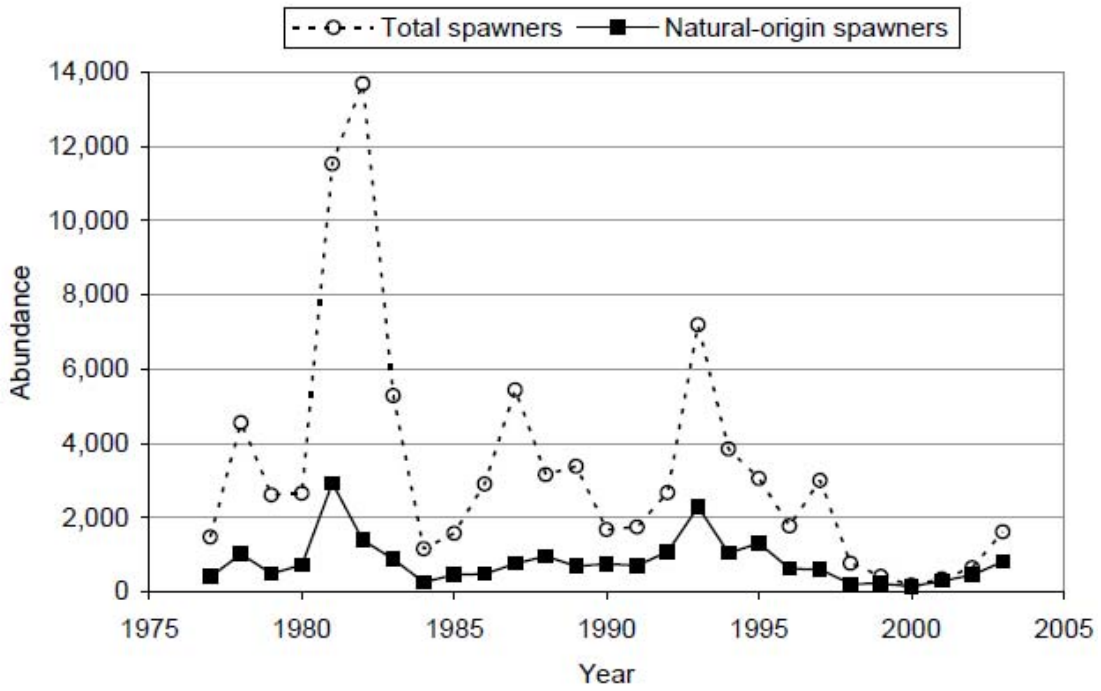


Figure 3. Summer steelhead spawner abundance in the Kalama River, 1977-2003 (from Good et al. 2005).

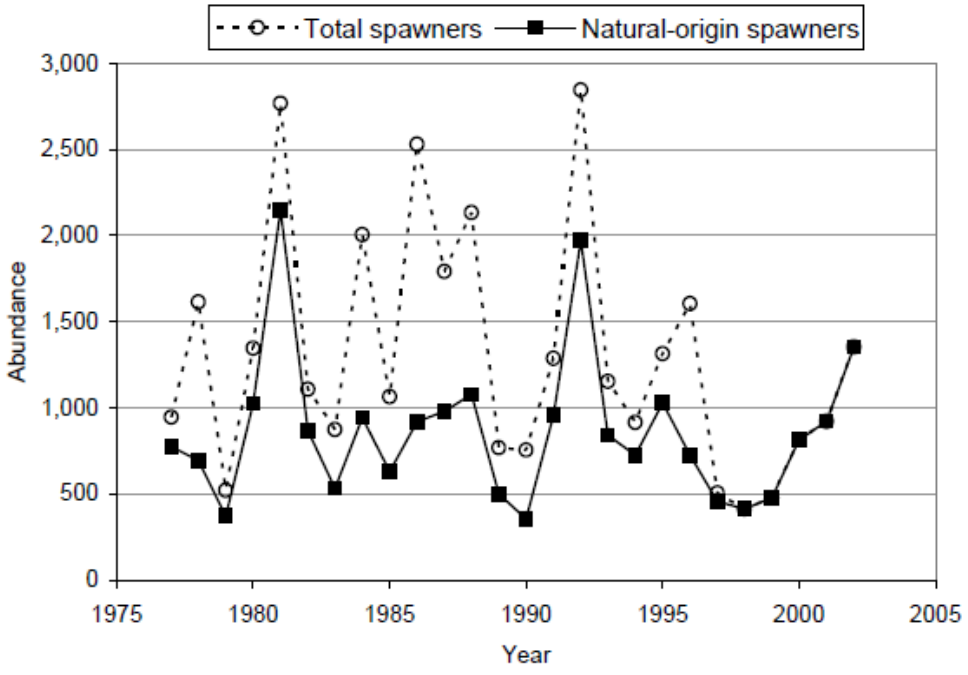


Figure 4. Winter steelhead spawner abundance in the Kalama River, 1977-2002 (from Good et al. 2005).

## 4.5 EULACHON

### 4.5.1 Status

Eulachon *(Thaleichthys pacificus)* are a small, anadromous forage fish that belong to the smelt family (Osmeridae) and range from California to Alaska. NMFS listed the Southern DPS of eulachon as threatened on March 18, 2010 with an effective date of May 17, 2010 (75 FR 13012). This ESU extends from the Mad River in northern California north into British Columbia, including the lower Columbia River and several of its tributaries such as the Kalama River. On January 5, 2011, NMFS proposed critical habitat designation for the Southern DPS (76 FR 515). The proposed critical habitat designation includes a portion of the lower Kalama River mainstem from the confluence with the Columbia River upstream to the bridge at Modrow Road near RM 2.8.

### 4.5.2 Life History

Eulachon spend most of their lives in salt water before returning to fresh water to spawn. Adult eulachon enter the Columbia River system between December and May while peak entry and spawning takes place during February and March (WDFW and ODFW 2001). Eulachon typically spawn at 3 to 5 years of age in the lower Columbia River. Spawning takes place in the lower sections of rivers when water temperatures are between 4 and 10°C. Eulachon are broadcast spawners, laying between 7,000 and 31,000 eggs per female over areas with coarse sand and pea gravel substrates. Eggs are roughly 1-mm in diameter and adhere to stream substrates. WDFW and ODFW (2001) indicate that adults usually, but not always, die shortly after spawning while the findings of Clarke et al. (2007) suggest eulachon are semelparous.

Eggs have been observed in water depths ranging from 8 to 20 ft (LCFRB 2004). Water temperature dictates the duration incubation, which can last from 20 to 40 days (Howell et al. 2001). At temperatures between 6.5 and 9.0 °C, eggs hatch in about 22 days. In the nearby Cowlitz River, incubation lasts 30 to 40 days at water temperatures between 4.4 and 7.2 °C (Garrison and Miller 1982). After hatching, the 4-8 mm larvae are quickly flushed out to sea, often within days (WDFW and ODFW 2001). They have poor swimming abilities, moving downstream with river currents. The absence of fry developed beyond the yolk-sac stage suggests the do not feed in freshwater during outmigration (LCFRB 2004).

### 4.5.3 Distribution

Within the Columbia River basin, the major and most consistent spawning runs return to the mainstem of the Columbia River and the Cowlitz River. Spawning also occurs in other tributaries to the Columbia River, including the Grays, Elochoman, Kalama, Lewis, and Sandy

Rivers (WDFW and ODFW 2001). The normal extent of spawning within the Kalama River is from the confluence with the Columbia River to Modrow Bridge (Anderson 2009 as cited in 76 FR 515) at RM 2.8, indicating that essential features in this reach of the Kalama River are spawning, incubation, and migration corridor habitat. Although the last commercial harvest of eulachon in the Kalama River occurred in 1993, sampling for larval eulachon has confirmed spawning in the Kalama River as recently as 2002 (JCRMS 2009).

### 4.5.4 Abundance

While eulachon are a relatively poorly monitored species, Gustafson et al. (2010) concluded that the southern DPS of eulachon has experienced an abrupt decline in abundance and is at a moderate risk of extinction throughout its range. With respect to the Kalama River, there is little information available regarding the abundance of eulachon. The last commercial harvest from the Kalama River in 1993 reported landings of 66,800 pounds (WDFW and ODFW 2001). Prior commercial landings dating back to 1938 ranged from 0 pounds in multiple years to 326,200 pounds in 1977 (Gustafson et al. 2010). Spawning runs have been described as “sporadic” (76 FR 515) and “periodic” (WDFW and ODFW 2001) in the Kalama River. However, Gustafson et al. (2010) cite communications from WDFW indicating that eulachon use the Kalama River more frequently than commercial landings would suggest and list spawning regularity as “regular” rather than “irregular” or “occasional.” To obtain a measure of brood-year strength that is more direct than landing records, WDFW and ODFW began monitoring the density of emigrating smelt larvae in the early 1990s at several index sites below spawning areas in the mainstem Columbia River and key lower tributaries (JCRMS 2009). Larval catches in the Kalama River are shown in Table 1.

Table 1. Eulachon catch (larvae per cubic meter) in the Kalama River during the 1994-2009 Lower Columbia River Basin Larval Sampling Program (JCRMS 2009). N/S = not sampled.

| 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N/S | 32.4 | 0.2 | 0.3 | 0.3 | 0.4 | 0.1 | 5.5 | 0.5 | N/S | N/S | N/S | N/S | N/S | N/S | N/S |

# 5. ANALYSIS OF EFFECT OF THE ACTION

The following section describes potential effects on listed species associated with the Modrow Trap Upgrade. For listed salmon, steelhead, and eulachon the potential indirect and direct effects are considered with regard to potential stressors related to either stream diversion during construction and/or operation of the new trap. Potential stressors that may result from coffer cell construction include: 1) harm or "take" due to coffer cell construction and removal, 2) reduced habitat when the coffer cell is in place, and 3) water quality changes with deployment and removal of coffer cell. The one potential operational stressor that included in the analysis is: changes to handling, sorting, and transport of fish. Because larval eulachon quickly outmigrate after hatching and will not be subjected to handling or sorting, consideration of effects for this species is limited to the three potential stressors associated with coffer cell construction.

## 5.1 LOWER COLUMBIA RIVER CHINOOK SALMON

***Harm or Take Due to Coffer Cell Construction and Removal*** – Construction activities require a coffer cell that covers approximately 2,700 square ft of the Kalama River bed below the ordinary high water line. The coffer cell will extend approximately 20 ft into the Kalama River channel over a length of roughly 135 ft. While the coffer cell is in place, flow in the Kalama River will be excluded from the 20-ft width of channel covered by the coffer cell but will continue unobstructed along the remaining portion of the channel cross-section. The coffer cell is expected to be in place between May 1 and August 1, 2011. Downstream migration of Chinook salmon smolts and upstream migration of spring Chinook salmon adults is likely to occur during this period; however, adult fall Chinook salmon upstream migration will occur after the coffer cell has been removed. Neither the coffer cell nor any other construction activity will pose a physical barrier to upstream or downstream migration. Given the channel profile at the action area, a migratory corridor with sufficient water velocity will be maintained even with the coffer cell in place. No measurable effects related to delay or passage impediments or are expected to occur.

The distribution of Chinook spawning and subsequent egg incubation includes the lower Kalama River and may occur in the vicinity of the action area. Thus, the 2,700 square ft of stream channel encompassed by the coffer cell has potential to be used as Chinook salmon spawning habitat and thus may contain salmon redds. However, Chinook salmon incubation and emergence of Chinook salmon likely will be completed by April before the coffer cell is constructed and spawning occurs from late August through October after the coffer cell will be removed. Thus, no direct harm or take to incubating eggs, embryos, or sacfry is anticipated due to the placement of the coffer cell.

Because Chinook salmon spawning may occur in the vicinity of the action area, juvenile Chinook, salmon, in particular spring Chinook salmon that rear in freshwater throughout the year, may occur in the action area during the period of in-water work. Placement of the super sacks during construction of the coffer cell has the potential to physically injure any juvenile located underneath the super sack during placement. The super sacks will be placed individually using a mobile crane. The sacks will create an overhead shadow that should elicit an avoidance response by juvenile salmon. Thus, there is a high probability that any juvenile present will be able to avoid being crushed. Once the coffer cell has been formed, juvenile salmon also may be trapped inside the cell before dewatering occurs. The combination of fish salvage efforts and the use of fish screens (if necessary prior to complete removal of fish), will allow juveniles to be removed before dewatering occurs. While these fish will be handled and subject to capture stress, they will only have to be transported a short distance for release to the river outside the coffer cell and the likelihood that any injury or mortality would occur is low. Any potential injury or mortality to juvenile Chinook salmon would be on an individual basis and have little to no affect at the population level.

***Reduced Habitat When the Coffer Cell Is in Place –*** As mentioned above, Chinook salmon spawning could occur in the action area and spawning habitat may be present within the area dewatered by the coffer cell that would be made inaccessible to spawning adults.
However, the coffer cell will be removed on or before August 1st and spawning of both spring and fall Chinook salmon in the Kalama River occurs later in August through October. Thus, any spawning habitat contained within the coffer cell will be available to Chinook salmon at the time of spawning and no reduction of accessible spawning habitat is anticipated.

***Water Quality Changes with Deployment and Removal of the Coffer Cell –*** The water quality parameters on which the proposed action may have a potential effect is sediment and turbidity and the release of deleterious substances. The action with the potential to release sediment into fish habitat in the Kalama River is associated with the deployment and removal of “super sacks” used to create the coffer cell. Construction of the coffer cell is scheduled for May 1, 2012 and the subsequent removal is scheduled to occur by August 1, 2012. During deployment and removal fine sediments may be mobilized and released downstream. It is anticipated that the coffer cell will be deployed over 2 days and removed in 2 days. Turbidity monitoring described in section 2.2 will be used to detect any increased turbidity event, the duration of any event, and identify possible corrective actions if necessary. Moreover, incubation is the lifestage for which sedimentation and turbidity increases have the greatest potential to cause harm and Chinook salmon incubation will have been completed by the time these actions occur. Given the expected

short-term duration and limited severity of sedimentation and turbidity increases, and the timing of those potential increases, we do not anticipate any measurable effects on Chinook salmon from sediment inputs.

The heavy equipment used for this project would be working in and adjacent to the Kalama River. Improper fueling and servicing and potential leaks on this equipment represent a water pollution threat from petroleum and other hazardous substances. To reduce the potential for spills, leaks or the effects of one should it occur, the following measures would be required in the special use permit: Equipment will be free of leaks and in good operating condition; Equipment storage, fueling and servicing areas will be designated by WDFW and located to prevent entry of pollutants to surface waters; All petroleum or hazardous waste products will be properly contained, removed from the site and disposed of in a manner consistent with applicable regulations; Bulk (stationary) fuel containers will not be allowed for this project; Contractor will have petroleum absorbent pads on site at all times during the construction period; Fueling nozzles shall be equipped with operational automatic shutoffs and all fueling conducted with personnel immediately available to prevent fuel overflow and spills; and Contractor will submit a contingency plan identifying spill prevention and containment measures for approval by WDFW.

***Handling, Sorting, and Transport –*** Upgrades to the Modrow Fish Trap will include an increase in holding pool volume as well as an on-site sorting facility. The increase in holding pool volume will reduce crowding in the trap and thereby reduce potential for injuries, stress, and mortalities to adult Chinook salmon in the trap. New trap operations include an automated crowder and fish lift that have been designed specifically to facilitate the volitional movement of fish from the trap into the sorting facility. The sorting facility will utilize state of the technology, DC electroanesthesia, that will allow for anesthetizing fish without strain and for all sorting to occur in-water. These design features will greatly reduce handling stress on any listed Chinook salmon that are captured in the trap. The onsite sorting facility also will eliminate the unnecessary transport of any wild adult Chinook salmon (those beyond hatchery broodstock needs) to the hatchery as has occurred in the past. With the new trap these fish will be manually sorted on site and returned to the Kalama River without transport. An additional benefit of sorting fish at the Modrow trap is the flexibility allowed to fish managers to remove excess hatchery salmon from the system thereby minimizing the demographic risk posed by hatchery fish to naturally spawning populations of Chinook salmon in the Kalama River. The new trap and sorting facility has been designed and will be operated to reduce handling, sorting, and transport stressors and will have both individual- and population-level benefits to Lower Columbia river Chinook salmon populations.

## 5.2 LOWER COLUMBIA RIVER COHO SALMON

***Harm or Take Due to Coffer Cell Construction and Removal*** – As described above, while the coffer cell is in place (May 1 to August 1), flow in the Kalama River will be excluded from the 20-ft width of channel covered by the coffer cell but will continue unobstructed along the remaining portion of the channel cross-section. Downstream migration of coho salmon smolts is likely to occur during this period; however, adult coho salmon up stream migration will occur after the coffer cell has been removed. Neither the coffer cell nor any other construction activity will pose a physical barrier to upstream or downstream migration. Given the channel profile at the action area, a migratory corridor with sufficient water velocity will be maintained even with the coffer cell in place. No measurable effects related to delay or passage impediments are expected to occur.

Coho salmon generally spawn in low-gradient tributaries with complex in-river habitat (76 FR 1392). In the Kalama River, coho salmon spawning tributaries are downstream of Kalama Falls (RM 10) and include: Fallert Creek, Arnold Creek, and the Little Kalama River (LCFRB 2004); however, the overall distribution of coho spawning habitat is thought to include the Kalama River mainstem (WDFW 2002). The in-river habitat in the action area is a relatively deep fast water riffle with cobble and gravel substrate, no large wood complexity and few trees shading the streams edges and is not likely to be used by coho salmon for spawning. Given habitat characteristics of the mainstem Kalama in the action area, the low level of natural production of coho salmon in the Kalama River, and the propensity for coho salmon to prefer smaller tributary systems, no direct harm or take to incubating eggs, embryos, or sacfry is anticipated due to the placement of the coffer cell.

Because coho salmon spawning may occur in the vicinity of the action area, juvenile coho, salmon may be moving through the mainstem Kalama and could occur in the action area during the period of in-water work. Placement of the super sacks during construction of the coffer cell has the potential to physically injure any juvenile salmon located underneath the super sack during placement. The super sacks will be placed individually using a mobile crane. The sacks will create an overhead shadow that should elicit and avoidance response by juvenile salmon. Thus, there is a high probability that any juvenile present will be able to avoid being crushed. Once the coffer cell has been formed, juvenile salmon also may be trapped inside the cell before dewatering occurs. The combination of fish salvage efforts and the use of fish screens (if necessary prior to complete removal of fish), will allow juveniles to be removed before dewatering occurs. While these fish will be handled and subject to capture stress, they will only have to be transported a short distance for release to the river outside the coffer cell and the likelihood that any injury or mortality would occur is low. Any potential injury or mortality to

juvenile coho salmon would be on an individual basis and would have little to no affect at the population level.

***Reduced Habitat When the Coffer Cell Is in Place –*** As mentioned above, coho salmon spawning habitat does not exist within the action area thus, it is very unlikely that coho salmon spawning habitat would be present within the area dewatered by the coffer cell. Regardless, the coffer cell will be removed on or before August 1st and spawning of coho salmon in the Kalama River occurs later from mid-August to March. Thus, the any spawning habitat contained within the coffer cell will be available to coho salmon at the time of spawning and no reduction of accessible spawning habitat is anticipated.

***Water Quality Changes with Deployment and Removal of the Coffer Cell –*** The water quality parameters on which the proposed action may have a potential effect are sediment, turbidity and the release of deleterious substances. The action with the potential to release sediment into fish habitat in the Kalama River is associated with the deployment and removal of "super sacks" used to create the coffer cell. It is anticipated that the coffer cell will be deployed over 2 days starting May 1st and removed over 2 days starting August 1st. Turbidity monitoring described in section 2.2 will be used to detect any increased turbidity event, the duration of any event, and identify possible corrective actions if necessary. Moreover, incubation is the lifestage for which sedimentation and turbidity increases have the greatest potential to cause harm. The only known coho salmon spawning in the Kalama River is in tributaries and these habitats would not be exposed to a sediment plume from the action area. Coho salmon juveniles migrating downstream would have the ability to move to avoid any sediment plume. Given the location of any water quality impacts, the expected short-term duration and limited severity of sedimentation and turbidity increases, and the timing of those potential increases, we do not anticipated any measurable effects on coho salmon from sediment inputs.

The heavy equipment used for this project would be working in and adjacent to the Kalama River. Improper fueling and servicing and potential leaks on this equipment represent a water pollution threat from petroleum and other hazardous substances. To reduce the potential for spills, leaks or the effects of one should it occur, the following measures would be required in the special use permit: Equipment will be free of leaks and in good operating condition; Equipment storage, fueling and servicing areas will be designated by WDFW and located to prevent entry of pollutants to surface waters; All petroleum or hazardous waste products will be properly contained, removed from the site and disposed of in a manner consistent with applicable regulations; Bulk (stationary) fuel containers will not be allowed for this project; Contractor will have petroleum absorbent pads on site at all times during the construction period; Fueling

nozzles shall be equipped with operational automatic shutoffs and all fueling conducted with personnel immediately available to prevent fuel overflow and spills; and Contractor will submit a contingency plan identifying spill prevention and containment measures for approval by WDFW.

***Handling, Sorting, and Transport –*** Upgrades to the Modrow Fish Trap will include an increase in holding pool volume as well as an on-site sorting facility. The increase in holding pool volume will reduce crowding in the trap and thereby reduce potential for injuries, stress, and mortalities to naturally produced coho salmon that may enter the trap. New trap operations include an automated crowder and fish lift that have been designed specifically to facilitate the volitional movement of fish from the trap into the sorting facility. The sorting facility will utilize state of the technology, DC electroanesthesia, that will allow for anesthetizing fish without strain and for all sorting to occur in-water. These design features will greater reduce handling stress on any listed coho salmon that are captured. The onsite sorting facility also will eliminate the unnecessary transport of any listed coho salmon to the hatchery as has occurred in the past. With the new trap these fish will be manually sorted on site and returned to the Kalama River without transport. An additional benefit of sorting fish at the Modrow trap is the flexibility allowed to fish managers to remove excess hatchery coho salmon from the system thereby minimizing the potential demographic risk posed by hatchery fish on the natural coho populations. The new trap and sorting facility has been designed and will be operated to reduce handling, sorting, and transport stressors and will have both individual- and population-level benefits to Lower Columbia River coho salmon populations.

## 5.3 COLUMBIA RIVER CHUM SALMON

***Harm or Take Due to Coffer Cell Construction and Removal*** – As described above, while the coffer cell is in place (May 1 to August 1), flow in the Kalama River will be excluded from the 20-ft width of channel covered by the coffer cell but will continue unobstructed along the remaining portion of the channel cross-section. Downstream migration of chum smolts occurs in early spring, likely prior to deployment of the coffer cell. Upstream migration of chum salmon begins in late September through mid-November. Thus, it is not anticipated that and chum salmon migrants will be in the action area at the time of coffer cell construction or removal and therefore no potential for injury or mortality to chum salmon juveniles or adults from the coffer cell is expected.

The lower end of the primary chum salmon spawning habitat in the Kalama River is upstream of action area by roughly 1,000 ft. However, it is possible that some chum salmon spawning may occur in the vicinity of the action area and that the stream channel enclosed by the coffer cell may include potential chum spawning/incubation habitat. Chum emergence will likely be

completed prior to the coffer cell am installation and spawning occurs in November and December after the coffer cell will be removed. However, the low abundance of spawning chum salmon (estimated at 50 adults) suggests the potential for chum spawning in the action area is very low. Thus, the risk of direct harm to chum salmon eggs, embryos or sacfry is very low.

Chum salmon spawn upstream of the action area, fry emerge in early spring and quickly migrate downstream. Chum salmon outmigrations occur with spring freshets and are generally on the order of a number of days. Thus, it is possible that juvenile chum salmon may pass through the action area during the period of in-water work. Placement of the super sacks during construction of the coffer cell has the potential to physically injure any juvenile located underneath the super sack during placement. However, the super sacks will be placed individually using a mobile crane and there is a high probability that any juvenile present will be able to avoid being crushed. Any potential injury would be on an individual basis and have little impact on the population as a whole. Once the coffer cell has been formed, juveniles also may be trapped inside the cell before dewatering occurs. The combination of fish salvage efforts and the use of fish screens (if necessary prior to complete removal of fish), will allow juveniles to be removed before dewatering occurs. While these fish will be handled and subject to stress, they will only have to be transported a short distance to be released and the likelihood that any mortality would occur is low.

***Water Quality Changes with Deployment and Removal of the Coffer Cell –*** The water quality parameters on which the proposed action may have a potential effect are sediment, turbidity and the release of deleterious substances. The action with the potential to release sediment into fish habitat in the Kalama River is associated with the deployment and removal of “super sacks” used to create the coffer cell. It is anticipated that the coffer cell will be deployed over 2 days starting May 1st and removed over 2 days starting August 1st. Turbidity monitoring described in section 2.2 will be used to detect any increased turbidity event, the duration of any event, and identify possible corrective actions if necessary. Moreover, incubation is the lifestage for which sedimentation and turbidity increases have the greatest potential to cause harm. The distribution of chum salmon spawning in the Kalama River is upstream of the action area and this habitat would not be exposed to a sediment plum from the action area. Chum salmon juveniles migrating downstream with spring freshets and given their rapid egress would move very quickly through any plume encountered. Given the location of any water quality impacts, the expected short-term duration and limited severity of sedimentation and turbidity increases, and the very short time period of exposure, we do not anticipated any measurable effects on chum salmon from sediment inputs.

The heavy equipment used for this project would be working in and adjacent to the Kalama River. Improper fueling and servicing and potential leaks on this equipment represent a water pollution threat from petroleum and other hazardous substances. To reduce the potential for spills, leaks or the effects of one should it occur, the following measures would be required in the special use permit: Equipment will be free of leaks and in good operating condition; Equipment storage, fueling and servicing areas will be designated by WDFW and located to prevent entry of pollutants to surface waters; All petroleum or hazardous waste products will be properly contained, removed from the site and disposed of in a manner consistent with applicable regulations; Bulk (stationary) fuel containers will not be allowed for this project; Contractor will have petroleum absorbent pads on site at all times during the construction period; Fueling nozzles shall be equipped with operational automatic shutoffs and all fueling conducted with personnel immediately available to prevent fuel overflow and spills; and Contractor will submit a contingency plan identifying spill prevention and containment measures for approval by WDFW.

***Handling, Sorting, and Transport –*** Upgrades to the Modrow Fish Trap will include an increase in holding pool volume as well as an on-site sorting facility. The increase in holding pool volume will reduce crowding in the trap and thereby reduce potential for injuries, stress, and mortalities to chum salmon that enter the trap. New trap operations include an automated crowder and fish lift that have been designed specifically to facilitate the volitional movement of fish from the trap into the sorting facility. The sorting facility will utilize state of the technology, DC electroanesthesia, that will allow for anesthetizing fish without strain and for all sorting to occur in-water. These design features will greatly reduce handling stress on any listed chum salmon that are captured as compared to the existing trap. In addition, the onsite sorting facility also will eliminate the unnecessary transport of chum salmon to the hatchery as has occurred in the past. With the new trap these fish will be manually sorted on site and returned to the Kalama River without transport. The new trap and sorting facility has been designed and will be operated to reduce handling, sorting, and transport stressors and will have both individual- and population-level benefits to Columbia River chum salmon populations.

## 5.4 LOWER COLUMBIA RIVER STEELHEAD

***Harm or Take Due to Coffer Cell Construction and Removal*** – As described above, while the coffer cell is in place (May 1 to August 1), flow in the Kalama River will be excluded from the 20-ft width of channel covered by the coffer cell but will continue unobstructed along the remaining portion of the channel cross-section. Downstream migration of summer steelhead smolts and upstream migration of adults are likely to occur during the construction period. Neither the coffer cell nor any other construction activity will pose a physical barrier to upstream or downstream migration. Given the channel profile at the action area, a migratory corridor with

sufficient water velocity will be maintained even with the coffer cell in place. No measurable effects related to delay or passage impediments are expected.

The lower end of the summer steelhead spawning distribution in the Kalama River is several miles upstream of action area and it is not anticipated that the stream channel enclosed by the coffer cell would include any summer or winter steelhead spawning habitat. Thus, there would be no risk of direct harm to steelhead eggs, embryos or sacfry from coffer cell installation or removal.

Because steelhead juveniles may rear in the vicinity of the action area throughout the year, they may occur in the action area during the period of in-water work. Placement of the super sacks during construction of the coffer cell has the potential to physically injure any juvenile located underneath the super sack during placement. However, the super sacks will be placed individually using a mobile crane and there is a high probability that any juvenile present will be able to avoid being crushed. Any potential injury would be on an individual basis and have little impact on the population as a whole. Once the coffer cell has been formed, juveniles may be trapped inside the cell before dewatering occurs. The combination of fish salvage efforts and the use of fish screens (if necessary prior to complete removal of fish), will allow juveniles to be removed before dewatering occurs. While these fish will be handled and subject to stress, they will only have to be transported a short distance to be released and the likelihood that any mortality would occur is low.

***Reduced Habitat When the Coffer Cell Is in Place –*** As mentioned above, steelhead spawning habitat does not exist within the action area. Thus no temporary reduction of steelhead spawning habitat is expected.

***Water Quality Changes with Deployment and Removal of the Coffer Cell –*** The water quality parameters on which the proposed action may have a potential effect are sediment, turbidity and the release of deleterious substances. The action with the potential to release sediment into fish habitat in the Kalama River is associated with the deployment and removal of “super sacks” used to create the coffer cell. It is anticipated that the coffer cell will be deployed over 2 days starting May 1st and removed over 2 days starting August 1st. Turbidity monitoring described in section 2.2 will be used to detect any increased turbidity event, the duration of any event, and identify possible corrective actions if necessary. Moreover, incubation is the lifestage for which sedimentation and turbidity increases have the greatest potential to cause harm. Steelhead spawning habitat in the Kalama River is upstream of the action area; thus, these habitats would not be exposed to a sediment plume from the action area. Adult steelhead migrating upstream as

well as juvenile steelhead migrating downstream through, or rearing in, the project area would have the ability to move to avoid any sediment plume. Given the location of any water quality impacts, the expected short-term duration of potential impacts, and limited severity of sedimentation and turbidity increases, we do not anticipated any measurable effects on steelhead from sediment inputs.

The heavy equipment used for this project would be working in and adjacent to the Kalama River. Improper fueling and servicing and potential leaks on this equipment represent a water pollution threat from petroleum and other hazardous substances. To reduce the potential for spills, leaks or the effects of one should it occur, the following measures would be required in the special use permit: Equipment will be free of leaks and in good operating condition; Equipment storage, fueling and servicing areas will be designated by WDFW and located to prevent entry of pollutants to surface waters; All petroleum or hazardous waste products will be properly contained, removed from the site and disposed of in a manner consistent with applicable regulations; Bulk (stationary) fuel containers will not be allowed for this project; Contractor will have petroleum absorbent pads on site at all times during the construction period; Fueling nozzles shall be equipped with operational automatic shutoffs and all fueling conducted with personnel immediately available to prevent fuel overflow and spills; and Contractor will submit a contingency plan identifying spill prevention and containment measures for approval by WDFW.

***Handling, Sorting, and Transport*** - Upgrades to the Modrow Fish Trap will include an increase in holding pool volume as well as an on-site sorting facility. The increase in holding pool volume will reduce crowding in the trap and thereby reduce potential for injuries, stress, and mortalities to naturally produced steelhead that may enter the trap. New trap operations include an automated crowder and fish lift that have been designed specifically to facilitate the volitional movement of fish from the trap into the sorting facility. The sorting facility will utilize state of the technology, DC electroanesthesia, that will allow for anesthetizing fish without strain and for all sorting to occur in-water. These design features will greatly reduce handling stress on all summer and winter steelhead that are captured in the trap. In addition, the onsite sorting facility also will eliminate the unnecessary transport of steelhead that are in excess of hatchery broodstock needs. With the new trap, these fish will be manually sorted on site and returned to the Kalama River without transport to swim volitionally upstream.

Steelhead management in the Kalama River includes separation of hatchery and wild fish on the spawning grounds. An additional benefit of sorting fish at the Modrow trap is the flexibility provided to fish managers to control the number of hatchery steelhead allowed to spawn naturally in the lower river and, if necessary, minimize the potential risk posed by hatchery fish

on the natural spawning populations of ESA listed salmon or steelhead below Kalama Falls Hatchery. The new trap and sorting facility has been designed and will be operated to reduce handling, sorting, and transport stressors and will have both individual- and population-level benefits to Lower Columbia River steelhead populations.

## 5.5 EULACHON

***Harm or Take Due to Coffer Cell Construction and Removal*** – As described above, while the coffer cell is in place (May 1 to August 1), flow in the Kalama River will be excluded from the 20-ft width of channel covered by the coffer cell but will continue unobstructed along the remaining portion of the channel cross-section. Both the downstream migration of larval eulachon and the upstream migration of adult eulachon may occur during this period. However, as eulachon generally do not migrate upstream of the project area no effects on migratory lifestages or habitats are expected.

The distribution of eulachon spawning extends upstream to RM 2.8 and critical habitat is listed up the Modrow bridge approximately 900 ft upstream of the action area. Peak spawning takes place in February and March and incubation can take up to 40 days, indicating that incubating eulachon may be present in the action area during the scheduled deployment of the coffer cell on May 1. However, the action area is located at the upper end of the spawning distribution, with approximately 94% of the habitat below the action area. Moreover, the large substrates in the action area are not of the preferred size for eulachon spawning and incubation. This is would be expected that only a small portion of eulachon spawning or egg deposition would occur within the action area. Moreover, eulachon are intermittent spawners and a spawning run does not occur in the Kalama River every year. Given the intermittent nature of eulachon spawning, the lack of preferred substrates in the action area, and the location of the action area at the upper end of the spawning distribution, it is possible but unlikely that any direct harm will occur to eulachon eggs or embryos associated with coffer cell installation.

***Reduced Habitat When the Coffer Cell Is in Place –*** As mentioned above, the majority of eulachon spawning habitat is located downstream of the action area. In addition, substrates in the action area are composed of larger gravel and cobbles than the coarse sand and pea gravels preferred by eulachon for spawning. Thus, it is unlikely that eulachon spawning habitat would be present within the area dewatered by the coffer cell.

***Water Quality Changes with Deployment and Removal of the Coffer Cell –*** The water quality parameters on which the proposed action may have a potential effect are sediment, turbidity and the release of deleterious substances. The action with the potential to release sediment into fish

habitat in the Kalama River is associated with the deployment and removal of "super sacks" used to create the coffer cell. It is anticipated that the coffer cell will be deployed over 2 days starting May 1st and removed over 2 days starting August 1st. Turbidity monitoring described in section 2.2 will be used to detect any increased turbidity event, the duration of any event, and identify possible corrective actions if necessary. Incubation is the lifestage for which sedimentation and turbidity increases have the greatest potential to cause harm. The distribution of eulachon spawning in the Kalama River includes habitat downstream of the action area. Eggs deposited within this habitat have the potential to be affected by exposure to a sediment plume associated with coffer cell installation. Eulachon fry also have the potential to encounter a plume. Eulachon fry move downstream quickly with high spring flows and are usually out of the river within days of emergence. Given the expected short-term duration, localized nature, and limited severity of sedimentation inputs and turbidity increases combined with the very short time period of exposure, we do not anticipated any measurable effects on eulachon fry from sediment inputs.

The heavy equipment used for this project would be working in and adjacent to the Kalama River. Improper fueling and servicing and potential leaks on this equipment represent a water pollution threat from petroleum and other hazardous substances. To reduce the potential for spills, leaks or the effects of one should it occur, the following measures would be required in the special use permit: Equipment will be free of leaks and in good operating condition; Equipment storage, fueling and servicing areas will be designated by WDFW and located to prevent entry of pollutants to surface waters; All petroleum or hazardous waste products will be properly contained, removed from the site and disposed of in a manner consistent with applicable regulations; Bulk (stationary) fuel containers will not be allowed for this project; Contractor will have petroleum absorbent pads on site at all times during the construction period; Fueling nozzles shall be equipped with operational automatic shutoffs and all fueling conducted with personnel immediately available to prevent fuel overflow and spills; and Contractor will submit a contingency plan identifying spill prevention and containment measures for approval by WDFW.

## 5.6 ALTERATION OF FISH HABITAT

Potential alteration of habitat to listed species has been discussed in concert with potential species effects. Below we discuss additional project activities that will alter the river and riparian habitat associated with trap construction.

There will be excavation of the stream bank upstream and downstream of the trap for placement of the bank stabilization measures, all within the coffer cell dewatered area. An area approximately 25 linear ft along the upstream, hydraulic right bank has been subject to erosion from an eddy created by the existing fish trap. A length of approximately 33 linear ft of the

hydraulic right stream bank downstream of the trap will be excavated to allow for linear stream flow along the bank and minimize scour after construction of the trap upgrade.

Large rock will be used for both the upstream and downstream bank stabilization above and below the OHW line. The total volume of large rock to be used is approximately 141 cubic yards. The large rock will be placed using a tracked excavator working from the top of bank.

Precast concrete interlocking ("ecology") blocks will be used for the top of the downstream bank stabilization. The ecology blocks will be placed above the large rock to stabilize the steep bank downstream of the fish trap, while allowing adequate area for truck flow to the sorting area. The total volume of precast concrete to be used for this project is 110 cubic yards. The embankment work will most likely be completed by a tracked excavator with a reach sufficient to excavate and place material from the top of slope.

The existing riparian area within the action area is very limited and dominated by exotic and invasive species. There is limited vegetative cover on the steep, rocky hydraulic left bank of the river upstream and downstream of the existing trap. On the downstream side of the trap, bank vegetation consists of two deciduous trees (a willow and a big leaf maple) and herbaceous plants, such as willow shrubs, grasses, thistle, and blackberry. On the upstream side of the trap, the small amount of bank vegetation consists primarily of blackberry and other herbaceous grasses and plants.

Approximately 58 linear ft of the proposed project would occur within the riparian area above the OHW. The two trees described above and the riparian vegetation would be removed. This limited number of trees is not of sufficient quantity or in a location to measurably affect riparian values such as LWD recruitment or stream shading and temperature. No revegetation plan is proposed.

Streambank stabilization activities would occur within the coffer cell and would not affect listed fish species.

# 6. PROPOSED AND DESIGNATED CRITICAL HABITAT

The action addressed within this document falls within Critical Habitat for Chinook and chum salmon, steelhead, and eulachon. A designation of critical habitat has not yet been proposed for the Lower Columbia River Coho ESU but is under development. Given the presence of coho salmon in the Kalama River and the general similarities in habitat requirements for spawning, rearing, and migration to other listed salmon for which critical habitat has been designated, this BA effectively presumes that the action area likely falls within future designated critical habitat for coho salmon.

Critical habitat designations reflect primary constituent elements (PCEs) for habitats in freshwater, estuarine, and marine environments. Because the proposed action only has the potential to affect habitat located in freshwater, only those PCEs related to freshwater habitat are addressed. Based on the effects analysis in Sections 5 and Table 2 below, the following analysis is presented for the PCEs that have the potential to be affected by the proposed action. As the results are consistent, this analysis pertains to all four salmon ESUs.

*Spawning/Incubation: Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.*

The effects analysis indicates that there will be no measurable long term affects to water quality, water quantity and or substrates associated with salmon spawning sites and that even the potential temporary affects associated with resuspension of fine sediments during installation and removal of the coffer cell will occur over a localized area and will be of short duration, a matter of hours to 2 days. As such, spawning/incubation conditions will be maintained with occurrence of the proposed action.

*Rearing: Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.*

The effects analysis indicates that there will be no measurable adverse impacts on the physical habitat conditions that support freshwater rearing habitats for salmon and steelhead and that existing physical habitat conditions will be maintained or improved with the proposed action.

*Migration: Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.*

The effects analysis indicates that there will be no long term or permanent impacts on the migration corridor. Even with construction of the coffer cell to isolate the work area, adequate passage conditions will be provided for both juvenile and adult salmon and steelhead. The migration conditions in the lower Kalama River will be maintained as result of the proposed action.

The critical habitat designation for eulachon lists physical or biological features essential for conservation of the eulachon southern DPS. Based on the effects analysis in Section 5 and Table 2 below, the following analysis is presented regarding PCEs for the eulachon southern DPS that have potential to be impacted by the proposed action.

*Spawning/Incubation: Freshwater spawning and incubation sites with water flow, quality and temperature conditions and substrate supporting spawning and incubation.*

The majority of eulachon spawning/incubation habitat is located downstream of the proposed action area. The effects analysis indicates that there will be no measurable long term affects to water quality, water quantity and or substrates associated with salmon spawning sites and that even the potential temporary affects associated with resuspension of fine sediments during installation and removal of the coffer cell will occur over a localized area and will be of short duration, a matter of hours to 2 days. As such, eulachon conditions for spawning/incubation will be maintained with the proposed action.

*Migration: Freshwater and estuarine migration corridors free of obstruction and with water flow, quality and temperature conditions supporting larval and adult mobility, and with abundant prey items supporting larval feeding after the yolk sac is depleted.*

The majority eulachon migration corridor is located downstream of the proposed action area and no measureable downstream effects on habitat would be expected. The migration conditions for eulachon in the lower Kalama River will be maintained as result of the proposed action.

## 6.1 EFFECTS MATRIX CHECKLIST

Based on the review of existing conditions in the Kalama River, salmon species and habitat have been determined to be largely functioning at risk (Table 2). The proposed action has minimal potential for long term and permanent affects on listed salmonid species and their habitats and thus would be expected to result in maintenance or restoration of all species and habitat indicators. The overall net effect of the proposed project, as determined by integrating the effects to species and habitat indicators to the four listed salmonid ESUs and eulachon, is for beneficial effect towards restoring listed populations.

Table 2. Potential Effects to Salmonid Species Indicators and Habitat Indicators.

| | Population and Environmental Baseline | | | Effects of the Action | | |
|---|---|---|---|---|---|---|
| **Pathway**<br>Indicator | **Functioning Appropriately** | **Functioning at Risk** | **Functioning at Unacceptable Risk** | **Restore** | **Maintain** | **Degrade** |
| **Species** | | | | | | |
| Subpopulation Size | | x | | x | | |
| Growth and Survival | | x | | x | | |
| Life History Div. and Isolation | | x | | x | | |
| Persistance and Genetic Integrity | | x | | x | | |
| **Water Quality** | | | | | | |
| Temperature | | x | | | x | |
| Sediment/Turbidity | | x | | | x | |
| Contaminants/Nutrients | | x | | | x | |
| **Habitat Access** | | | | | | |
| Physical Barriers | x | | | | x | |
| **Habitat Elements** | | | | | | |
| Substrate Embeddedness | | x | | | x | |
| Large Wood | | x | | | x | |
| Pool Frequency | | x | | | x | |
| Large Pool | | x | | | x | |
| Off-Channel habitat | | x | | | x | |
| Refugia | | x | | | x | |
| **Channel Conditions** | | | | | | |
| Width/Depth Ratio | | x | | | x | |
| Streambank | | x | | x | | |
| Floodplain connectivity | | x | | | x | |
| **Flow/Hydrology** | | | | | | |
| Peak/Base Flows | | x | | | x | |
| Drainage Network | | x | | | x | |
| **Watershed Conditions** | | | | | | |
| Road Density & Location | | x | | | x | |
| Disturbance History | | x | | | x | |
| Riparian Reserves | | x | | | x | |
| Disturbance Regime | | x | | | x | |
| **Integration of Indicators** | | x | | x | | |

# 7. INTERDEPENDENT AND INTERRELATED ACTIONS

Under ESA, interdependent actions are those that have no significant independent utility apart from the action that is under consideration. No interdependent actions have been identified.

Interrelated actions are those that are part of a larger action and depend on the action for their justification. One interrelated action was identified for this Project, which is the ongoing reform of Washington State Hatchery Programs. Washington Department of Fish and Wildlife fish hatcheries have operated for more than 100 years to produce fish for fisheries and harvest. Recently, hatcheries have taken on a new role to assist with conservation and recovery of ESA listed salmon stocks. To ensure that the state hatcheries can be effective in this newer role, WDFW is collaborating with regional fisheries scientists first to examine current hatchery facilities and operations and then to determine what structural and operational changes are necessary. Hatchery reform actions and facility upgrades have been identified for WDFW hatcheries in the Kalama River. This larger hatchery facility program will serve to minimize direct impacts and enhance populations of listed salmon in the Kalama River.

# 8. CUMULATIVE EFFECTS

Cumulative effects from an ESA perspective include all future state, local, tribal, or private activities that are reasonably certain to occur in the foreseeable future within the action area. Cumulative effects in the Kalama River would include timber production and harvest on state and private lands, continued operation of state fish hatchery programs, hatchery facility improvement and upgrades including fish passage modifications. All of these activities would be subject to Section 7 Consultation and potential impacts to listed species would be minimized. Residential development is likely to continue in the Kalama River basin. Development and associated infrastructure likely would have negative impacts on listed species and their habitats. However, local planning and permitting efforts should minimize these adverse affects

# 9. EFFECTS DETERMINATION

*Lower Columbia River Chinook Salmon*

Based on the analysis of species and habitat effects in Section 5 and 6, the proposed upgrades to the Modrow fish trap ***may affect, but are not likely to adversely*** affect Lower Columbia River Chinook salmon or their critical habitat.

*Lower Columbia River Coho Salmon*

Based on the analysis of species and habitat effects in Section 5 and 6, the proposed upgrades to the Modrow fish trap ***may affect, but are not likely to adversely*** affect Lower Columbia River coho salmon.

*Columbia River Chum Salmon*

Based on the analysis of species and habitat effects in Section 5 and 6, the proposed upgrades to the Modrow fish trap ***may affect, but are not likely to adversely*** affect Columbia River chum salmon habitat.

*Lower Columbia River Steelhead*

Based on the analysis of species and habitat effects in Section 5 and 6, the proposed upgrades to the Modrow fish trap ***may affect, but are not likely to adversely*** affect Lower Columbia River steelhead and their habitat.

*Eulachon Southern DPS*

Based on the analysis of species and habitat effects in Section 5 and 6, the proposed upgrades to the Modrow fish trap ***may affect, but are not likely to adversely*** affect Eulachon Southern DPS.

# 10. ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires Federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). When possible, NMFS uses existing interagency coordination processes to perform EFH consultations with federal agencies. For the proposed action, this goal is being met by incorporating EFH consultation into the ESA Section 7 consultation, as represented by this BA.

Potential effects of upgrades to the Modrow Fish Trap were evaluated with respect to two fisheries protected by the essential fish habitat (EFH) provisions of the Magnuson-Stevens Act (16 U.S.C. 1855[b]): the Chinook salmon and coho salmon fisheries. The Kalama River and its tributaries are included in designated EFH for these two fisheries because they may support spawning, rearing, and migratory use by Chinook and coho salmon or because they are located upstream of areas used by salmon and may affect downstream water quality. As federally listed species are, the analyses of potential project effects on Chinook and coho salmon addressed in this BA also describe all potential impacts to EFH. Based on the effects analysis provided above, the upgrade to the Modrow Fish Trap ***will not adversely affect*** EFH.

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# APPENDIX A

## Photographs

Figure A-1. Modrow Trap Upgrade upland project site on the left hydraulic bank of the Kalama River.

Figure A-2. Hydraulic right bank of the Kalama River across from the existing Modrow Trap.

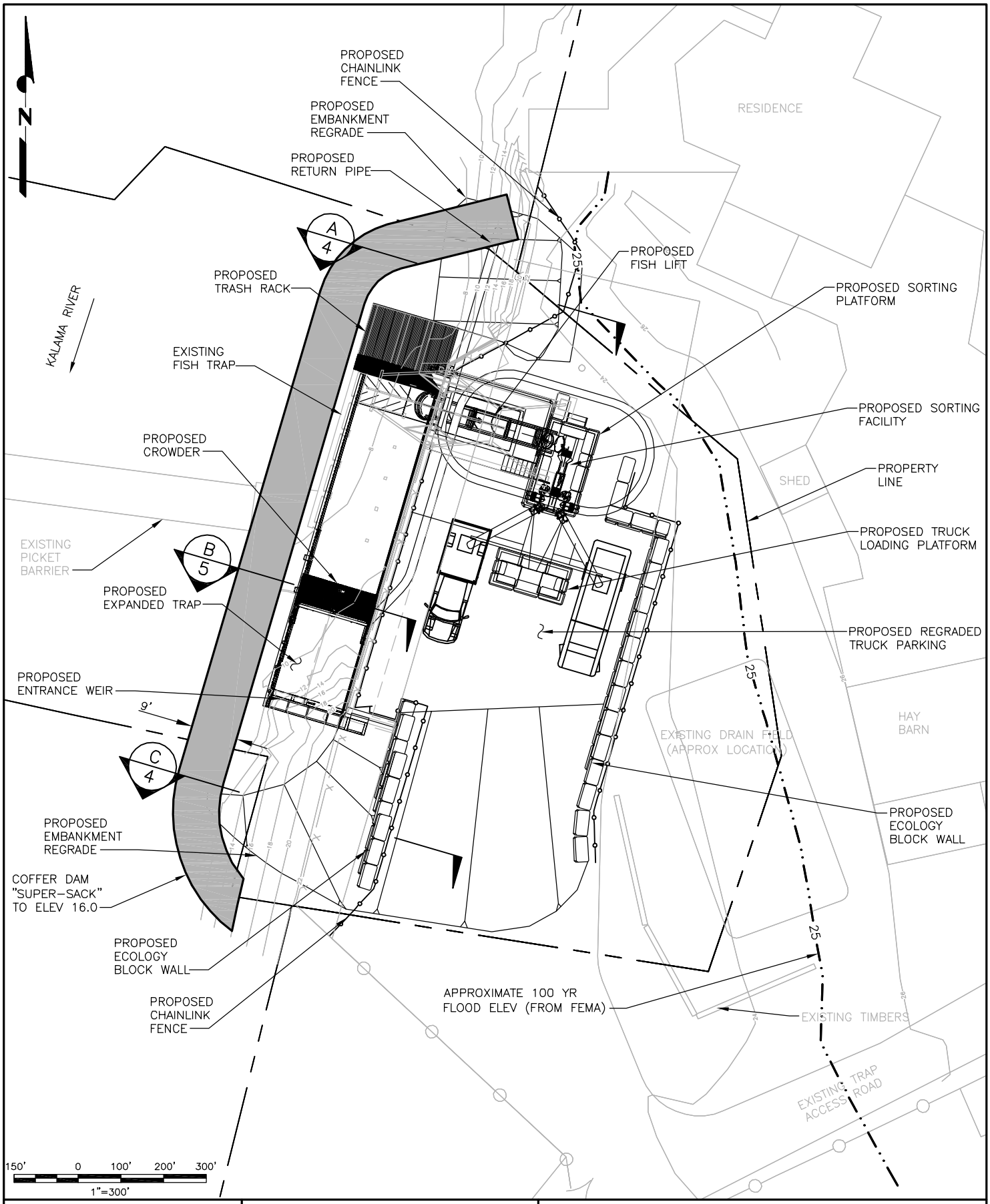
Figure A-3. Hydraulic left bank of the Kalama River immediately upstream of the existing Modrow Trap.

Figure A-4. Hydraulic left bank of the Kalama River downstream of the existing Modrow Trap.

Figure A-5. Hydraulic left bank of the Kalama River immediately downstream of the existing Modrow Trap.

# APPENDIX B

## Plan View Drawing of Project Area




Resource Consultants, Inc.
REDMOND, WA.

APPLICANT:
WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE

PROPOSED:
AT KALAMA, WA

KALAMA FALLS HATCHERY
MODROW TRAP MODIFICATIONS

PROPOSED SITE PLAN
FIGURE – 3
SHEET 3 OF 5