

RECLAMATION

Managing Water in the West

**Finding of No Significant Impact
Final Environmental Assessment
Beaver Creek Weirs Renovation Project
Methow River Subbasin, Twisp, Washington**



U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia Snake Salmon Recovery Office
Boise, Idaho

September 2013

U.S. DEPARTMENT OF THE INTERIOR

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian tribes and our commitments to island communities.

MISSION OF THE BUREAU OF RECLAMATION

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

RECLAMATION

Managing Water in the West

**Finding of No Significant Impact
Final Environmental Assessment
Beaver Creek Weirs Renovation Project
Methow River Subbasin, Twisp, Washington**



U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia Snake Salmon Recovery Office
Boise, Idaho

September 2013

FINDING OF NO SIGNIFICANT IMPACT

Beaver Creek Weirs Renovation Project Methow River Subbasin, Twisp, Washington

**U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia Snake Salmon Recovery Office**

PN FONSI 13-03

Introduction

The Bureau of Reclamation (Reclamation) has prepared this Finding of No Significant Impact (FONSI) to comply with the Council on Environmental Quality's regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA). This document briefly describes the proposed action, the alternatives considered, the scoping process, Reclamation's consultation and coordination activities, and Reclamation's finding. The Final Environmental Assessment (EA) fully documents the analyses.

Location

Beaver Creek is located in the Methow River subbasin in north-central Washington State, Okanogan County. Beaver Creek flows approximately 22.3 miles in length from its headwaters to where it enters into the Methow River at river mile (RM) 35.2 about 5 miles downstream from the town of Twisp (RM 40.0). The Beaver Creek drainage runs northeast to southwest, draining an area of about 111 square miles.

Background

Beaver Creek fish screening, fish passage, and irrigation efficiency efforts began about 15 years ago when the Washington State Department of Fish and Wildlife (WDFW), National Resources Conservation Service (NRCS), Bonneville Power Administration (BPA), and Okanogan Conservation District collaborated with local ranchers and water users to address improvements within the river basin. The original work resulted in installation of fish screens, numerous fish passage projects at road crossings as well as irrigation diversions, ditch piping, conversion to center pivot irrigation lines, and conservation easements to protect riparian and agricultural values. To meet commitments in the Federal Columbia River Power

Systems (FCRPS) Biological Opinion (BiOp), Reclamation provided technical assistance for the design of fish passage improvements at irrigation diversions as part of the collaborative efforts in Beaver Creek.

Over the years private lands in the lower portion of the watershed downstream and upstream of State Highway 20 have reduced channel access to its floodplain and reduced riparian habitat due to agricultural practices and rural development (Andonaegui 2000). In addition, irrigation diversions divert virtually all of Beaver Creek flows in late summer (USFS 2004). Past management activities in the upper watershed such as timber harvests and road construction on U.S. Forest Service (USFS) lands have increased sediment levels in the Beaver Creek drainage (USFS 2007b). The 2006 Tripod fire burned the Upper Beaver Creek drainage and resulted in considerable areas of high and moderate burn severity (USFS 2006).

Due to these conditions, the following watershed limiting factors that limit the ability of habitat to fully sustain populations of salmon, steelhead, and bull trout have been identified for the Beaver Creek drainage:

- Lack of overwintering juvenile rearing habitat.
- Loss of access to spawning and rearing habitat.
- Loss of floodplain function.
- Lack of woody debris.
- Accumulation of fine sediment in spawning gravel.
- Elevated water temperature.
- Impaired water quality (Andonaegui 1999; UCSRB 2007).
- Impaired water quantity.

Purpose and Need

The purpose for the action is to restore upstream fish passage on Beaver Creek by repair or replacement of the damaged weir structures and to allow for irrigators to continue diverting water using these structures. The need for the action is to repair two weirs that were damaged during the spring runoff in 2011.

Alternatives Considered

The alternatives considered in detail in this Final EA include one action alternative (the Proposed Action) and the No Action alternative.

Alternative A – No Action

Under the No Action alternative, the Marracci Rock Weir Diversion and the Fort-Thurlow Rock Weir Complex would not be repaired. Conditions at the Marracci site would continue

to deteriorate eventually blocking fish passage and creating conditions that could affect downstream spawning, rearing, and other general habitat features. The Fort-Thurlow site would continue to be impassable to fish, and high gradient and high water velocities would continue to negatively affect downstream habitat at all but high flows.

Alternative B – Weir Complex Repair (Proposed Action)

The Proposed Action is the implementation of Reclamation’s responsibilities under RPA actions 34 and 35 of the 2008 FCRPS BiOp in the Methow River subbasin. Reclamation is specifically required to implement actions 34 and 35 to conserve listed species under the Endangered Species Act (ESA). Reclamation proposes to fund the implementation of permanent repairs, either through reconstruction or alteration of the existing structures at two locations on Beaver Creek. The repairs would occur in phases as design is complete and funding is available. In 2013, Reclamation proposes to provide funds to the Methow Salmon Recovery Foundation (MSRF) through a cooperative agreement to implement permanent repair of the Marracci weir providing stability of the structure, improved irrigation diversion, and continued fish passage. The Proposed Action also includes installation of a temporary prefabricated fish ladder to provide fish access to Beaver Creek at the Fort-Thurlow site in 2013 to prevent further degradation with a proposed permanent correction to be completed at a later date when the final design is complete and funding is provided.

The Proposed Action weir complex repairs are intended to enhance fisheries habitat by reconstructing the current weir formations. At both sites, a “roughened channel” is proposed; these sites will require intake relocation and/or alteration of existing weir complex to a step-pool complex and/or installation of a downstream sill to mitigate head cutting or down cutting.

Environmental Commitments

Reclamation will fulfill compliance requirements and environmental commitments given in the EA for each project. Examples of these additional requirements include:

- The appropriate Best Management Practices (BMPs) and mitigation presented in the EA.
- Any necessary permits under Section 404 of the Clean Water Act.
- State of Washington permits for instream work.

Environmental Impacts

This EA focused on those resource areas identified as potentially impacted by the alternatives considered, including the No Action alternative. Identified resources were geomorphology, hydrology and water quality, threatened and endangered (T&E) species, vegetation, cultural

resources, Indian Sacred Sites, Indian Trust Assets (ITA's), environmental justice, and cumulative impacts.

Geomorphology and Hydrology

The construction operations will require removal and sorting of existing bed materials. Removed materials will be replaced with a graded mix favoring larger material to avoid mobilization of bed flow. Natural conditions and weather may play a role in influencing flow, but during construction impacts to flow will be otherwise minimal. Following construction, the geomorphology and hydrology of the river will return to current conditions, providing habitat complexity and upstream mobility for fish species. The Proposed Action would not adversely affect water quality within the project area. Reclamation and/or its contractors will ensure that the design meets proper standards and that it complies with water quality policy. Reclamation will work with the U.S. Army Corps of Engineers (Corps) and the Environmental Protection Agency (EPA) to comply with the respective BMPs, regulatory requirements, and obtain the appropriate permits prior to construction activities. The contractor would be required to comply with any Section 401 or 404 permit conditions. During construction of any cofferdam or similar system, the contractor will be required to comply with all permit requirements.

Threatened and Endangered Species

The Proposed Action would not adversely affect any ESA wildlife or plants within the project area. Some temporary impacts to wildlife may occur, such as noise and activity that would cause wildlife to avoid the area. The Proposed Action would have a "Likely to Adversely Affect" impact on listed threatened and endangered (T&E) fish species in the project area. Mitigation efforts and suggestions will be monitored by the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) and U.S. Fish and Wildlife Service (USFWS) to reduce impacts during construction activities.

Vegetation

The Proposed Action would not adversely affect any vegetation due to construction activities; however, there is a possibility of introducing noxious weeds within the project area. To ensure that existing populations of noxious weeds do not spread or are introduced during construction, Reclamation or its contractors will use equipment brought to the site that is free of noxious weed seed, use weed-free straw, and clean all equipment before taking it off site to prevent the spread to other areas. Where practical, a vegetation program reintroducing appropriate native vegetation to those areas previously disturbed or disturbed during construction activities may be considered.

Cultural Resources

The Marracci project involves work at previously constructed features within Beaver Creek and a cultural resources survey found no historic properties. A report was submitted to BPA with a determination of “no potential to cause effects” (NoPE) as defined in 36 Code Federal Regulations (CFR) 800.2(a) and no further Section 106 review is necessary. The Washington SHPO concurred with this determination.

A cultural resources survey including fieldwork was completed at the Fort-Thurlow site and no evidence of historic properties in the Area of Potential Effects (APE) was found. Based on these findings, Reclamation reached a Finding of No Historic Properties Affected and the Washington SHPO concurred.

Sacred Sites and Traditional Cultural Properties

Reclamation requested information from the appropriate tribes and received no response. With no response, Reclamation assumes there will be no adverse effects to any unidentified sacred sites or traditional cultural properties due to construction of the Proposed Action.

Indian Trust Assets

The Proposed Action would not affect any tribal rights to hunt, fish, and gather within the project area.

Environmental Justice

Census data indicates there are few, if any, minority populations in or near the project area. Construction of the Proposed Action would not result in any significant and adverse impacts on any minority or low-income populations. There should be a short-term economic benefit in or near the project area due to construction activity.

Cumulative and Indirect Impacts

The Proposed Action would have adverse effects to several ESA-listed fish species that will be reduced through mitigation with the assistance of NOAA Fisheries and USFWS. With mitigation, effects would result in only minor impacts to the ESA-listed fish species and associated habitat of the Proposed Action. No present or reasonably foreseeable future actions at Beaver Creek or the surrounding area would have additive or interactive impacts on the environmental resources affected by the Proposed Action. Overall, the Proposed Action should improve and benefit fish species, fish passage, and habitat complexity.

Consultation and Coordination

Efforts to improve irrigation operations to protect aquatic species in Beaver Creek began about 15 years ago. The WDFW, NRCS, BPA, and the Okanogan Irrigation District collaborated with local ranchers and water users to implement irrigation improvements. Fish passage was identified as a primary limiting factor for steelhead, spring Chinook, and bull trout in Beaver Creek (Andonaegui 1999). These initial efforts resulted in the improvement or replacement of existing irrigation diversions, fish screens, and numerous fish passage projects at road crossings. As part of meeting its commitments in the FCRPS BiOps, Reclamation provided technical assistance for the design of fish passage improvements at five irrigation diversions. Since these projects were initiated, several other cooperators have joined in these efforts, including the MSRF, Yakama Nation, Methow Conservancy, the Washington Water Project of Trout Unlimited (WWP-TU), USFWS, the U.S. Geological Survey (USGS), and multiple landowners.

Endangered Species Act Section 7(a)(2)

The ESA requires all Federal agencies to ensure that their actions do not jeopardize the continued existence of listed species or destroy or adversely modify their critical habitat. Reclamation consulted on the proposed project with NOAA Fisheries and USFWS and both agencies agreed with Reclamation's determinations.

National Historic Preservation Act of 1966

Section 106 of the National Historic Preservation Act (NHPA), as amended, requires that Federal agencies identify historic properties that may be affected by their actions, and take into account the effects the actions may have on historic properties. Implementing regulations (36 CFR Part 800) requires Federal agencies to make determinations in consultation with the SHPO and Indian tribes with a traditional religious or cultural interest in the study area. Reclamation or their contractor completed notifications and consultations, but no responses were received from the Yakama Nation or the Colville Confederated Tribes.

Based on consultation between the SHPO and Reclamation, it was determined that cultural resources/historic properties would not be adversely impacted by the Proposed Action at Fort Thurlow.

The Marracci project involves work at previously constructed features within Beaver Creek and a cultural resources survey found no historic properties; therefore, it qualifies for a Determination of NoPE as defined in 36 CFR 800.2(a).

Tribal Coordination and Consultation

Reclamation sent letters to representatives from the Tribes explaining the EA process during the scoping phase. In a follow-up correspondence, Reclamation requested information on Indian Trust Assets (ITAs), traditional cultural properties (TCPs), and Indian sacred sites from the Tribes for documentation during the EA process. To date, the tribes have not responded to this request. Tribal governments contacted included the Colville Confederated Tribes and the Yakama Nation.

Public Involvement

Reclamation has coordinated with Federal, State, and local agencies during the preparation of the EA to gather input, provide information, and to meet NEPA and ESA regulatory requirements. This coordination was integrated with the public involvement process. MSRF has coordinated with State government officials and agencies, Federal agencies, and businesses and non-government organizations. Reclamation sent letters to Tribal governments and both Reclamation and MSRF held individual meetings with affected land owners, irrigators, and regulatory agencies to familiarize the communities with the proposed program prior to the publication of the Draft EA. In addition, Reclamation met with local, State, and Federal agency staff to discuss the project.

Public Comment Summary

An internal review of the Draft EA for implementation of actions 34 and 35 was conducted from June 7 through June 21. It was determined that with the previous thorough public outreach meetings and coordination with landowners, a review of the draft was not necessary for public distribution. Most of the agency comments dealt with minor inconsistencies or errors of factual information in the document and suggested revisions for the text or map data.

Distribution of this Final EA/FONSI will be to the appropriate congressional delegates, appropriate agencies, commenter's, and responsible permitting agencies.

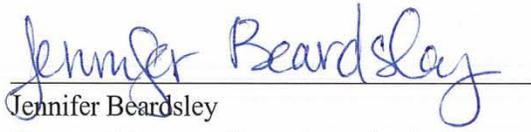
Changes to the Final EA

Reclamation incorporated editorial revisions to clarify aspects of the document and to ensure accuracy. These revisions did not substantially change the environmental impacts discussed in the Draft EA. The findings of this document are based on the Final EA.

Finding

Based on a thorough review of the comments received and analysis of the environmental impacts, mitigation measures, and implementation of all environmental commitments as presented in this Final EA and FONSI, Reclamation concludes that implementation of the Proposed Action of renovating the weirs on Beaver Creek will not have a significant effect on the quality of the human or natural environment and cultural resources. The effects of the Proposed Action will be short term, minor, and localized other than the short-term impacts to ESA-listed fish species of which mitigation and careful monitoring will be implemented to reduce adverse effects. Therefore, Reclamation concludes that preparation of an Environmental Impact Statement (EIS) is not required and that this FONSI satisfies the requirements of NEPA.

Recommended:


Jennifer Beardsley
Program Manager, Ecosystems Analysis

9-18-13
Date

Approved:


Lorri Lee
Regional Director
Pacific Northwest Region

9/18/2013
Date

RECLAMATION

Managing Water in the West

**Finding of No Significant Impact
Final Environmental Assessment
Beaver Creek Weirs Renovation Project
Methow River Subbasin, Twisp, Washington**



U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia Snake Salmon Recovery Office
Boise, Idaho

September 2013

Acronyms and Abbreviations

AER	Alternatives Evaluation Report
AMIP	Adaptive Management Implementation Plan
APE	Area of Potential Effects
BA	Biological Assessment
BiOp	Biological Opinion
BMP	Best Management Practices
BPA	Bonneville Power Administration
CBC	Colville Business Council
CCT	Colville Confederated Tribes
CFR	Code of Federal Regulations
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
cy	cubic yards
DAHP	Department of Archeology and Historic Preservation
EFH	essential fish habitat
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power Systems
FONSI	Finding of No Significant Impact
ft	foot
ITAs	Indian Trust Assets
JARPA	Joint Aquatic Resources Permit Application
LWD	large woody debris
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSRF	Methow Salmon Recovery Foundation
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NoPE	No Potential to Cause Effects
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PBA	Programmatic Biological Assessment
PEA	Programmatic Environmental Assessment
PHS	Priority Habitat Species
PIT	Passive Integrated Transponder
Reclamation	U.S. Bureau of Reclamation
RM	river mile
RPA	Reasonable and Prudent Alternatives
SEPA	Washington State Environmental Policy Act
SHPO	State Historic Preservation Office
SPIF	Specific Project Information Form
TCP	Traditional Cultural Property
TES	Threatened and Endangered Species
THPO	Tribal Historic Preservation Officer
UCR	Upper Columbia River
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology
WWP-TU	Washington Water Project-Trout Unlimited

CONTENTS

Acronyms and Abbreviations

Chapter 1	Purpose and Need	1
1.1	Introduction	1
1.2	Background	2
1.3	Adaptive Management Implementation Plan.....	4
1.4	Proposed Action.....	4
1.5	Purpose and Need for Action	7
1.6	Authority	7
1.7	Relevant Statutes, Regulations, and other Plans	7
Chapter 2	Alternatives	9
2.1	Introduction	9
2.2	Description of Alternatives	9
2.2.1	Alternative A – No Action.....	9
2.2.2	Alternative B – Weir Complex Repair (Proposed Action).....	9
	Marracci Rock Weir Diversion.....	10
	Fort-Thurlow Rock Weir Complex Site	12
2.2.3	Conditions Common to Marracci and Fort-Thurlow Rock Weir Complex.....	14
	General Site Conditions.....	14
2.2.4	Staging, Fueling, and Stockpiling.....	15
2.2.5	High-flow Conditions	16
	Site Restoration and Revegetation.....	16
2.2.6	Adaptive Management and Effectiveness Monitoring	16
2.3	Alternatives Considered but Eliminated	17
2.4	Summary Comparison of the Environmental Impacts of the Alternatives	18
Chapter 3	Affected Environment and Environmental Consequences	19
3.1	Introduction	19
3.2	Geomorphic Characteristics	19
3.2.1	Affected Environment	19
3.2.2	Environmental Consequences.....	20
	Alternative A – No Action.....	20
	Alternative B – Proposed Action.....	21

CONTENTS (CONTINUED)

3.3	Hydrology and Water Quality.....	21
3.3.1	Affected Environment	21
3.3.2	Environmental Consequences.....	22
	Alternative A – No Action.....	22
	Alternative B – Proposed Action.....	23
3.4	Threatened and Endangered Species and Habitat	23
3.4.1	Affected Environment	24
	Species	24
	Critical Habitat and Essential Fish Habitat.....	25
3.4.2	Environmental Consequences.....	26
	Alternative A – No Action.....	26
	Alternative B – Proposed Action.....	26
3.4.3	Mitigation	29
	Fish Handling and Salvage	29
	Isolation of the Work Area	30
3.5	Vegetation	30
3.5.1	Affected Environment	30
3.5.2	Environmental Consequences.....	31
	Alternative A – No Action.....	31
	Alternative B – Proposed Action.....	31
3.6	Cultural Resources	32
3.6.1	Affected Environment	32
3.6.2	Environmental Consequences.....	33
	Alternative A – No Action.....	33
	Alternative B – Proposed Action.....	33
3.7	Sacred Sites	34
3.7.1	Affected Environment	34
3.7.2	Environmental Consequences.....	34
	Alternative A - No Action	34
	Alternative B – Proposed Action.....	34
3.8	Indian Trust Assets.....	34
3.8.1	Affected Environment	35
3.8.2	Environmental Consequences.....	35
	Alternative A – No Action.....	35

CONTENTS (CONTINUED)

	Alternative B – Proposed Action.....	35
3.9	Environmental Justice	35
	3.9.1 Affected Environment	35
	3.9.2 Environmental Consequences.....	36
	Alternative A – No Action.....	36
	Alternative B – Proposed Action.....	36
3.10	Cumulative Effects.....	36
	Alternative A – No Action.....	36
	Alternative B – Proposed Action.....	36
3.11	Environmental Commitments	37
	Geology/Soils	38
	Fish and Wildlife	38
	Vegetation.....	38
	Cultural Resources.....	38
Chapter 4	Consultation and Coordination.....	41
	4.1 Agency Consultation and Public Involvement.....	41
	4.2 National Historic Preservation Act of 1966.....	42
	4.3 Endangered Species Act (1973) Section Consultation.....	42
	4.4 Tribal Coordination and Consultation.....	43
	4.4.1 Indian Sacred Sites (Executive Order 13007)	43
	4.4.2 Indian Trust Assets (ITAS).....	44
	4.5 Other Laws and Regulations	44
Chapter 5	References	45
Chapter 6	List of Preparers	49
Appendices		
Appendix A – Project Site Location Maps and Design Details		
Appendix B – Permits and Other Applications		
Appendix C – Consultation and Coordination		

CONTENTS (CONTINUED)

List of Figures

Figure 1-1.	Upper Beaver Creek watershed geology and fires.	3
Figure 1-2.	Map of currently proposed site locations: Marracci and Fort-Thurlow.	6
Figure 2-1.	Example of roughened channel.	10

List of Tables

Table 2-1.	Design objectives.	17
Table 2-2.	Summary of environmental effects of actions.	18
Table 3-1.	Determination of effects.	29

Chapter 1 PURPOSE AND NEED

1.1 Introduction

The Bureau of Reclamation (Reclamation) prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulation. The EA discloses the direct, indirect, and cumulative environmental effects that would result from a proposal to complete, either by providing Federal funds or contracting directly, the Marracci and Fort-Thurlow rock weirs renovation on Beaver Creek in the Methow River subbasin near Twisp, Washington. Since installation of the weirs, Marracci in 2005 and Fort-Thurlow in 2004, high spring flow events have caused undermining of the structures affecting the performance and leading to degraded conditions and failure of fish passage at the Fort-Thurlow weirs. Through onsite evaluations, it has been determined the deficiencies exist and eventual complete failure of both structures may occur blocking fish passage at both locations and affecting irrigation diversions.

In May 2008, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) issued a Biological Opinion (BiOp) on the operation of 14 of the projects that make up the Federal Columbia River Power System (FCRPS). The FCRPS projects are operated for multiple purposes including flood control, power generation, and fish augmentation. The FCRPS BiOp considered a suite of Reasonable and Prudent Alternative (RPA) actions proposed by the Bonneville Power Administration (BPA), Reclamation, and U.S. Army Corps of Engineers (Corps). These actions, developed through a collaborative process with States and Tribes in the Columbia Basin, were designed to protect salmon and steelhead across their life cycle and were supported by a biological analysis that NOAA Fisheries concluded would avoid jeopardy to the fish and would not adversely modify their critical habitat. In 2009, the Obama Administration directed the development of the Adaptive Management Implementation Plan (AMIP), which takes a more precautionary approach in implementation of the RPA actions and provides contingency and rapid-response actions in case of unanticipated, significant fish declines. On May 20, 2010, NOAA Fisheries completed the 2010 Supplemental BiOp, incorporating the AMIP into the 2008 BiOp. In addition, in July 2008 the Corps developed a Programmatic Biological Assessment (PBA) for Restoration Actions in Washington State.

To comply with NEPA, Reclamation has prepared this EA to address the potential impacts associated with two adaptive management projects related to fish habitat improvement

measures within the Beaver Creek drainage. Habitat improvement measures will take place on private lands with willing participants.

1.2 Background

Beaver Creek is located in the Methow River subbasin in north-central Washington State, Okanogan County. Beaver Creek flows approximately 22.3 miles in length from its headwaters to where it enters into the Methow River at river mile (RM) 35.2 about 5 miles downstream from the town of Twisp (RM 40.0). The Beaver Creek drainage runs northeast to southwest, draining an area of about 111 square miles. Tributaries to Beaver Creek include Frazer Creek, Wolf Canyon Creek, Piper Creek, South Fork Beaver Creek, Middle Fork Beaver Creek, Volstead Creek, Lightning Creek, and Blue Buck Creek.

Beaver Creek fish screening, fish passage, and irrigation efficiency efforts began about 15 years ago when the Washington State Department of Fish and Wildlife (WDFW), National Resources Conservation Service (NRCS), Bonneville Power Administration (BPA), and Okanogan Conservation District collaborated with local ranchers and water users to address improvements within the river basin. The original work resulted in installation of fish screens, numerous fish passage projects at road crossings as well as irrigation diversions, ditch piping, conversion to center pivot irrigation lines, and conservation easements to protect riparian and agricultural values. To meet commitments in the FCRPS BiOps, Reclamation provided technical assistance for the design of fish passage improvements at irrigation diversions as part of the collaborative efforts in Beaver Creek.

Since these projects were initiated, several other cooperators have joined in these efforts including the MSRF, Yakama Nation, Methow Conservancy, Washington Water Project-Trout Unlimited (WWP-TU), U.S. Geological Survey (USGS), U.S. Fish and Wildlife Service (USFWS), and multiple landowners. Private lands in the lower portion of the watershed downstream and upstream of State Highway 20 have reduced channel access to its floodplain and reduced riparian habitat due to agricultural practices and rural development (Andonaegui 2000). In addition, irrigation diversions divert virtually all of Beaver Creek flows in late summer (USFS 2004). Past management activities in the upper watershed such as timber harvests and road construction on U.S. Forest Service (USFS) lands have increased sediment levels in the Beaver Creek drainage (USFS 2007b). In 2006, the Tripod fire burned the Upper Beaver Creek drainage including Lightning and Blue Buck Creek with considerable areas of high and moderate burn severity (USFS 2006) (Figure 1-1). Water uses in the Beaver Creek drainage have been adjudicated with water use exceeding water availability most years during the late irrigation season (USFS 1997). In recent years WWP-TU and others have been working to acquire water by funding irrigation efficiency improvements to augment late season instream flows, and as a result, complete dewatering of the stream below the last irrigation diversion is less likely to occur.

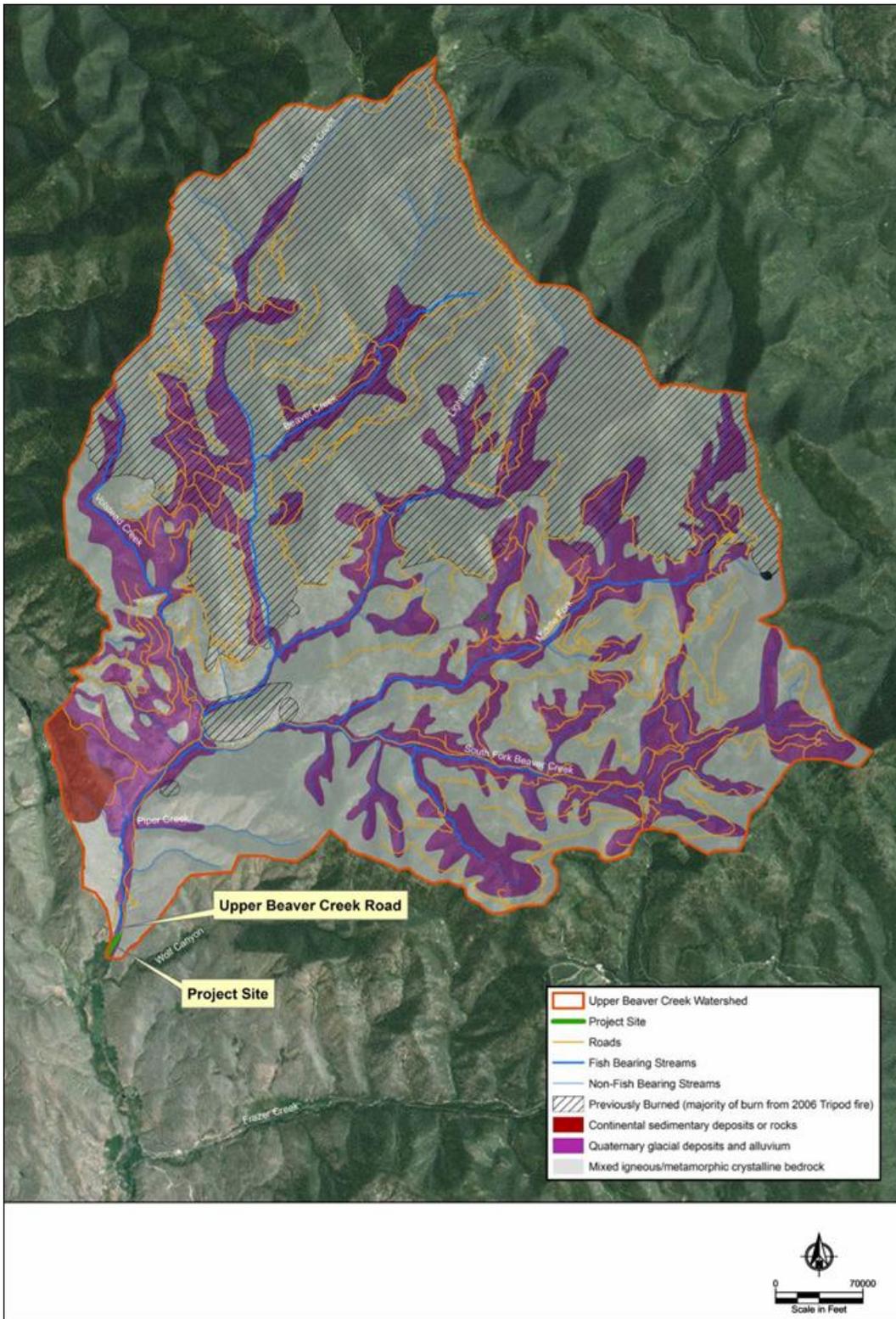


Figure 1-1. Upper Beaver Creek watershed geology and fires.

Due to these conditions, the following watershed limiting factors that limit the ability of habitat to fully sustain populations of salmon, steelhead, and bull trout have been identified for the Beaver Creek drainage:

- Lack of overwintering juvenile rearing habitat.
- Loss of access to spawning and rearing habitat.
- Loss of floodplain function.
- Lack of woody debris.
- Accumulation of fine sediment in spawning gravel.
- Elevated water temperature.
- Impaired water quality (Andonaegui 1999; UCSRB 2007)
- Impaired water quantity.

1.3 Adaptive Management Implementation Plan

Based on the previously identified limiting factors, two adaptive management criteria were selected for this area: 1) irrigation diversions should be maintained and functioning properly, and 2) the structures should be within the NOAA Fisheries fish passage criteria of 0.8 feet of drop.

As part of the Columbia River Basin, the Methow River and its tributaries, including Beaver Creek, contain the Upper Columbia River (UCR) spring Chinook salmon (*Oncorhynchus tshawysha*), UCR steelhead (*Oncorhynchus mykiss*), and adult and juvenile Columbia River bull trout (*Salvelinus confluentus*) of the Columbia River Distinct Population Segment (DPS), as well as juvenile Coho salmon (*Oncorhynchus kisutch*) (USFS 2007b) and aquatic ecosystems along Beaver Creek, which are included in the Threatened and Endangered (T&E) species list under the Endangered Species Act (ESA) (UCSRB 2007).

1.4 Proposed Action

Reclamation proposes to fund the implementation of both short-term and permanent repairs, either through reconstruction or alteration of the existing structures, at two locations on Beaver Creek (Figure 1-2). The repairs would occur in phases as design is complete and funding is available. In 2013, Reclamation proposes to provide funds to MSRF through a cooperative agreement to implement permanent repair of the Marracci weir providing stability of the structure, improved irrigation diversion, and continued fish passage. The Proposed Action also includes installation of a temporary prefabricated fish ladder to provide fish access to Beaver Creek at the Fort-Thurlow site in 2013 to prevent further degradation

with a permanent correction to be completed at a later date when the final design is complete and funding is provided. Installation of the temporary fish ladder will require moving 2 to 6 large rocks to fit the ladder in place. The ladder will be held in place with bolts. Installation will take less than one day. The Proposed Action weir complex repairs are intended to enhance fisheries habitat by proposing to reconstruct the current weir formations. At both locations, a “roughened channel” is proposed; these sites will require intake relocation and/or alteration of existing weir complex to a step-pool complex and/or installation of a downstream sill to mitigate head cutting or down cutting. The final designs for each site may vary slightly based on needs, but the impacts will remain similar. The current conditions of the two sites and the necessary improvements required are described below for each specific site. Descriptive information that is common to both projects is provided after the individual site specific sections.

The Proposed Action supports the AMIP by enhancing riverine features to accommodate fish passage for several species listed under the ESA and to enhance irrigation performance. The Proposed Action is funded and designed by Reclamation in cooperation with the MSRF.

1.5 Purpose and Need for Action

The purpose for the action is to restore upstream fish passage on Beaver Creek by repair or replacement of the damaged weir structures and to allow for irrigators to continue diverting water using these structures. The need for the action is to repair two weir complexes that were damaged during the spring runoff in 2011.

1.6 Authority

Reclamation has been delegated authority to take the following actions, either directly or by providing financial assistance to non-federal parties, pursuant to the Conservation of Wild Life, Fish and Game Act of March 10, 1934 (Pub. L. 73-121; 48 Stat. 401) as amended by the Fish and Wildlife Coordination Act of August 14, 1946 (Pub. L. 85-624; 72 Stat. 563; 16 U.S.C. 661-666c); Section 5 of the ESA of 1973, December 28, 1973 (Pub. L. 93-205; 87 Stat. 884; 16 U.S.C. 1534); and Section 7(a) of the Fish and Wildlife Coordination Act of 1956, August 8, 1956 (70 Stat. 1122; 16 U.S.C. 742f(a)), regarding the construction and/or continued operation and maintenance of any Federal reclamation project:

- 1) Plan, design, and construction, including acquiring lands or interests therein as needed for:
 - a) Fish passage and screening facilities at any non-federal water diversion or storage projects; or
 - b) Projects to create or improve stream habitat.
- 2) Acquire or lease water or water rights from willing sellers or lessors; or
- 3) Monitor and evaluate the effect of Reclamation actions on ESA-listed species.

1.7 Relevant Statutes, Regulations, and other Plans

Compliance is required under the provisions of Section 7 of the ESA as administered by NOAA Fisheries and USFWS and Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470) as administered by the Washington State Historic Preservation Office (SHPO). Under the Corps PBA, the Beaver Creek projects will comply with Fish Passage via Construction of Structures to Provide Passage over Small Dams (1: g) and Installation of Instream Structures with Boulder Weirs and Roughened Channels (2: g) with

completion of a Specific Project Information Form (SPIF) as well as the Washington State Joint Aquatic Resources Permit Application (JARPA) (See Appendix B).

Project designs have improved based on modeling and adaptive response to previous design limitations and also allow for the adaptive management of older projects. In addition, site visits, USGS monitoring efforts, and other background material has been researched and reviewed to help identify the limiting factors affecting salmonid habitat within the Beaver Creek watershed. Another project at the Thurlow Transfer Ditch upstream of the State Route 20 crossing of Beaver Creek was also recently proposed; however, since the impacts of this project were not likely to affect ESA-listed fish or cultural resources, a Categorical Exclusion was prepared.

Chapter 2 ALTERNATIVES

2.1 Introduction

This chapter describes the two alternatives analyzed in this EA: the No Action alternative and the Proposed Action alternative. Other alternatives considered are also documented.

2.2 Description of Alternatives

2.2.1 Alternative A – No Action

Under the No Action alternative, the Marracci Rock Weir Diversion and the Fort-Thurlow Rock Weir Complex would not be repaired. Conditions at the Marracci site would continue to deteriorate eventually blocking fish passage and begin to create conditions that would affect downstream spawning, rearing, and other general habitat features. The Fort-Thurlow site would continue to block fish access to Beaver Creek for most of the year, and high gradient and high water velocities would continue to negatively affect downstream habitat.

2.2.2 Alternative B – Weir Complex Repair (Proposed Action)

Under Alternative B, Reclamation proposes to fund the implementation of permanent repairs, either through reconstruction or alteration of the existing structures at two locations on Beaver Creek. The repairs would occur in phases as design is complete and funding is available. In 2013, Reclamation proposes to provide funds to MSRF through a cooperative agreement to implement permanent repair of the Marracci weir providing stability of the structure, improved irrigation diversion, and continued fish passage. The Proposed Action also includes installation of a temporary, prefabricated fish ladder at the Fort-Thurlow site in 2013 to prevent further degradation with a permanent correction to be completed at a later date when the final design is complete and funding provided.

The Proposed Action weir complex repairs are intended to enhance fisheries habitat by proposing to reconstruct the current weir formations. At both sites, a “roughened channel” is proposed (Figure 2-1); these sites will require intake relocation and/ or alteration of existing weir complex to a step-pool complex and/or installation of a downstream sill to mitigate head cutting or down cutting. The final designs for each site may vary slightly based on needs, but

the impacts will remain similar. The current conditions of the two sites and the necessary improvements required are described below for each specific site. Descriptive information that is common to both projects is provided after the individual site specific sections.



Figure 2-1. Example of roughened channel

Marracci Rock Weir Diversion

In July 2011, Reclamation performed a topographic survey of Marracci Rock Weir Diversion, located at RM 6.5 on Upper Beaver Creek in the Methow subbasin in north-central Washington State, Okanogan County. The Marracci project consists of repairing a single rock vortex V-weir irrigation diversion structure constructed in 2005 to provide fish passage meeting the NOAA Fisheries maximum of 0.8-foot drop passage criterion. The weir was undermined during high flows in 2011. Replacing the weir with a roughened channel will take approximately 2 to 3 weeks. An 80-foot section of Beaver Creek would be isolated and dewatered using cofferdams during construction.

The potential affected area for the Marracci Diversion intake to the proposed grade sill downstream of the project is approximately 0.1 acres (See Appendix A for maps and design detail). This site is located on private land and the floodplain is surrounded by irrigated valley bottom agriculture and rolling hills used as rangeland. Immediately upstream of the Marracci location, the terrain becomes markedly rugged with a steep, narrow valley bottom—not conducive to agriculture with considerably more forested cover on the adjacent slopes. Upstream of the Marracci Diversion there is a significant bend within the channel and the outside bank (river left) is eroding. Riprap was placed on the eroding bank by the landowner causing the formation of a large logjam. There is potential of avulsion into a relic channel as well as a mid-channel bar forming approximately 5 feet upstream of the diversion. This bar

has been removed in past years but has since returned. The dominant stream substrate has increased following several high flow events in 2011 and 2012 altering substrate size from approximately a 6-inch size class to approximately a 12-inch size class.

Major Project Features

1. Construct grade control sills at the upper and lower extents of the project area in order to maintain fish passage at all flows while providing adequate surface elevation for the irrigation diversion.
2. Fill scour holes and construct a roughened channel between the sills to stabilize the grade control complex while maintaining fish passage.
3. Move the existing intake and trash rack flush into the bank in order to minimize risk from debris impact.

Total impacted area, from the diversion intake downstream to the proposed lower grade sill, is approximately 0.1 acres in-channel and 0.1 acres for staging and access located on private land.

Major Construction Tasks

Replacement of Weir with Upstream Sill

The failed weir crest would be reconfigured into a perpendicular sill to re-establish and maintain the water surface elevation required for the irrigation diversion. This will consist of placing angular rocks to recreate the original crest elevation. Reconfiguration will require approximately 10 cubic yards (cy) of excavation and importing an equivalent volume of 2 to 3 foot boulders and is expected to take 1 to 2 days. Material excavated would be hauled off site and replaced with an engineered streambed mix.

Installation of Downstream Sill

A grade control sill would be installed at the downstream extent of the project. The intent of this feature is to protect the rock ramp from head cutting below the ramp. The sill would be composed of 2 stacked rows of approximate 3-foot angular rock installed at grade, keyed into the bank a minimum of 6 feet. Construction of the sill will require 12 cy of excavation and importing an equal volume of rocks and is expected to take 1 to 2 days. Material excavated would be hauled off site and replaced with an engineered streambed mix.

Construction of Rock Ramp

A rock ramp would be constructed between the two grade control sills. This will add stability to the sill structures while maintaining fish passage. The existing scour hole would be filled with rock to spread the drop over a longer area. The engineered streambed material would be

placed by an excavator; bucket compacted, and then jetted into the bed using a small trash pump that recycles water from a sump dug within the dewatered area. This installation procedure will ensure that water flow stays on the surface of the rock ramp. Construction of this feature will require excavation of unsuitable materials currently onsite together with importing and placing suitable materials. The construction process may require as much as 12 to 18 working days.

In addition to the engineered streambed material, about 60 larger boulders approximately 2 to 3 feet in diameter would be placed and countersunk to add roughness and pockets of slower water to aid in fish passage.

Adjustment of Trash Rack and Intake Location

The existing trash rack and intake would be moved inward approximately 8 feet to bring it flush with the bank, and would be rotated to face perpendicular to the flow. These adjustments will reduce the impact of debris carried toward it. Relocation of the intake structure will require 2 cy of excavation and 30 cubic feet footing prep/bedding material.

Site Access

Access to the Marracci site would be provided from an existing gravel drive as shown on Drawing 1678-100-1558 (Appendix A).

Fort-Thurlow Rock Weir Complex Site

In August 2011, Reclamation performed a topographic survey of Fort-Thurlow Rock Weir Complex, located between RM 1.2 and RM 1.3 on Beaver Creek in the Methow subbasin. This survey was conducted in response to a previous site visit that identified the Fort-Thurlow rock weirs as needing adaptive management. This project consists of repairing a series of rock weirs between the upstream dam and the downstream most damaged weir, which were undermined during high flows in 2011. Replacing the failed weirs with a roughened channel will take approximately 2 to 3 weeks. A 120-foot section of Beaver Creek would be isolated and dewatered using cofferdams; flow would be temporarily diverted around the site through the existing irrigation diversion and fish return during construction.

The potential affected area for this site is approximately 0.2 acres and consists of three double drop rock vortex A-Weirs and one single drop rock vortex V-weir constructed in 2004 to provide fish passage over an existing irrigation diversion (See Appendix A for maps and design detail). The existing concrete diversion dam was partially removed and the channel below the dam was modified to allow for fish passage by placing a series of four rock weirs. The original dam created an approximate 5.5-foot passage barrier. The rock weirs allowed for fish passage by creating a series of drops designed to be 0.8 feet, meeting passage requirements.

All the Fort-Thurlow weirs had performed well since construction and endured significant high flow events, including spring 2006 before the Tripod fire. However, spring runoff from 2011 was particularly high and of longer duration. Unfortunately, the lack of a gage makes it difficult to quantify the severity and extent of the flow event. Estimates place the flow above a 20-year event (approximately 850 cubic feet per second [cfs]).

The first two upstream weirs at Fort-Thurlow had several weir boulders mobilized downstream. The first weir lost the boulders forming the “cross arm” of the weir and the second weir lost several boulders at the weir crest upstream end of the “A.” These components are consecutive, and as a result, the water surface has lowered between the two weirs creating an approximate 24-inch drop that is well outside of fish passage criteria. Also, the loss of boulders compromises the integrity of the structures and there is a greater potential of additional boulders mobilizing downstream. The Proposed Action includes replacing the existing weir complexes with a combination of a “roughened channel” and step-pools at Fort-Thurlow.

Major Project Features

1. Construct a series of three grade control sills between the upstream dam and the downstream-most damaged weir.
2. Construct a roughened channel with a series of complexity boulders which will stabilize the weirs as well as maintain fish passage.
3. Install temporary prefabricated fish ladder. This would be completed by using an excavator to relocate 5 to 8 large rocks, place the fish ladder and bolt to existing concrete dam. The ladder would be removed at the start of the permanent construction effort.

Total area expected to be impacted during repairs would be approximately 0.2 acres, at approximate RM 1.5.

Major Construction Tasks

Excavation

Any existing material within 3 feet of the proposed final grade would be removed and sorted, with any material meeting the specifications for the D100-D84 stockpiled on site and the remainder hauled off site.

Construction of Roughened Channel

Construction of the roughened channel will proceed from downstream to upstream, moving stepwise a distance within swing radius of an excavator constructing channel/banks before

moving to the next section. Large roughness boulders would be placed at the direction of the engineer. The mid-range boulders and smaller cobbles would be placed in 1-foot lifts and bucket-compacted with an excavator. Fines would be washed into the boulders and cobbles with a 2-inch trash pump until all voids are filled and water sheets over the material. This process would be repeated until final grade is reached (Appendix B).

Construction of Pools

Two to three pools would be constructed of boulders, a mid-channel pool, and an energy dissipation pool. The mid-channel pool will help the structural integrity of the roughened channel as it makes a bend approximately half way from the top of the project to the bottom and to promote fish passage. The energy dissipation pool will help dissipate some of the energy of the water at higher flows before it enters the existing channel downstream of the project as well as to promote fish passage.

Grout

Approximately 20 to 40 cy of grout would be placed at the interface between the existing dam and the roughened channel as shown on Drawings 1678-100-1550 and 1678-100-1551 in Appendix A.

Site Access

Access to Fort-Thurlow would be provided from Highway 20 as shown on Drawing 1678-100-1561 (Appendix A).

Construction of Temporary Fish Ladder

Install temporary prefabricated fish ladder. This would involve removing 5 to 8 large rocks from the constructed weirs with a tracked excavator; attach the temporary fish ladder to the existing concrete dam head wall with mechanical anchors; secure the lower end of the fish ladder with ballast or mechanical anchors; and modify the fish ladder or dam crest to ensure that attractive flows are concentrated through the ladder.

2.2.3 Conditions Common to Marracci and Fort-Thurlow Rock Weir Complex

General Site Conditions

Required Permits

MSRF, the project sponsor submitted a JARPA to the Corps, WDFW, and Okanogan County (the same document, but submitted separately) on April 3, 2013. A Specific Project

Information Form (SPIF) was also submitted to the Corps on April 3, 2013 in order to utilize their programmatic ESA consultation process.

MSRF also submitted a Washington State Environmental Policy Act (SEPA) Environmental Checklist to Okanogan County on June 5, 2013.

As required by NEPA and ESA Section 7 Consultation, the Corps consulted with NOAA Fisheries and USFWS regarding the project's effects on T&E species and to document potential affects to the environment. The consulting agencies have determined that T&E species may be adversely affected by the Proposed Action and have assigned incidental take allowances to the project.

The contractor would be required to abide by all permit conditions. Should the contractor wish to deviate from the work described herein, the contractor would be responsible for notification of permit agencies to obtain any needed modifications to secured construction permit conditions for any proposed deviation prior to starting construction.

2.2.4 Staging, Fueling, and Stockpiling

Landowner agreements will be in place prior to construction. Following construction, the contractor will remove all equipment and material from the staging area and restore the area to pre-project conditions. If re-vegetation is required, the contractor will leave the site in a condition suitable for replanting.

Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located a minimum of 150 feet from Beaver Creek or other flowing stream or water body. Fueling (other than occasional hand fueling of small tools) and overnight parking for vehicles will be available across Lower Beaver Creek Road from the project sites. The Contracting Officer will inspect and approve the fueling area prior to use. No fuel will be stored onsite for use by heavy equipment; trucks will haul fuel to the approved site when required. Five to ten gallons of fuel in approved containers may be kept at the fueling area in an approved containment vessel for use with hand-held power tools and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. No other fueling sites will be allowed.

Equipment to be used or stored onsite may include an excavator, backhoe, dozer, 10 cy dump trucks, and small tools. Additional equipment may be required as determined by the contractor. All hydraulic fluid used for this project will be certified as nontoxic to aquatic organisms; equipment shall be free of external petroleum-based products. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of Beaver Creek or any adjacent water body. Equipment shall be checked daily for leaks and any necessary repairs shall be

completed prior to commencing work activities. All stationary power equipment such as generators operated within 150 feet of any water body shall be diapered to prevent leaks, unless suitable containment is provided to prevent potential spills from entering the water.

Materials to be stored onsite will include engineered streambed material, large rock, sediment fencing, straw bales, and native plants for vegetation treatments. All excess materials not used on the job will be removed within 10 days of completion of the project. Non-native waste materials not reused in construction or reclaimed by the project sponsor will be removed by the contractor to a disposal site in accordance with State regulations.

2.2.5 High-flow Conditions

If a high-water-level event occurs that threatens to overtop the project site, work in the area will be suspended until the high water recedes. The contractor will remove all motorized equipment and most tools before leaving the site so that any inundation in the contractor's absence will not pollute the stream. The contractor should also monitor weather and river forecasts and evacuate the site in a timely manner if flows are predicted to affect the project area. After the high water recedes, biologists will again remove fish from the work area behind the cofferdams, which will then be dewatered as needed to resume construction.

Site Restoration and Revegetation

Rehabilitation goals for the projects include minimizing soil disturbance, replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds. Protection of aquatic and riparian habitat will be accomplished if these goals are met. The negative effects of project construction on local plant, fish, and wildlife habitat are expected to be temporary. Ground disturbance activities will be limited to the staging areas, access routes, and construction sites.

2.2.6 Adaptive Management and Effectiveness Monitoring

Annual effectiveness monitoring would be completed to check conditions at each site and to confirm revegetation success. This would occur for up to 3 years. Survey cross sections of the creek would be completed at least once per year by Reclamation to track changes over time. Adaptive work in the river may be required for up to 3 years if problems develop or if conditions change to reduce the operational performance of the structures. Contact with resource agencies and completion of appropriate environmental compliance would be completed prior to any in-water adaptive management efforts.

2.3 Alternatives Considered but Eliminated

Another alternative considered for the Marracci site was to relocate the entire weir complex and diversion intake upstream of the existing one. Although this alternative would improve the overall slope of the roughened channel and provide a more accurate match of the stream profile upstream and downstream, it required realigning the pipe and diversion structure. The upstream sill would need to be set precisely to maintain the required water surface elevation to meet the irrigation diversion. The cost, design, and increase in environmental impacts of this alternative would be much greater than Alternative B (Proposed Action) for the Marracci site; therefore, it was eliminated from consideration.

The use of log weir step-pools was also considered as a potential permanent fix for the weirs. Establishment of design objectives and identification of options (see Table 2-1) to meet those objectives provided alternative actions that could be implemented to achieve the permanent fix desired at these locations. Through further evaluation of the needs and character of the locations of the sites, roughened channels were chosen as the preferred alternative because they could provide more natural stream processes throughout the site and they will likely have better ability at passing both sediment and woody material in the long term. Therefore, the log weir step-pool was eliminated from further consideration for these sites.

Table 2-1. Design objectives.

Design Objective	Best Option	Comments
Year-round fish passage.	Step-pool	More control over low-flow fish passage
Irrigation head.	Step-pool	The roughened channel will fill with sediment above the structure, leaving limited depth against intake. Measures can be placed to address this, but will likely prove difficult as they go against hydraulic approach needs for roughened channel.
Minimal maintenance.	50-50	For fish passage could be step-pool, for irrigator diversion needs, likely roughened channel.
Design life and stability.	Roughened channel	Step-pools are prone to failure from one or two components; roughened channels more resilient.
Maintain physical and ecological process.	Roughened channel	Less disruption to sediment transport.
Intake structure protection.	Step-pool	Weir protects intake, design measures could address this for roughened channel also, but likely not as well as a full cross weir.

2.4 Summary Comparison of the Environmental Impacts of the Alternatives

The environmental impacts of each alternative are compared in Table 2-2 against the environmental impacts that would result under Alternative A – No Action. The environmental consequences of the alternatives arranged by resource are described in detail in Chapter 3. The terms “environmental consequences” and “environmental impacts” are synonymous in this document.

Table 2-2. Summary of environmental effects of actions.

Issue	Alternative A – No Action	Alternative B – Proposed Action
Potential effects on geomorphology and hydrology.	Stream will continue to shift to areas of inefficiency for irrigation and reduce access for fish passage.	Increase irrigation efficiency and fish passage.
Potential effects on wildlife, fish, and T&E species.	Would continue to reduce or prevent fish passage, habitat complexity, and access to spawning areas and associated critical or essential fish habitat.	No effect to wildlife except for potential short-term localized noise/equipment disturbance. “May likely adversely affect” fish species while dewatering, but with mitigation measures may be reduced to a “Not likely to adversely affect.” In addition, potential long-term benefits to fish species and habitat may occur.
Potential effects on vegetation resource.	No change or effect.	No T&E species present; therefore, no effect. Project may increase the risk of spreading existing noxious weeds and increase the risk of new noxious weed invasion. Standard BMPs will be implemented.
Potential effects on cultural resources, sacred sites, and ITAs.	No change or effect.	No structures, sites, or properties eligible for the NRHP would be affected at the proposed sites. No historic properties were identified within the Area of Potential Effect (APEs) of either project. There will be no effect to cultural resources.
Potential effects on environmental justice	No change or effect.	No change or effect; possible short-term localized employment opportunities.

Chapter 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter discusses the environmental consequences of the Proposed Action compared to the No Action alternative. The direct, indirect, and cumulative effects are considered for each resource. Past, present, and reasonably foreseeable future actions are considered in the cumulative effects analysis. The resources analyzed include geomorphic characteristics, hydrology and water quality, threatened and endangered species and habitat, vegetation, cultural resources, Sacred Sites, Indian trust assets, and environmental justice.

The description of the affected environment for these resources can be found in the *Alternatives Evaluation Report (AER) Upper Beaver Creek Habitat Improvement Project Methow River Subbasin, Washington Columbia Snake River Salmon Recovery Program* document, prepared by Anchor Environmental, L.L.C. December 2008 and is incorporated by reference in this document (Anchor Environmental, L.L.C. 2008).

The affected environment is within the Beaver Creek drainage of the Methow River subbasin between the Methow and Okanogan River valleys and covers about 62 square miles with an average elevation of 4800 feet. Principle tributaries include Frazer Creek, Wolf Canyon Creek, South Fork Beaver Creek, Middle Fork Beaver Creek, Lightning Creek, and Volstead Creek from south to north, respectively. From Frazer Creek downstream and including the mainstem Beaver Creek the land is mostly private. WDFW, NRCS, and USFS manage the remaining lands within the subbasin. Beaver Creek is an area where habitat/ecosystem restoration projects tend to be highly beneficial to all life stages of the salmon and bull trout and the aquatic ecosystem in general.

3.2 Geomorphic Characteristics

3.2.1 Affected Environment

Field surveys and evaluations were conducted in the Beaver Creek drainage during the 2007 field season to determine the condition of the geomorphic, hydrologic, and vegetative regimes. Ecosystem processes in the Beaver Creek drainage are in a moderately degraded

state as a result of anthropogenic impacts. The dynamic interactions between the three regimes have been impacted by roads, fires, and development. These features have reduced the overall floodplain connectivity and resulted in localized changes in sediment transport and deposition.

The floodplain along much of Beaver Creek and its tributaries consists of glacial drift that has been reworked by the stream. These materials form a series of inset terraces consisting of poorly-graded gravel with silt, sand, cobbles, and boulders. The soils in the site areas are classified by the U.S. Department of Agriculture (USDA), NRCS Soils WA649 (for Okanogan County, Washington), and WA749 (for Okanogan National Forest Area, Washington) (NRCS 2008). The majority of the soil is either gravelly ash loam (mixed volcanic ash and stony surface overlaying glacial till, characterized with smaller infiltration) or gravelly loamy sand (overlaying glacial outwash, characterized with very high infiltration). Beaver Creek has a relatively consistent profile throughout much of its length and under current conditions the channel in the site areas is generally narrow, straight, steep, and where unconstrained are lined with riprap. Due to the low coarse sediment load, relatively small peak flows, and resistant substrate and bank material, Beaver Creek has a stable planform. Both sites have no major channel migration. Where channel migration is present the movement has occurred in unconstrained areas with logjams. High levels of fine sediment input within Beaver Creek are the result of both natural sources and human disturbances; road erosion; sheet, rill, and gully erosion in areas disturbed by timber harvest, grazing, fires, and recreational activities; landslides; and bank erosion. These exceed 20 percent surface fines (less than 6 millimeters) and more than 50 percent of substrate in all pools was rated as embedded (USFS 2007a). Much of the bed of Beaver Creek is armored by cobble and boulder material, with little bed load movement except under extreme peak flows. Sand and finer particles do move through the system and deposit in areas where water velocities drop, such as in the irrigation water intakes and channels, creating ongoing maintenance concerns.

3.2.2 Environmental Consequences

Alternative A – No Action

Beaver Creek has been altered in many places due to both natural sources and human disturbances; the loss of floodplains, the straightening of the creek channel, steep gradients, and other characteristics are less conducive to anadromous fish spawning and rearing, in addition these characteristics provide low habitat complexity. Structures intended to improve these characteristics have been affected by high spring run-off and other influences and are in need of repair. The No Action alternative will allow these natural processes and human disturbances to continue unchecked, thereby, allowing continued erosion to the current weir complexes and diversions within Beaver Creek preventing fish passage, habitat complexity, and proper irrigation performance.

Alternative B – Proposed Action

During construction of the weir complexes, care will be taken to minimize disturbance and/or repositioning of main channel materials primarily large boulders. The amount and extent of excavation varies dependent on the site location, but general reconstruction methods will be similar and short-term impacts to the local geology would occur due to the required excavations. The long-term effects of the final structures will be beneficial in providing fish passage, improved irrigation performance, and more natural stream processes.

The Proposed Action also includes installation of a temporary, prefabricated fish ladder at the Fort-Thurlow site in 2013 to prevent further degradation with a permanent correction to be completed at a later date when the final design is complete and funding provided. This temporary repair will improve but not fully restore fish passage at low flows.

Standard construction Best Management Practices (BMPs) would be implemented to minimize sediment inputs to the river during work operations including the use of straw bales or sediment fencing to control runoff waters. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. Sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment and materials will be stored in the staging area more than 150 feet away from any water sources. Any contributions of sedimentation would be temporary and be curbed via the silt fences and other BMPs (Appendix B). The Proposed Action would maximize protection of the main channel through reconstruction of weir complexes, while continuing to supply sufficient water flow to the diversions.

3.3 Hydrology and Water Quality

3.3.1 Affected Environment

Most of Beaver Creek is relatively steep with an average longitudinal creek gradient in excess of 6 percent upstream of the Marracci site in the mountainous terrain from the Piper Creek confluence up to the headwaters at 6,000 feet. However, it is considerably less steep downstream of the Piper Creek confluence, and near the Fort-Thurlow site the average gradient is estimated at 1.8 percent. Central-eastern Washington, within the Beaver Creek basin is characterized with an arid climate: hot summer and cold winter. Average precipitation is between 15 inches at 2,000 feet to 40 inches at the mountain ridges along the western watershed boundary (USGS 1998). Precipitation occurs as rain in spring and early fall and snow in fall and winter. The highest runoff in the creek usually occurs in spring and early summer, associated with either rain-on-snow event or with prolonged snowmelt. The Beaver Creek watershed is subject to large late spring and early summer floods (Reclamation

2006). In addition to peak flows, base flow conditions during the dry summer months will also be utilized in project designs. The purpose of evaluating base flow conditions with respect to design is to evaluate flow depths and velocities during low-flow conditions to ensure that adult fish passage and juvenile migration is not impeded. At all locations, flow in the right floodplain is connected with the flow in the main channel as it does not split from flow in the main channel. When floodplain water recedes, it recedes back into the main channel. At all locations the left floodplain connectivity is minimal due to the confined channel and presence of the adjacent Beaver Creek road. In the lower reaches, Beaver Creek goes dry in low water years in the fall because the subwatershed is an adjudicated drainage where water uses are provided in excess of available water during part of the irrigation season.

The exception to this is in the lowest 0.3 miles of the drainage where surface flow is maintained via irrigation return. Beaver Creek is listed on the WDOE 303(d) list for flow because during dry years the stream is dewatered below the lowest diversion. Fine sediment input within Beaver Creek is high, as a result of both natural sources and human disturbances. Fine sediment levels in all surveyed stream reaches exceed 20 percent surface fines (less than 6 millimeters), and more than 50 percent of substrate in all pools was rated as embedded (USFS 2007a).

3.3.2 Environmental Consequences

Alternative A – No Action

Under the No Action alternative, no additional rock material would be added or repositioned into the main channel, the resulting in-river sediment load is expected to continue or increase slightly as the weir complexes become more unstable. Main channel migration will remain minimal except in locations where large woody debris (LWD) may build up and divert water flows. Current trends and fluctuations in localized bed load and river bed particle size distribution are expected to continue as well. Although slight changes may occur over brief timelines, they would be in response to natural events and would not persist over extended periods. Given the already erosive nature of the river drainage, flood events could increase the risk of mass wasting and continued channel erosion and shifting, which in turn will prevent flows from entering diversions consistently and efficiently. No fish habitat complexity or diversion improvements would occur under this alternative and the weirs would continue to fail. Landowners/irrigators may also continue to attempt to fix or maintain their diversions, which may result in poor quality or no fish passage. As these are often temporary fixes, irrigators would also be in the creek regularly to maintain them, potentially with equipment, thereby, increasing fish and fish habitat disturbance.

Alternative B – Proposed Action

Under Alternative B, the reconstruction of the weir complexes will improve hydrology at the site locations minimizing the gradients and allowing places for water to pool and create some habitat complexity, while also providing more efficient flows into the diversion intakes. During construction, some increased turbidity and sediment in the immediate work area may occur for short durations.

During construction, standard construction BMPs will be implemented and the site areas will be dewatered and carefully monitored. If a high-water-level event occurs after dewatering that threatens to undermine or overtop dewatering structures, pumps will be turned off and work in the area will be suspended until the high water recedes. The contractor will remove all motorized equipment and tools before leaving the site so that any inundation will not pollute the stream. Fish will again be removed from the work area behind the cofferdams, which will be dewatered as needed to resume construction. Weather and river forecasts should be monitored to determine if the site needs to be evacuated, if flows are predicted to affect the project site locations. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. Sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment and materials will be stored in the staging area more than 150 feet away from any water sources. Any contributions of sedimentation would be temporary and be curbed via the silt fences and other BMPs. The Proposed Action would maximize protection of the main channel through reconstruction of weir complexes, while continuing to supply sufficient water flow to the diversions.

3.4 Threatened and Endangered Species and Habitat

Priority Habitats and Species (PHS) Program is WDFW's forum to provide important fish, wildlife, and habitat information to local governments, state and federal agencies, private landowners and consultants, and tribal biologists for land use planning purposes on species considered to be priorities for conservation and management.

Priority species require protective measures for their survival due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority species include State Endangered, Threatened, Sensitive, and Candidate species; animal aggregations (e.g., heron colonies, bat colonies) considered vulnerable; and species of recreational, commercial, or tribal importance that are vulnerable (WDFW 2013.) The Magnuson–Stevens Fishery Conservation and Management Act (MFCMA) or the

Magnuson–Stevens Act (MSA), is the primary law governing marine fisheries management in the United States.

The list for priority species in the area within Okanogan County includes threatened and endangered species as well as unlisted species:

- Fish—rainbow/steelhead/inland redband trout, Chinook salmon, bull trout
- Amphibians—Columbia spotted frog
- Birds—Pileated Woodpecker, Golden Eagle, Sooty Grouse
- Mammals—Rocky Mountain mule deer, gray wolf
- Butterflies—Silver-bordered Fritillary (unknown occurrence, habitat present)

3.4.1 Affected Environment

The projects would have no significant effects to any of the species listed above except the gray wolves (Endangered-USFWS), steelhead (Threatened-NOAA Fisheries), Chinook salmon (Endangered-NOAA Fisheries), and bull trout (Threatened-USFWS). The remaining species have not been documented in the immediate project action areas and are not expected to occur based on a lack of appropriate habitat conditions.

Species

Gray wolves are present in the Methow Valley. Recent monitoring indicates that the active denning and rendezvous sites are in the vicinities of Lookout Mountain (Twisp River watershed), Booth Canyon, and in the Gold and Libby Creek drainages that are approximately 2 to 5 miles west and south of the project area. Summer and fall locations have been in the mountain habitat of the Lake Chelan Sawtooth Wilderness, away from areas of human habitation. The proposed projects are in agricultural and rural residential areas of moderate human activity. The projects represent a slight increase in disturbance for a couple days, with a discountable chance of an encounter.

Although fish distribution surveys were not conducted as part of the 2007 USFS stream survey near the project sites, the USGS has been conducting a Passive Integrated Transponder (PIT) tag study on salmonids in Beaver Creek since 2004. Beaver Creek and its tributaries contain habitat suitable for the following ESA-listed fish species

- UCR steelhead (*Oncorhynchus mykiss*) – Threatened
- UCR spring-run Chinook (*Oncorhynchus tshawytscha*) – Endangered
- bull trout (*Salvelinus confluentus*) – Threatened

Critical Habitat and Essential Fish Habitat

Little to no spawning habitat exists in the project areas. Most of the substrate consists mainly of large cobbles and small boulders, too large for fish spawning (USFS 2007a). Some fish rearing habitat exists in the slow velocity pocket pools formed by large substrate in the pools and riffles (USFS 2007a).

A county road parallels the left bank at all locations and the wood and trees were removed from the channel during its construction. Upstream of Marracci (RM 6.6 to 7.5) had the highest amount of wood of the entire 3.5 miles surveyed in Upper Beaver Creek (RM 5.8 to 9.3) during the August 2006 stream survey (USFS 2007a). Wood also accumulates around the current diversion intake at Marracci. Downstream habitat will receive LWD in spring flows and minimal contribution from the existing surrounding vegetation.

The stream channel is artificially constructed downstream of Marracci, which represents the majority of the stream channel within the Marracci project area. Any pools in this reach are formed by water plunging from large substrate. Little to no spawning substrate is found in the pools identified in this reach, which were shallow, with an average maximum depth of 2 feet and an average residual depth of about 1 foot. Overall, pools in the riprap-lined area below Marracci were more than 30 percent shallower than in the other 3.5 miles of Beaver Creek surveyed (USFS 2007a). The stream channel near Fort-Thurlow also has pools formed by large substrate, with little to no spawning substrate. Approximately two-thirds of the total habitat within the project areas consists of riffles which provides good cover for fish in the form of large cobble and boulder substrate. The average thalweg depth in the riffles was satisfactory for migrating fish (USFS 2007a).

The Marracci site is a low-flow partial barrier to adult anadromous salmonids and to bull trout. Steelhead and bull trout can likely pass the diversion during the spring freshet. However, as flows drop and as the existing diversion dam is manipulated to direct water into the diversion inlet, the Marracci project area becomes a full barrier to adult upstream passage. The diversion is a full barrier to juvenile salmonids year-round (Andonaegui 2008). At the Fort-Thurlow site due to the concrete diversion dam, the gradient of the stream is near 5 percent, but fish passage is not impeded. No natural side channel habitat exists in the project areas due to the artificial confinement of the stream channel through most of its length. About 5 percent of the total habitat area in the area downstream of Marracci is found in a diversion ditch, which is accessible to juvenile fish, providing the only off-channel habitat near Marracci (USFS 2007a).

Designated Critical Habitat:

- UCR spring-run Chinook salmon
- UCR steelhead trout

- bull trout (Distinct Population Segments)

Designated Essential Fish Habitat:

- UCR spring-run Chinook salmon
- coho (Non-ESA)

Beaver Creek is listed as essential fish habitat (EFH) for UCR spring Chinook, which are present in the lower reaches of Beaver Creek, from the mouth up past Fort-Thurlow (RM 1.5). Juvenile spring Chinook have been documented as far as 3.9 miles upstream (Tibbets 2012). Populations in the upper portion of this range are believed to be very low, with a single detection above RM 3.1 during extensive sampling from 2004 through 2012. An adult spring Chinook salmon was observed immediately below Marracci by WDFW screen shop personnel in 2007; this sighting is considered a rarity as no juveniles have been detected in the area by the USGS sampling effort.

3.4.2 Environmental Consequences

Alternative A – No Action

The No Action alternative would result in the continued poor fish passage and habitat conditions within Beaver Creek and would not address habitat complexity or diversion performance. No wildlife species or their habitats would be affected.

Alternative B – Proposed Action

Alternative B would have no affects to the above listed PHS fish and wildlife other than those listed below. In addition, implementation of the proposed projects is not expected to disturb wolves, affect prey populations or behavior, or result in avoidance of habitat that may provide a source of prey. Therefore, we expect the project will not likely adversely affect gray wolves in the Methow Valley.

Direct Effects Related to Timing, Sediment, and Dewatering/Defishing on Fish Species

Timing: The projects have been proposed for construction during September to November to minimize impacts to fish. At this time all steelhead present will be free-swimming juvenile fish, spring Chinook, and coho redds will be surveyed in the project areas and 500 feet downstream prior to construction activities. Bull trout which have migrated to spawning areas (spring), may be returning downstream and therefore may be present in low numbers at Fort-Thurlow.

Sediment: Projects may generate some sediment disturbance, with turbidity expected to last approximately 4 hours and extend downstream approximately 400 feet. At project areas, streambed construction will be confined between the cofferdams. These activities are not expected to release appreciable sediment into Beaver Creek, due to control measures that will isolate and capture sediment away from the creek. Upon removal of the cofferdams, some fines from the construction site will be washed downstream; these fines could be irritant to fish gills. Cofferdam removal will be done slowly to minimize sediment releases. Low flows will limit the downstream distribution of turbidity. Fine sediment could be irritant to fish gills; however as stated above, fish are not expected to be present.

Dewatering/Defishing:

Steelhead – Dewatering/defishing may affect juvenile steelhead in the project area. Project plans call for dewatering about 80 linear feet of stream at Marracci and 120 linear feet at Fort-Thurlow. Based on the population estimates, dewatering these areas would temporarily displace about 6 to 44 juvenile steelhead at Marracci and 5 to 50 at Fort-Thurlow. Many of these fish are expected to leave on their own or by herding as flows are reduced during construction of the upstream cofferdam. The remaining fish will be captured by electrofishing and released downstream of the project area. There is a chance that a few fish could be injured or killed from electrofishing or stranding.

Spring Chinook and Coho – Dewatering/defishing may affect spring Chinook in the Fort-Thurlow project area, where plans call for dewatering about 120 linear feet of stream. This could temporarily displace about 0 to 1 spring Chinook, based on the population estimates (number of fish/foot) given above. However, because juvenile Chinook tend to have a clumped distribution, it is possible that several could be found in one scour pool. Of any Chinook present, many are expected to leave on their own or by herding as flows are reduced during construction of the upstream cofferdam. Remaining fish will be captured by electrofishing and released downstream of the project area; a few fish could be harmed by this process or from being stranded. The Marracci site is above the known current distribution of spring Chinook in Beaver Creek. A weir trap was in place at RM 0.8 near Fort-Thurlow from 2004-2007; annual coho captures during these years ranged between 0 to 9 percent of total fish in the weir trap. In other surveys, one fish was detected at RM 2.9 in 2007 and 2010; no coho have been detected farther upstream.

Bull trout – At Marracci annual sampling surveys conducted by the USGS since 2004 have found a total of 1 fish in the reach from RM 5.6 to RM 8.1 (Marracci is at approximately RM 6.5). Dewatering this project site would include handling or displacing any bull trout that were in the area. The low population density, as indicated by only 1 bull trout detected in this area in 7 years of sampling, means the likelihood of an encounter is low. However, if bull trout were present, there is the potential for harm from electrofishing or stranding.

Sampling at Fort-Thurlow has recorded 7 fish caught in a weir trap at RM 0.8 over 4 years of sampling; none seen in other population surveys. These data suggest bull trout populations are very low through this reach; bull trout would most likely be in the Fort-Thurlow project area during spring and fall freshets. Because of the demonstrated low population density, and the timing of construction in mid-autumn, the likelihood of an encounter is low. However, if bull trout were present, there is the potential for harm from electrofishing or stranding.

Indirect Effects

Indirect effects will be the same for all species at all locations and include impacts to vegetation, scour pools, and sediment. Negative impacts to vegetation bank by construction equipment in the short term are likely to occur. All areas disturbed during the course of this project are previously disturbed. The project will require approximately 0.6 acres of disturbance in the riparian area at the two sites combined; most of this area currently supports grasses and herbaceous species. Disturbed areas will be replanted to help re-establish riparian vegetation resulting in neutral to beneficial long-term effects.

Existing scour pools below the weirs will be filled in to construct the roughened channel. There will be some negative impact to fish from the loss of these pools for resting areas, but this will be offset by improved stability of the roughened channel. The roughened channel will also increase complexity and prevent scouring and down-cutting and eventually mimic natural riffles. Sediment mobilized during construction is expected to return to pre-project levels during the first annual high flow. Any fines released will be temporary and will be dispersed from the streambed before the next season of spawning. The project will have a minor, short-term negative effect on sediment, with a neutral long-term effect.

Cumulative effects will likely result in the long-term sustainable fish passage and improved diversion performance will obviate seasonal instream disturbance by irrigators and therefore fish. Monitoring of the initial barrier removals and weir constructions in 2004 and 2005 proved successful as Chinook were observed farther up Beaver Creek in an area they had not previously been found. Through the use of PIT tags, the USGS have been able to track the movement of juvenile steelhead up and downstream in Beaver Creek throughout the year. It is anticipated that these new renovations will restore this passage. The roughened channel is designed to be passable by all species and life stages at all flows by mimicking a natural riffle. At low flows, it will concentrate water to sufficient depths for adults to pass, while at high flows, juvenile fish will be helped through slower water regimes along the edges. The long-term stability of the roughened channel promises to reduce the need for in-water work to maintain passage or irrigation flows.

3.4.3 Mitigation

As presented in Table 3-1, project activities at both sites are likely to adversely affect steelhead, Chinook salmon, and bull trout. All site projects will disturb any individual fish species present at the time of required dewatering.

Table 3-1. Determination of effects.

ESA Species and Critical Habitat (CH)	Determination of Effect		
	No Effect	Not Likely to Adversely Affect	Likely to Adversely Affect
NMFS Species and CH and EFH			
UCR spring Chinook			X
UCR spring Chinook CH		X	
UCR spring Chinook EFH			X
Coho EFH (non-ESA)			X
UCR steelhead			X
UCR steelhead CH		X	
USFWS species and CH			
CR bull trout			X
CR bull trout CH		X	
gray wolf		X	

To mitigate for these potential effects, Reclamation has a proposed dewatering plan in place and will concur with recommendations from USFWS and NOAA Fisheries (See Appendix C). The projects in the long term are expected to benefit the species by maintaining fish passage and reducing the need for annual maintenance at the diversions.

Fish Handling and Salvage

The project sites will be isolated from streamflows by directing increasing flow into the diversion structure by gradually placing gravel bags on the existing dam structure and left overnight to encourage fish to leave the area on their own prior to defishing activities.

Fish handling and salvage will be conducted by fisheries biologists and technicians. To reduce impacts to ESA-listed species, fish removal will be completed for the entire length of the project site prior to any construction activities. Defishing may be coordinated with the USGS so the captured fish can be measured and tagged as part of their on-going monitoring effort. Defishing will not increase the number of fish they handle under their permit. Tagging will be done under the USGS's existing permit, and will help reduce the total number of fish handled.

Once the project sites are isolated at the upstream end and flows have been reduced, the fish salvage crew will make one downstream pass with the electrofisher. The downstream cofferdam will then be constructed to prevent fish from re-entering the project site. Once both cofferdams are in place, fish biologists will begin removing any remaining fish using approved methods according to the terms of the Dewatering and Fish Capture Protocol given

in Appendix A of the 2008 Corps Restoration Programmatic for the State of Washington (Corps 2008). It is anticipated that dewatering will occur over a period of 2 days; the sites will remain dewatered for approximately 2 to 3 weeks. About 80 to 120 feet of channel will be dewatered at each site.

Isolation of the Work Area

Water will be removed from behind the cofferdams using trash pumps to prevent sediment-laden water from entering Beaver Creek. At Fort-Thurlow, it is anticipated that the presence of the concrete dam will allow very little water to re-enter the project site. The dewatering system will discharge into flocculent socks, straw bales, sediment fencing, or other sediment controls on the adjacent bank. Any sediment release into Beaver Creek from the dewatered construction area is anticipated to be minimal.

The contractor shall divert runoff water to prevent erosion at all sites affected by the work operations. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. The sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment and materials will be stored in the staging area more than 150 feet away from any water sources.

Following completion of renovations, all construction materials within the cofferdams will be removed to the extent practical prior to cofferdam removal. Individual gravel bags comprising the cofferdam will be pulled incrementally to prevent a large pulse of sediment during removal. Any release of fines washed from the new rock ramp will be minimized by this incremental, gradual reintroduction of water to the dewatered site, and will be of short duration.

3.5 Vegetation

3.5.1 Affected Environment

Much of this watershed is covered with sparse low-lying vegetation typical for a semi-arid climate and is subject to periodic wildfires. Trees are concentrated around the floodplains of Beaver Creek and its tributaries. Until 2006, increasing forest cover was found in the upper watershed particularly on USFS land and slopes with a north facing aspect. Prior timber harvesting and the 2006 Tripod fire have reduced this vegetation cover significantly. The USFS reported that the 2006 fire severely impacted soil erosion, infiltration, and the surface runoff on the watershed (USFS 2006). The report noted that the fire burned 51 percent of the watershed, reduced infiltration by 51 percent, and increased the 100-year peak flood runoff

by 153 percent. The effects from the 2006 fire could continue until watershed soil and trees re-establish to the pre-2006 conditions, as described in Section 3.2. In order to speed up the stabilization of the Upper Beaver Creek watershed, the USFS implemented Burned Area Emergency Rehabilitation treatments following the 2006 fires to reduce the potential for erosion and sediment delivery to Beaver Creek. Treatments included application of massive quantities of straw over severely burned areas by helicopter, hydro-mulching along roads, and road drainage improvements. These may have reduced runoff rates, soil erosion, and sediment delivery immediately following the fire (Andonaegui 2008).

Riparian habitat within the project areas includes tree, shrub, grass, and herbaceous species associated with mixed deciduous riparian forest and wetland habitats. Forest habitat on the west side of the road is generally an even-aged stand of second-growth deciduous species dominated by black cottonwood (*Populus trichocarpa*), red alder (*Alnus rubra*), and water birch (*Betula occidentalis*) with coniferous species such as Douglas fir (*Pseudotsuga menziesii*) and Ponderosa pine (*Pinus ponderosa*) occasionally occurring. A dense shrub community of snowberry (*Symphoricarpos albus*) and prairie rose (*Rosa woodsii*) dominate the understory. The majority of the riparian vegetation community provides a great deal of shade, particularly when the deciduous species are leafed out.

3.5.2 Environmental Consequences

Alternative A – No Action

Under the No Action alternative, vegetation at both sites would continue to persist as is with minimal to no disturbance.

Alternative B – Proposed Action

As a result of Alternative B, ground disturbance activities will be limited to the staging area, access routes, and the construction sites all of which have been previously disturbed.

Standard construction BMPs will be implemented to minimize soil disturbance and will include replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds.

3.6 Cultural Resources

3.6.1 Affected Environment

The proposed undertakings lie within the traditional territories of the Methow Tribe, one of the twelve tribes that make up the Confederated Tribes of the Colville Reservation (Colville Confederated Tribes [CCT]), which is governed by the Colville Business Council (CBC). The CBC has delegated to the Tribal Historic Preservation Officer (THPO) the responsibility of representing the CCT with regard to cultural resources management issues throughout the traditional territories of all of the constituent tribes under Resolution 1996-29. THPO has assumed all of the responsibilities of a state historic preservation office within the exterior boundaries of the Colville Reservation and associated parcels of trust land that lay outside the current reservation boundaries, as outlined in Section 101 (d) (2) of the NHPA.

Prior to the start of the current project, two cultural resource surveys had been conducted within one mile of the Marracci site (Boersema, Nelson, and Bishop 2009; Baldwin 2009). No historic properties were identified within the one mile radius. A cultural resource background search and field survey of the Marracci Diversion project area was conducted by Mark DeLeon, Reclamation Archaeologist for the Upper Columbia Area Office, on July 12, 2005. A report was submitted to BPA on September 23, 2005; with a determination of “no potential to cause effects” (NoPE) and no further Section 106 review necessary on this undertaking.” During the week of October 3, 2005, Steve Tromly, BPA archaeologist consulted with the Washington SHPO and received verbal concurrence with the report findings. A follow-up letter of concurrence from Gregory Griffith, Deputy SHPO, dated October 14, 2005, was received and is on file. For the current project, Reclamation (acting as the lead agency) reviewed the prior Determination of NoPE and found that it still applied. Reclamation approved a Determination of NoPE on March 23, 2012 (Appendix C).

Six cultural resources surveys have been conducted within one mile of the Fort-Thurlow site (Trost 2012). The closest of these was a cultural resources survey of the nearby Tice Ranch Irrigation Efficiency Project, which was immediately west of the Fort-Thurlow project. Landreau and Stipe (2010) found no historic properties in the Tice Ranch area. An irrigation ditch identified in that project area was determined to be ineligible for the National Register of Historic Places (NRHP). The nearest known pre-contact archaeological site is over one mile from the Fort-Thurlow project area and on a different landform. One structure, the East Side Canal, which is part of the Methow Valley Irrigation District Canal system, is about ¾-mile west of the Fort-Thurlow project area and has been determined to be eligible for inclusion in the NRHP (Emerson 1996).

Although the project area lies within the traditional territory of the Methow Tribe, few traditional cultural properties have been identified in the immediate project vicinity. The

project area also lies within the boundaries of the Moses-Columbia Reservation that was established through Presidential Executive Order in 1879 but then returned to the public domain in 1884 (CCT 2006). Fulkerson (1988) noted that there were traditional Native American uses of Beaver Creek, and traditional cultural properties (TCP) were identified along the route of the nearby corridor of Okanogan Public Utility District's Methow Transmission Project (Oxedine et al. 2006), but no TCPs have been identified within one mile of the Fort-Thurlow project area.

Because review of the existing information suggested that the Fort-Thurlow project had the potential to contain historic properties, Reclamation worked with the MSRF to secure the services of Cascadia Archaeology to conduct a cultural resources survey. Cascadia Archaeology reviewed the existing literature regarding the prehistoric, ethnographic, and historical uses of the project area, and they found no evidence of traditional cultural properties in the Area of Potential Effects (APE). They conducted fieldwork to determine if the project site contained any archaeological resources, structures, or buildings that might be considered eligible for the NRHP. The archaeological survey included a close visual inspection of the ground surface throughout the area to be disturbed by construction, as well as the excavation of six shovel test pits. No archaeological resources were identified. Although historic-period maps from the 1890s suggested that early irrigation features may be present in the project area, no trace of ditches or canals were found (Trost 2012).

Based on this research, Reclamation reached a Finding of No Historic Properties Affected, and then invited the concurrence of the Washington SHPO, the Colville Tribal Historic Preservation Officer, and the Chair of the Yakama Tribal Council (Appendix C). The Washington SHPO concurred with the finding on July 16, 2012, but requested that Reclamation provide them with feedback from the involved tribes if any was provided. Reclamation did not receive any correspondence or comments from concerned tribes or other parties regarding our Finding of No Historic Properties Affected for the Beaver Creek Weir Renovation Projects.

3.6.2 Environmental Consequences

Alternative A – No Action

There will be no effects to cultural resources under the No Action alternative.

Alternative B – Proposed Action

There are no structures, sites, or properties eligible for the NRHP that would be affected as a result of Alternative B at the proposed sites. No historic properties of any time period or type were identified within the APEs of either project (DeLeon 2005; Trost 2012). It has been determined that the Proposed Action would have no effect on cultural resources.

3.7 Sacred Sites

3.7.1 Affected Environment

Executive Order 13007, (May 24, 1996), defines “sacred site” as any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site [Executive Order 13007, Section 1 (b) (iii)].

Members of the CCT and Yakama Nation often recognize that, in general, many aspects of the natural environment should be considered sacred, including water, land, air, and various plant and animal species. In their Cultural Resources Management Plan (CCT 2006), the CCT grouped “sacred sites” with TCPs and properties of traditional religious and cultural importance to tribes.

Neither tribe has specifically identified any sacred sites within the immediate vicinity of the proposed project area. A number of locations with traditional Indian place names and traditional cultural value have been identified in the Methow Valley, but none of these have been specifically identified as having established religious significance or ceremonial use. All locations are outside of the area of direct project effects.

3.7.2 Environmental Consequences

Alternative A - No Action

There will be no effects to sacred sites under the No Action alternative.

Alternative B – Proposed Action

There will be no effects to sacred sites under Alternative B.

3.8 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the U.S. Government for federally recognized Indian Tribes or individual Indians. ITAs may include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship

are federally recognized Indian tribes or individuals with trust land, the U.S. acting as trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the U.S.

3.8.1 Affected Environment

The proposed projects are outside of the area ceded in the Yakama Treaty of 1855, so there are not specifically reserved rights for the members of the Yakama Nation for hunting or fishing in this area. When the Moses-Columbia Reservation was returned to the public domain in 1884, select parcels remained in trust for Methow tribal members who chose to remain in the area, but no lands currently remain in trust in the project area.

No ITAs have been identified in the proposed project area.

3.8.2 Environmental Consequences

Alternative A – No Action

There will be no effects to ITAs under the No Action alternative.

Alternative B – Proposed Action

There will be no effects to ITAs under Alternative B.

3.9 Environmental Justice

3.9.1 Affected Environment

The planning and decision-making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations, including Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations," which was issued by President Clinton on February 11, 1994 (59 FR 7629). The essential purpose of Executive Order 12898 is to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

3.9.2 Environmental Consequences

Alternative A – No Action

The No Action alternative will not adversely affect the use of the proposed action sites and will have no bearing on the Twisp area community.

Alternative B – Proposed Action

The Proposed Action sites will be constructed entirely on private lands. There are no anticipated environmental effects that would result in disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or tribes. The Proposed Action may provide employment opportunities to local contractors.

3.10 Cumulative Effects

A cumulative effect results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Alternative A – No Action

The No Action alternative may contribute increased negative effects to the Beaver Creek drainage as the site locations may further degrade preventing fish passage and damaging or minimizing irrigation performance.

Alternative B – Proposed Action

Alternative B will have a net positive benefit to the salmon, steelhead, and bull trout and the aquatic ecosystem in general in Beaver Creek because of the enhanced fish passage and habitat complexity and will increase habitat for T&E species and overall biodiversity within the drainage.

Restoration efforts from various agencies and landowners will also benefit from this project because of increased habitat connectivity for the fish species. The methods to be used by Reclamation for restoration efforts are expected to have no long-term adverse impacts to any T&E species. Cumulative impacts from these projects will benefit the overall recovery efforts of the fish species within Beaver Creek by increasing the availability and connectedness of habitat in upper reaches of the creek and its tributaries.

3.11 Environmental Commitments

The following environmental commitments would be followed to avoid or minimize potential effects that could occur if the action alternative is implemented.

- Following structure placement, restore vegetation to produce a suitable vegetative cover, provide protection to soils and the adjacent stream, and provide wildlife habitat.
- Temporarily fence off the area until the vegetation has been established.
- As much as possible, perform bank stabilization and construction during dry periods and when flow is low in the channel.
- Restrict the use of the access road to dry periods and only to those performing the construction and oversight.
- Use BMPs to minimize environmental consequences caused by stabilizing activities and construction.
- Take standard and reasonable precautions to reduce erosion and limit sediment runoff from the construction site.
- At standard engineering sites, stockpile or deposit excavated materials away from streambanks, wetlands, or other watercourse perimeters where they could be washed away by storm events.
- Implement final erosion control and site restoration measures, such as restoring original contours, and blocking unnecessary construction access roads, and reseeding areas of construction, including culvert installation sites to prevent future erosion.
- Obtain and follow all conditions of the appropriate Corps permits.
- During construction, take appropriate measures to prevent the entrance of accidental spillage of contaminants or other objectionable pollutants into the surface water.
- Remove heavy equipment and machinery from the river area prior to refueling, repair, and maintenance. Heavy equipment use in the river channel would be kept to a minimum, and within the areas specified in applicable Federal permits.
- Avoid wetlands during the construction process where possible.
- Follow the appropriate requirements and obtain all permits required for construction in or near a wetlands area to comply with the CWA.
- Arrange clearing operations and standard engineering structures to preserve and protect all trees, shrubs, and current vegetation to the maximum practicable extent.
- Implement site specific erosion control to avoid degradation of downstream fish habitat caused by release of sediment or increased turbidity.

- Coordinate with USFWS, NOAA Fisheries, and the Tribes to preserve and protect species and ensure potential impacts are either avoided or minimized.
- During the 3 years following project completion, Reclamation recommends joint monitoring and evaluation of the project's performance. This would be accomplished semi-annually, first in the spring and second after irrigation season ends. If problems are identified, necessary repairs would be completed to prevent potential failure of the project.

In addition to the above general environmental commitments, the following specific commitments would apply:

Geology/Soils

- Protect areas of high traffic volume by placement of temporary road fill; fill would be removed upon project completion.
- Reduce amount of staging area by using off-site areas, if possible.
- Construct temporary work pads and parking areas to help prevent short-term damage of local soils.

Fish and Wildlife

- Revegetate streambanks and other disturbed areas with native species that would provide habitat and forage for fish and wildlife.

Vegetation

- Use only live cuttings and suitable local native vegetative species for bioengineering techniques that would provide quality habitat and forage for wildlife.

Cultural Resources

- If cultural deposits or human remains are encountered during construction, all ground disturbing actions will immediately cease in the vicinity of the discovery. Reclamation will then assess the discovery and implement the requirements, as needed, of either Section 106 of the NHPA or Washington State burial laws. Ground disturbing actions in the vicinity of the find will resume only after written authorization is provided by Reclamation's Contracting Officer.
- The cultural resources clearance is provided only for the areas investigated by Reclamation and MSRF and included in consultations with the Washington SHPO and tribes to assess project effect. If Reclamation or their partners or contractors identify any additional locations outside of the "cleared" area, then prior to approval for use of those areas, a Reclamation archaeologist shall determine if additional survey or consultation is needed in order to comply with Section 106 of NHPA. If

additional survey or consultation is needed, it shall be completed prior to any use of the land for project purposes. The further actions shall use methods consistent with requirements defined in 36 CFR 800.

- The commitments outlined above shall be defined as requirements in the construction contract and in any associated agreements with partnering entities. These requirements shall be discussed with partners and contractors during pre-work meetings to ensure they are understood and that notification processes are defined to use in the events defined.

Chapter 4 CONSULTATION AND COORDINATION

4.1 Agency Consultation and Public Involvement

On behalf of Reclamation, MSRF informally requested the participation of landowners, NOAA Fisheries, and the USFWS.

Reclamation formally invited comments from the Washington State Department of Archaeology and Historic Preservation (DAHP) under Section 106 of the NHPA 1966, implementing regulations (36 CFR 800) (Appendix C), Yakama Nation, and CCT for sacred sites and ITAs.

The identification, prioritization, and design of the Beaver Creek Weir Renovation Project have been accomplished within the framework of the AMIP as administered by Reclamation in partnership with MSRF. A critical component to this planning process is public involvement. The participants with the MSRF are made up of a diverse group of stakeholders representing a wide range of interests including local governments and districts, citizens, tribes, State and Federal agencies, irrigation, agriculture, community groups, conservation groups, and economic development.

The MSRF helps implement the AMIP as part of the Methow River subbasin and has been active in identifying priority actions to protect and enhance habitat of threatened and endangered species throughout the watershed, improving overall habitat function and connectivity. Since the selection of the weir improvement sites, MSRF has conducted landowner outreach to affected and adjacent landowners in the project reach. This effort has included the following actions to date:

- Site visits to all landowners within the project locations, inviting participation in informal meetings.
- Fort-Thurlow – On February 17, MSRF met with the ranch manager on the project site to review the design and discuss work dates, access routes, staging areas, fence replacement, revegetation, etc.; the ranch manager gave us a verbal approval for the project to proceed.
- Marracci – Two landowners were consulted. MSRF contacted one landowner via email on January 9 with news of a potential repair project and again on February 13

to confirm Reclamation's intention to proceed with the project and confirm support of the repair. The other landowner was contacted by letter in January and replied back by phone in early February. The discussion focused on whether or not the design would involve moving the intake structure upstream and the landowner's concerns regarding potential flooding of his property should the intake be moved upstream.

- MSRF also contacted the Methow Conservancy regarding the Marracci conservation easement that encompasses the project area. The spokesman for the Methow Conservancy did not see any problem with the project.
- The two landowners who use the ditch at Marracci will be notified of the work dates. If the project plans call for a project start-date to occur before the ditch shut-off date, their cooperation will be requested. If cooperation is not obtained, the start date will be postponed until after October 1.

4.2 National Historic Preservation Act of 1966

Section 106 of the NHPA, as amended, requires that Federal agencies identify historic properties that may be affected by their actions, and take into account the effects the actions may have on historic properties. Implementing regulations (36 CR Part 800) requires Federal agencies to make determinations in consultation with the Washington SHPO and Indian tribes with a traditional religious or cultural interest in the study area. Based on consultation between the Washington SHPO and Reclamation, it was determined that cultural resources/historic properties would not be adversely impacted by the recommended action alternative at Fort Thurlow.

The Marracci project involved work at previously constructed features within Beaver Creek and a cultural resources reconnaissance found no historic properties; therefore, it qualifies for a Determination of NoPE as defined in 36 CFR 800.2(a).

4.3 Endangered Species Act (1973) Section Consultation

The ESA requires all Federal agencies to ensure that their actions do not jeopardize the continued existence of listed species or destroy or adversely modify their critical habitat. The evaluation of endangered species contained in this EA serves as Reclamation's support as required under the ESA. It evaluates impacts on listed species including gray wolves (Endangered). Several other species are listed for the county but these species have not been documented in the immediate project action areas and are not expected to occur based on a lack of appropriate habitat conditions.

USFWS agrees that the proposed project is consistent with the categories of restoration actions described in the Washington State Fish Passage and Habitat Enhancement Programmatic and concurs with the "May Affect, Likely to Adversely Affect" determination for the bull trout (*Salvelinus confluentus*), as well as "Not Likely to Adversely Affect" determinations for gray wolf (*Canis lupus*), and the designated critical habitat of bull trout. USFWS anticipates the projects will result in adverse effects to one adult bull trout from the Beaver Creek local population from both repairs due to handling of fish, substrate compaction, and elevated turbidity resulting from cofferdam placement and removal events (See Appendix C).

NOAA Fisheries agrees with the determination that these projects will result in a NLAA for EFH for Chinook and coho salmon within the action area. NOAA Fisheries considers this project to be "Likely to Adversely Affect" UCR steelhead and estimates that 110 juvenile steelhead will be present in the areas slated for disturbance prior to commencement of operations. NOAA Fisheries anticipates the loss of 15 steelhead, all of which will be in pre-smolt life stages. However, NOAA Fisheries states that these projects will more than offset losses, by increased survival rates for the brood years that will benefit from this restoration action. The proposed action's adverse effects include the extent of take resulting from electrofishing, salvage, and anticipated turbidity levels similar to the concerns of the USFWS (See Appendix C).

4.4 Tribal Coordination and Consultation

Reclamation consulted with the Colville THPO, and the Chair of the Yakama Tribal Council on this project requesting information or concerns addressed by the Tribes. The letters were followed up with email and telephone calls and no response or concerns were received within the 30-day review period (Appendix C). Reclamation has fulfilled its responsibilities under Section 106 of the NHPA.

4.4.1 Indian Sacred Sites (Executive Order 13007)

Indian sacred sites are defined as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or an Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion." Since the proposed project will occur on privately-owned lands, Executive Order 13007 does not apply.

4.4.2 Indian Trust Assets (ITAS)

No ITA's are recorded within the project model sites.

4.5 Other Laws and Regulations

The relationship between Federal agencies and sovereign Tribes is defined by laws, regulations, and executive orders addressing the requirement of Federal agencies to notify or consult with Native American groups or otherwise consider their interests when planning and implementing Federal undertakings.

Chapter 5 REFERENCES

Parenthetical Reference	Bibliographic Citation
59 FR 7629	Federal Register. 1994. Executive Order 12898. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. February 11, 1994. Vol. 59, No. 32.
Anchor Environmental, L.L.C. 2008	Anchor Environmental, L.L.C. 2008. <i>Alternatives Evaluation Report (AER) Upper Beaver Creek Habitat Improvement Project Methow River Subbasin, Washington</i> . Columbia Snake River Salmon Recovery Program. Seattle, Washington. December.
Andonaegui 1999	Andonaegui, C. 1999. <i>Salmon and steelhead habitat limiting factors report for the Entiat Watershed, Water Resource Inventory Area (WRIA) 46, Version 3</i> . Washington State Conservation Commission, Olympia, Washington, 77 p.
Andonaegui 2000	Andonaegui, Carmen. 2000. <i>Salmon, steelhead, and bull trout habitat limiting factors, Water Resource Inventory Area 48</i> . Washington State Conservation Commission, Olympia, WA. 232pp.
Andonaegui 2008	Andonaegui, Carmen. 2008. Personal communication between Jennifer Molesworth of Reclamation and Carmen Andonaegui of Anchor Environmental, L.L.C. November 12, 2008.
Baldwin 2009	Baldwin, Garth. 2009. Letter Report Dated January 7, 2009: Archaeological Assessment of the Former Riise Property, Okanogan County, WA. Letter prepared by Drayton Archaeological Research, Blaine, Washington. Report submitted to Washington State Department of Fish & Wildlife, Olympia, Washington.
Boersema, Nelson, and Bishop 2009	Boersema, Jana L., Margaret A. Nelson, and George Bishop. 2009. "Archaeological Investigations of the Upper Beaver Creek Habitat Improvement Project, Okanogan County, Washington." Report prepared by Cascadia Archaeology, Seattle, Washington. Report prepared for Anchor Environmental, LLC, Seattle, Washington. Report funded by the U.S. Bureau of Reclamation, Pacific Northwest Region Office, Boise, Idaho.

References

Parenthetical Reference	Bibliographic Citation
CCT 2006	Colville Confederated Tribes. 2006. <i>Final Cultural Resource Management Plan</i> . Confederated Tribes of the Colville Reservation, History/Archaeology Program, Nespelem, Washington.
Corps 2008	U.S. Army Corps of Engineers. 2008. Restoration Programmatic for the State of Washington, Specific Project Information Form. Seattle, Washington. Accessed online at: http://www.nws.usace.army.mil/Portals/27/docs/regulatory/ESA%20forms%20and%20templates/2008%20Restoration%20SPIF.pdf
DeLeon 2005	DeLeon, Mark. 2005. Memorandum Dated October 6, 2005: Results of Historic Properties Field Reconnaissance, Marracci Diversion. Bureau of Reclamation, Upper Columbia Area Office, Yakima, Washington.
Emerson 1996	Emerson, Stephen. 1996. National Register of Historic Places Registration Form for the Methow Valley Irrigation District Canals. Form on file at the Washington Department of Archaeology and Historic Preservation, Olympia, Washington.
Fulkerson 1988	Fulkerson, Ann C. 1988. "Predictive Locational Modeling of Aboriginal Sites in the Methow River Area, North-Central Washington." Unpublished Master's thesis, Department of Anthropology, Washington State University, Pullman, Washington.
Landreau and Stipe 2010	Landreau, Christopher, and Frank Stipe. 2010. <i>A NHPA Section 106 Archaeological Reviews and Inventory of the Tice Ranch Irrigation Efficiency Project, Okanogan County, Washington</i> . Prepared by Reiss-Landreau Research for the Okanogan County Conservation District.
NRCS 2008	Natural Resources Conservation Service. 2008. "2008 Soil Survey of Okanogan County Area, Washington." Available online at: http://soils.usda.gov/survey/online_surveys/washington/#okanogan2010
Oxedine et al. 2006	Oxedine, Joan, Penny Eckert, Frank Stipe, and Jenna Ferrell. 2006. "Methow Transmission Project Traditional Cultural Property Overview and Evaluation." Report prepared by Tetra Tech, Inc. Report prepared for Public Utility District No. 1 of Okanogan County, U.S. Forest Service, and Bureau of Land Management.
Reclamation 1994	U.S. Bureau of Reclamation. 1994. Indian Trust Asset Policy and NEPA Implementing Procedures: Questions and Answers about the Policy and

Parenthetical Reference	Bibliographic Citation
	Procedures. U.S. Bureau of Reclamation, Native American Affairs Office, Denver, Colorado. Accessed on-line August 3, 2009 at http://www.usbr.gov/us/albuq/envdocs/ea/sanjuanlama/Attachment1.pdf
Reclamation 2006	U.S. Bureau of Reclamation. 2006. Internal Memorandum from David Sutley "Methow River Drainage Basin, Hydrology Data and GIS for the Methow River, In- Stream Habitat Restoration Project." Reclamation. July 5, 2006.
Tibbits 2012	Tibbits, Wes. 2012. USGS. Fisheries Biologist. Personal communication with Brian Fisher and Torre Stockard of the Methow Salmon Recovery Foundation. June 27.
Trost 2012	Trost, Teresa. 2012. "Cultural Resources Survey for the Thurlow Fort Diversion Dam Fish Passage Improvement Project, Okanogan County, Washington." Report prepared by Cascadia Archaeology, Seattle, Washington. Report prepared for the Methow Salmon Recovery Foundation, Twisp, Washington. Report funded by the U.S. Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho.
UCSRB 2007	Upper Columbia Salmon Recovery Board. 2007. Upper Columbia spring Chinook salmon and steelhead recovery plan. Accessed online at: http://www.nwr.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/upper_columbia/upper_columbia_spring_chinook_steelhead_recovery_plan.html
USFS 1997	U.S. Forest Service. 1997. <i>Middle Methow Watershed Analysis</i> . Okanogan National Forest, Methow Valley Ranger District, Winthrop, WA.
USFS 2004	U.S. Forest Service. 2004. <i>Upper Beaver Creek Sub watershed Stream Survey Report</i> . Okanogan-Wenatchee National Forest, Methow Valley Ranger District.
USFS 2006	U.S. Forest Service. 2006. Hydrology Specialist Report. <i>Tripod Complex – 2006 Burned Area Emergency Response</i> . Okanogan – Wenatchee National Forest. Prepared by Brad Higginson,
USFS 2007a	U.S. Forest Service. 2007a. <i>Beaver Creek Habitat Assessment Stream Survey of Beaver Creek (Balky Hill Road to the Confluence with South Fork Beaver Creek, August 2006)</i> . Prepared by Dave Hopkins, USFS, for Okanogan-Wenatchee National Forest, Methow Valley Ranger District.

References

Parenthetical Reference	Bibliographic Citation
USFS 2007b	U.S. Forest Service. 2007b. <i>Beaver Creek Sub watershed Stream Survey Report</i> . Okanogan-Wenatchee National Forest, Methow Valley Ranger District.
USGS 1998	U.S. Geological Survey. 1998. "Magnitude and Frequency of Floods in Washington." Water Resources Investigations Report 97-4277, Tacoma, Washington.
WDFW 2013	Washington Department of Fish and Wildlife. 2013. Priority Habitat and Species (PHS) List. Accessed online at: http://wdfw.wa.gov/conservation/phs/list/

Chapter 6 LIST OF PREPARERS

Name	Background	Responsibility
Gretchen Fitzgerald	NEPA Specialist	Bureau of Reclamation NEPA Manager, Senior Review
Jennifer Molesworth	Methow Subbasin Liaison	Bureau of Reclamation Senior Review
Sean Hess	Regional Archaeologist	Bureau of Reclamation Cultural Resource Information
Corey Carmack	Environmental Protection Specialist	Bureau of Reclamation Native American Affairs Coordinator
Justin Nielsen	Civil Engineer	Bureau of Reclamation Weir Construction and Design Details
Colin Forsyth	Civil Engineer	Bureau of Reclamation Weir Construction and Design Details
Brian Fisher	Project Manager	Methow Salmon Recovery Foundation Preparation of the BA
Greg Knott	Project Manager	Methow Salmon Recovery Foundation
Chris Johnson	Executive Director	Methow Salmon Recovery Foundation Program Manager
Jessica Goldberg	Permit Specialist	Methow Salmon Recovery Foundation Preparation of State HPA permits and coordination of Corps SPIF process
Torre Stockard	Biologist	VanHees Environmental LLC (VHE) Preparation of BA

APPENDICES

APPENDIX A
PROJECT SITE LOCATION MAPS
AND DESIGN DETAILS

Thurlow Fort

Construction Activities—Major Tasks

Excavation

Any existing material within 3' of the proposed final grade will be removed and sorted, with any material meeting the spec for the D100-D84 stockpiled on site and the remainder hauled off site.

Construction of roughened channel

Construction of the roughened channel will proceed from downstream to upstream, moving stepwise a distance within swing radius of an excavator constructing channel/banks before moving to the next section. Roughness boulders will be placed at the direction of the engineer. The D84 minus material will be placed in 1' lifts and bucket compacted with an excavator. Fines will be washed in to the D84 minus with a 2" trash pump until all voids are filled and water sheets over the material. This process will be repeated until final grade is reached.

<i>ENGINEERED STREAMBED MATERIAL (ESM)</i>		
<i>Gradation</i>	<i>% of Mix</i>	<i>Size</i>
<i>*D100</i>	<i>16%</i>	<i>4 feet</i>
<i>*D84</i>	<i>34%</i>	<i>2.5 feet</i>
<i>D50</i>	<i>34%</i>	<i>1 foot</i>
<i>D16</i>	<i>8%</i>	<i>2.25 inch</i>
<i>D8</i>	<i>8%</i>	<i>0.75 inches</i>

- Roughness boulders and boulders for pool construction are considered D100-D84 of ESM

Construction of pools

Two pools will be constructed of boulders, a mid-channel pool and an energy dissipation pool. The mid-channel pool will help the structural integrity of the roughened channel as it makes a bend approximately half way from the top of the project to the bottom and to promote fish passage. The energy dissipation pool will help dissipate some of the energy of the water at higher flows before it enters the existing channel downstream of the project as well as to promote fish passage.

Grout

Approximately 20cy of grout will be placed at the interface between the existing dam and the roughened channel as shown on Sheets 1550 and 1551.

General Site Conditions

Required Permits

The project Sponsor, Methow Salmon Recovery Foundation (MSRF), will submit the Joint Aquatic Resources Permit Application (JARPA) to obtain the necessary permits from Okanogan County, WDFW, and Washington Department of Ecology. MSRF will also submit the Washington SEPA Environmental Checklist. As required by National Environmental Policy Act (NEPA) and ESA Section 7, Reclamation will consult with NOAA Fisheries and the US Fish and Wildlife Service regarding the project's effects on threatened or endangered species and document potential affects

to the environment. The consulting agencies may issue an Incidental Take Permit if they determine threatened or endangered species may be adversely affected by the project.

The contractor will be required to abide by all permit conditions. Should the contractor wish to deviate from the work described herein, the contractor will be responsible for notification of permit agencies to obtain any needed modifications to secured construction permit conditions for any proposed deviation prior to starting construction.

Staging, Fueling, and Stockpiling

Landowner agreements will be in place prior to construction. Following construction, the contractor will remove all equipment and material from the staging area and restore the area to pre-project conditions. If revegetation is required, the contractor will leave the site in a condition suitable for replanting.

Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located a minimum of 150 feet from the Beaver Creek or other flowing stream or water body. Fueling and overnight parking for vehicles will be available across Lower Beaver Creek Road from the project site. See Figure 1678-100-1551, Access, Staging, and Dewatering Plan, for more details.

Fueling, other than occasional hand fueling of small tools, will be allowed only on Upper Beaver Creek road. The Contracting Officer will inspect and approve the fueling area by prior to its use. No fuel will be stored onsite for use by heavy equipment. Trucks will haul fuel to the approved site as needed for fueling heavy equipment. Five to 10 gallons of fuel in approved containers may be kept at the fueling area in an approved containment vessel for use with hand-held power tools and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. No other fueling sites will be allowed.

Equipment to be used or stored onsite may include an excavator, backhoe, dozer, 10-cy dump trucks, and small tools. Additional equipment may be required as determined by the contractor. This equipment, of an adequate size to move and place the materials necessary for construction, will minimally affect the existing terrain while moving around the site. Equipment operating with hydraulic fluid and used for this project will use only those fluids certified as nontoxic to aquatic organisms while working in or around the stream. Equipment used for this project shall be free of external petroleum-based products. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of the Beaver Creek or any adjacent water body. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities. No special or high-cost equipment will be purchased with project funds.

All stationary power equipment such as generators operated within 150 feet of any water body shall be diapered to prevent leaks unless suitable containment is provided to prevent potential spills from entering the water.

Materials to be stored onsite will include engineered streambed material and large rocks. All excess materials not used on the job will be removed within 10 days of completion of the project.

Non-native waste materials not reused in construction or reclaimed by the Project Sponsor will be removed by the contractor to a disposal site in accordance with State regulations.

Access from Staging Area to Work Site

Access to the work site would be provided from Lower Beaver Creek Road.

Sediment Control

The contractor shall divert runoff water to prevent erosion at all sites affected by the work operations. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. The sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment and materials will be stored in the staging area more than 150 ft away from any water sources.

In the Event of High Flow Conditions during Construction

If a high-water-level event occurs after dewatering that threatens to undermine or overtop dewatering structures, pumps will be turned off and work in the area will be suspended until the high water recedes. The contractor will remove all motorized equipment and most tools before leaving the site so that any inundation in the contractor's absence will not pollute the stream. After the high water recedes, qualified biologists will again remove fish from the work area behind the cofferdams, which will then be dewatered as needed for construction. The contractor should also monitor weather and river forecasts and evacuate the site in a timely manner if flows are predicted to affect the project area.

Area Disturbed

The footprint of the proposed construction work would extend from the existing intake to the proposed grade control sill. The construction total area that would be disturbed is approximated to be 0.05 acres. The staging area location has not been confirmed yet, but we anticipate that the staging area will be 120 ft by 40 ft. An area near the site, adjacent to the road, is a possible location.

Site restoration and Revegetation

Rehabilitation goals for the project include minimizing soil disturbance, replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds. Protection of relevant aquatic habitat will be accomplished if these goals are met. The negative effects of project construction on local plant, fish, and wildlife habitat are expected to be temporary. Ground disturbance activities will be limited to the staging area, access routes, and the construction site.

Adaptive Management and Effectiveness Monitoring

Adaptive management will include annual effectiveness monitoring to check conditions at the site and to confirm revegetation success. Survey cross sections of the river will continue at least once per year to allow changes in the river to be observed and tracked over time. Adaptive work in the river may occur if problems develop or if conditions change in the river to reduce the operational efficiency or required maintenance. Contact with resource agencies would be made prior to any in-water adaptive management efforts.

Dewatering Plan

Cofferdams

Two cofferdams would be required to isolate work areas from the active flow of the creek; one located directly on the existing dam structure, and one immediately upstream of the fish and sluice return. Figure 1678-100-1551 shows the conceptual plan for cofferdam placement. It is anticipated that the placement of the cofferdam materials would be conducted by hand. It is anticipated that each of these cofferdams would be comprised of structures formed by clean washed gravel-filled bags (gravelbags) with a synthetic membrane such as PVC or HDPE placed on the outside of the gravelbags, then folded over the top of the gravelbags and secured on both inside and outside of the cofferdam to reduce seepage into the work area.

The footprint of the cofferdams would be as small as possible to accommodate proposed work while minimizing impact to river substrate.

The flows at the time of project construction in early fall are expected to be near base flow levels of approximately 0 - 8cfs. All flow will be routed through the existing diversion, around the project site, and back into the stream immediately below the project site.

Fish Handling and Salvage

Fish handling and salvage will be conducted by professionally qualified and experienced fisheries biologists and technicians. To reduce take of ESA-listed salmonid species and Pacific lamprey, fish removal will be completed for the entire length of the project site prior to any construction activities.

The project site will be gradually isolated from stream flows by gradually directing more and more flow into the diversion structure by gradually placing gravelbags. These gravelbags will be placed on the existing dam structure, as shown on the drawings. The gravelbags will be placed to reduce flow into the project location and left overnight. This gradual reduction in flow will encourage fish to leave the area on their own prior to defishing activities.

Once the project site is isolated at the upstream end and flows have been reduced, the downstream cofferdam will be constructed to prevent fish from re-entering the project site. Once both cofferdams are in place, qualified fish biologists will begin to remove any remaining fish using approved methods according to the terms of the NOAA Fisheries Habitat Improvement Project II BiOp Capture and Release Protocol (NOAA Fisheries 2008). It is anticipated that 2 days will be required for a crew of approximately 3 people to complete fish and larval lamprey removal in the project site using the following fish removal sequence:

Day 1 (end of the day):

1. Reduce flows by gradually placing gravel bags

Day 2:

2. Construct downstream cofferdam
3. Make 2 passes with an electro-fisher

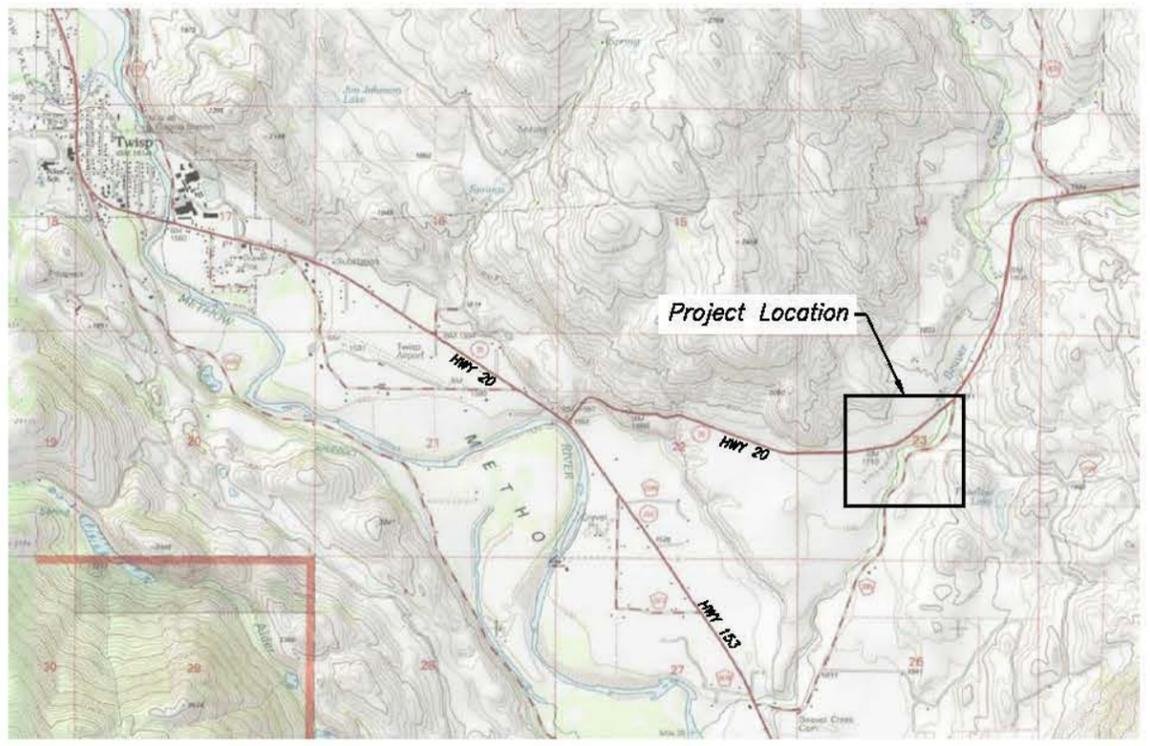
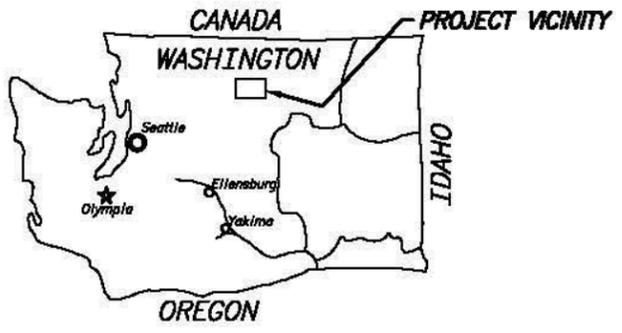
Isolation of the Work Area

It is anticipated that, due to the presence of the concrete dam, very little water will enter the project site. Water will be removed from the project site to the extent that sediment laden water will not reenter Beaver Creek. Water would be removed from behind the cofferdams using trash pumps. To prevent sediment-laden water from entering the Beaver Creek, the dewatering system would discharge in to flocculent socks on the adjacent bank.

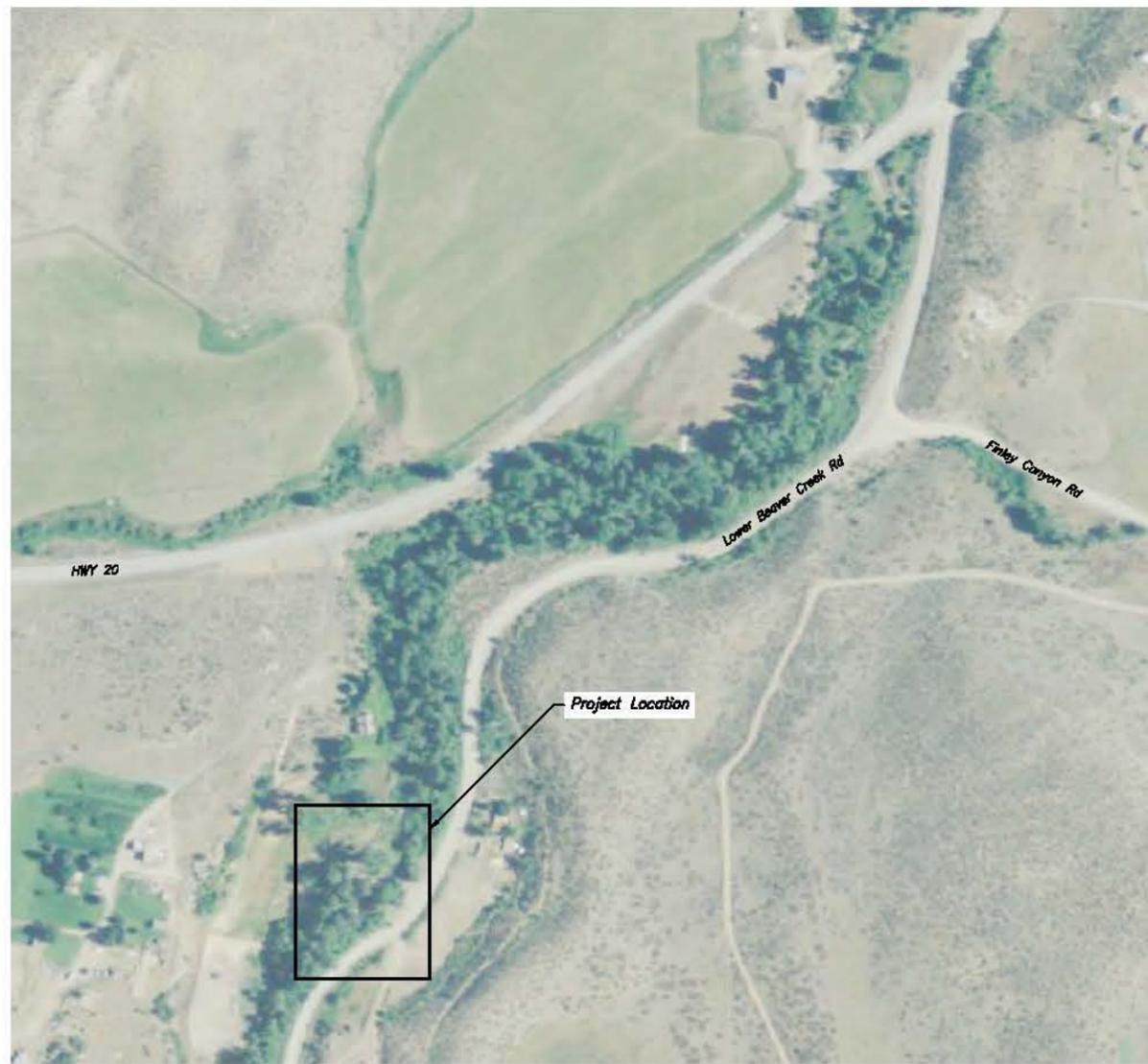
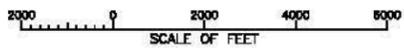
It is anticipated that once the excavation within each cofferdam is complete that dewatering turbidity levels will significantly drop. Following completion of construction, all construction materials within the cofferdams would be removed to the extent practical

prior to cofferdam removal. Individual gravelbags comprising the cofferdam would be pulled incrementally to prevent a large pulse of sediment during removal. All areas of construction that do not extend down to the creek surface ordinary high water level will have silt fencing between the construction area and the river.

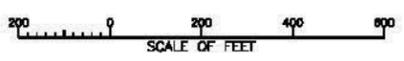
1 2 3 4 5



VICINITY MAP



LOCATION MAP



SHEET INDEX	
1678-100-1546	LOCATION MAP
1678-100-1547	GENERAL NOTES, AND LEGEND
1678-100-1548	EXISTING PLAN AND PROFILE
1678-100-1549	ROUGHENED CHANNEL PLAN AND PROFILE
1678-100-1550	SECTIONS AND DETAILS
1678-100-1551	PLAN - ACCESS, STAGING, AND DEWATERING
1678-100-1552	"BLANK"

SITE SUMMARY
 T33N, R22E, Sec. 23
 Okanogan County
 Twisp, Washington

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
 BEAVER CREEK
 FORT THURLOW

Not For Distribution

DATE AND TIME PLOTTED
 05/04/2011 11:11
 PLOTTED BY
 JAWELSON

JOB NUMBER: 1678-100-1546-1000
 JOB TITLE: LOCATION MAP
 DATE PLOTTED: 05/04/2011 11:11

BOISE, ID 2011-12-28

LOCATION MAP

1678-100-1546

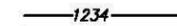
SHEET 1 OF 7

1 2 3 4 5

GENERAL NOTES

1. ALL COMPONENTS OF THE CONTRACT DOCUMENTS SHALL FULLY APPLY TO THE WORK WHETHER SPECIFICALLY REFERENCED IN THE DRAWINGS OR NOT.
2. STATIONING, DISTANCES, AND LENGTHS SHOWN ON THE DRAWINGS ARE BASED ON HORIZONTAL MEASUREMENTS ALONG THE STREAM CENTERLINE. CROSS SECTIONS, CROSSING DETAILS, AND REFERENCES TO LEFT (L) AND RIGHT (R) ON THE DRAWINGS ASSUME LOOKING IN THE DIRECTION OF INCREASING STATION ALONG STREAM CENTERLINE ALIGNMENT (FACING DOWNSTREAM).
3. ALL DIMENSIONS, INCLUDING, BUT NOT LIMITED TO, ELEVATIONS, STATIONS, AND DISTANCES ARE IN STANDARD ENGLISH UNITS.
4. ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND ACTUAL SITE CONDITIONS; OR ANY INCONSISTENCIES OR AMBIGUITIES BETWEEN THE DRAWINGS AND OTHER COMPONENTS OF THE CONTRACT DOCUMENTS SHALL BE IMMEDIATELY REPORTED IN WRITING TO THE ENGINEER. THE ENGINEER WILL PROMPTLY CORRECT INCONSISTENCIES OR AMBIGUITIES IN WRITING. WORK DONE BY THE CONTRACTOR INVOLVING SUCH DISCREPANCIES WITHOUT A WRITTEN REPORT AND RESPONSE FROM THE ENGINEER SHALL BE DONE AT THE CONTRACTOR'S SOLE RISK AND EXPENSE.
5. CONTRACTOR SHALL NOT DISTURB OR DESTROY ANY EXISTING SURVEY MONUMENTS OR BENCHMARKS. ANY BENCHMARKS DISTURBED OR DESTROYED BY THE CONTRACTOR SHALL BE REPLACED TO THE ENGINEER'S SATISFACTION AT THE CONTRACTOR'S SOLE EXPENSE.
6. EXISTING UTILITIES ARE NOT SHOWN ON THE DRAWINGS. UTILITY LOCATION AND PROTECTION IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT TYPE, OWNER, LOCATION, AND ELEVATION OF ALL BURIED AND OVERHEAD UTILITIES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PERFORM THE WORK IN A SAFE MANNER AND IN ACCORDANCE WITH ANY REQUIREMENTS SET FORTH BY THE UTILITY OWNER AND APPLICABLE LAWS AND REGULATIONS.
7. CONTRACTOR IS ADVISED THAT NORTH ARROWS AND ORIENTATION OF PLAN VIEW SHEETS VARY TO ALLOW FOR LEFT-TO-RIGHT STATIONING AND STATIONING IN THE DIRECTION OF STREAM FLOW.
8. CONTRACTOR SHALL NOTIFY UTILITY OWNERS WITHIN THE LIMITS OF CONSTRUCTION A MINIMUM OF TWO WEEKS PRIOR TO EXCAVATION, OR OTHER CONSTRUCTION ACTIVITY THAT MAY IMPACT THE UTILITY. CONTRACTOR SHALL ALSO CONTACT MSRF PRIOR TO ANY CONSTRUCTION ACTIVITY IN THE AREA. CONTRACTOR SHALL PROVIDE ACCESS TO UTILITY OWNERS FOR MAINTENANCE AND WORK ON THEIR UTILITIES DURING THE COURSE OF THE WORK.
9. CONTRACTOR SHALL ENSURE THAT OPERATION OF EXISTING IRRIGATION, SEWER, DRAINAGE, DOMESTIC WATER, AND OTHER UTILITY SYSTEMS ARE CONTINUOUS DURING CONSTRUCTION.
10. RELOCATIONS AND/OR REPLACEMENTS OF EXISTING UTILITIES SHALL BE COORDINATED BY THE CONTRACTOR WITH THE UTILITY OWNER. CONTRACTOR SHALL CONTACT, SCHEDULE, AND ESTABLISH UTILITY SHUT DOWN TIMES AND DETERMINE THE RELOCATION AND/OR REPLACEMENT REQUIREMENTS OF EXISTING UTILITIES PRIOR TO THE START OF ANY WORK. THE UTILITY SHALL BE RELOCATED OR REPLACED TO THE SATISFACTION OF THE UTILITY OWNER.
11. IF APPLICABLE, CONSTRUCTION EASEMENTS SHALL NOT BE USED IN ANY MANNER THAT WILL CAUSE PERMANENT DAMAGE TO THE PROPERTY. DESCRIPTIONS OF THE EASEMENTS ACQUIRED FOR THE WORK WILL BE ON FILE AT THE OFFICE OF THE OWNER. CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE EASEMENT AGREEMENTS.
12. FENCING THE WORK AREA FOR PROTECTION OF WORK AND PROPERTY AND PUBLIC SAFETY SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
13. CONTRACTOR SHALL KEEP ALL CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS AND ANY TEMPORARY CONSTRUCTION OR PERMANENT EASEMENTS OBTAINED FOR THIS PROJECT. IF APPLICABLE THIS INCLUDES, BUT IS NOT LIMITED TO, VEHICLES AND EQUIPMENT, LIMITS OF EXCAVATION, STOCKPILED EXCAVATED AND IMPORTED MATERIAL, BACKFILL MATERIAL, STREAMBED MATERIAL, AND WEIR MATERIAL. IF THE CONTRACTOR REQUIRES ADDITIONAL CONSTRUCTION EASEMENTS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN SUCH EASEMENTS FROM INDIVIDUAL PROPERTY OWNERS AND BEAR ALL ASSOCIATED COSTS.
14. UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR SPECIFICATIONS, ALL EXISTING ITEMS INCLUDING, BUT NOT LIMITED TO, STRUCTURES, IMPROVEMENTS, GROUNDWATER WELLS, SIGNS, FENCES, GATES, CURBS, PAVEMENT, BRIDGES, UTILITIES, IRRIGATION PIPELINES AND DITCHES, ETC. SHALL BE PROTECTED BY THE CONTRACTOR. IF SUCH ITEMS ARE DAMAGED OR MUST BE REMOVED OR MODIFIED TO FACILITATE CONSTRUCTION, CONTRACTOR SHALL FIRST NOTIFY THE OWNER AND THEN REPLACE THE ITEMS TO A LIKE OR BETTER CONDITION AT CONTRACTOR'S EXPENSE TO SATISFACTION OF OWNER OF FACILITIES.
15. REQUIREMENTS RELATED TO THE PROTECTION AND/OR REMOVAL OF TREES, VEGETATION, AND STRUCTURES WITHIN THE WORK AREA ARE DETAILED IN THE SPECIFICATIONS.
16. CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE TRENCH LIMITS NEEDED TO COMPLETE THE WORK IN CONFORMANCE WITH LOCAL, STATE AND FEDERAL CODES GOVERNING SHORING, SHEETING, BRACING OF EXCAVATIONS AND TRENCHES, AND FOR PROTECTION AND SAFETY OF THE WORKERS AND OTHER CONSTRUCTION RELATED PERSONNEL.
17. EXCAVATION SHALL MEET THE REQUIREMENTS OF OSHA 29 CFR PART 1926, SUBPART P, EXCAVATIONS. ACTUAL SLOPES SHALL NOT EXCEED THE MAXIMUM ALLOWABLE SLOPES (SUBPART P, APPENDIX B).
18. HORIZONTAL DATUM IS NAD83/91. HORIZONTAL COORDINATES SHOWN HEREIN ARE WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, US SURVEY FEET.
19. VERTICAL DATUM IS NAVD 88, FEET.
20. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE INDICATED.
21. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
22. THE CONTRACTOR IS RESPONSIBLE FOR PRODUCING, IMPLEMENTING, ADHERING TO, AND MAINTAINING A STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH THE REGULATIONS AND GUIDELINES SET FORTH AND SUBJECT TO APPROVAL BY THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, WATER QUALITY PROGRAM. CONTRACTOR SHALL IMPLEMENT AND DOCUMENT ANY ADDITIONAL MEASURES NECESSARY TO PREVENT ANY EROSION OR HAZARDOUS MATERIALS FROM LEAVING THE SITE, DISCHARGING, BEING ENTRAINED, ABSORBED OR OTHERWISE ENTERING SURFACE WATERS, GROUND WATER OR SOILS.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES AT ALL TIMES. MAINTENANCE OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE CONSIDERED INCIDENTAL.
24. THE CONTRACTOR SHALL BE HELD SOLELY RESPONSIBLE FOR ANY NPDES OR OTHER APPLICABLE ENVIRONMENTAL PERMIT VIOLATIONS AND FINES.

LEGEND

-  1234 EXISTING GRADE CONTOURS
-  1234 FINISH GRADE CONTOURS

ABBREVIATIONS

APPROX	APPROXIMATE
CFS	CUBIC FEET PER SECOND
CONT	CONTINUOUS
CP	CONTROL POINT
CY	CUBIC YARD
E	EAST
EL	ELEVATION
EXST	EXISTING
G	GRADE
H	HORIZONTAL
HWY	HIGHWAY
L	LENGTH
LF	LINEAR FOOT
LS	LUMP SUM
MAX	MAXIMUM
MIN	MINIMUM
MSRF	METHOW SALMON RECOVERY FOUNDATION
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OG	ORDINARY GROUND
OHW	ORDINARY HIGH WATER
PT	POINT
Q	FLOW
RD	ROAD
S	SOUTH
SF	SQUARE FOOT
SPEC	SPECIFICATION
STA	STATION
SY	SQUARE YARD
TYP	TYPICAL
W	WEST
WSE	WATER SURFACE ELEVATION

DATE AND TIME PLOTTED:
FEBRUARY 21, 2012 11:08
PLOTTED BY:
JANIELSEN

CADD SYSTEM:
CADD JOB NO. 16.29
CADD FILENAME:
1678-100-15468Z.DWG

FOOT ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN

BEAVER CREEK
FORT THURLOW

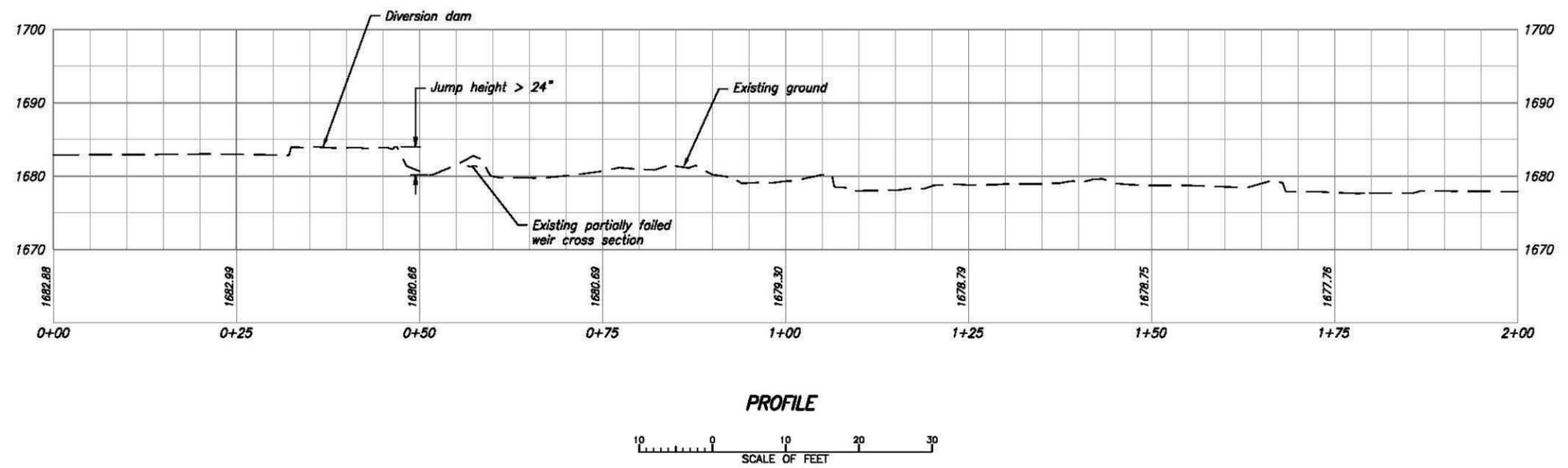
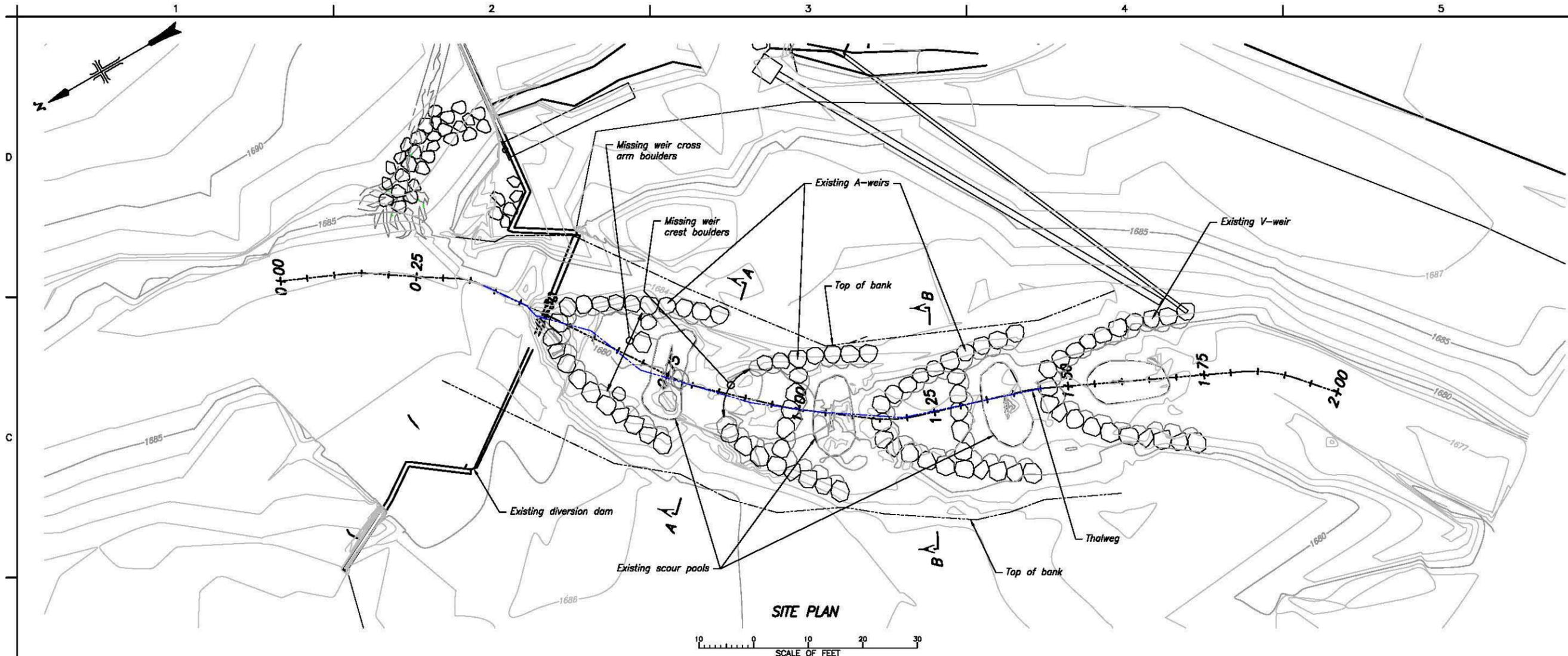
Not For Distribution

BOISE, ID 2011-12-28

GENERAL NOTES
AND LEGEND

1678-100-1547

SHEET 2 OF 7



DATE AND TIME PLOTTED
FEBRUARY 21, 2012 11:13
PLOTTED BY
JANIELSEN

CAD SYSTEM
CADD FILE
CADD FILENAME
1678-100-1548S1.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
FORT THURLOW

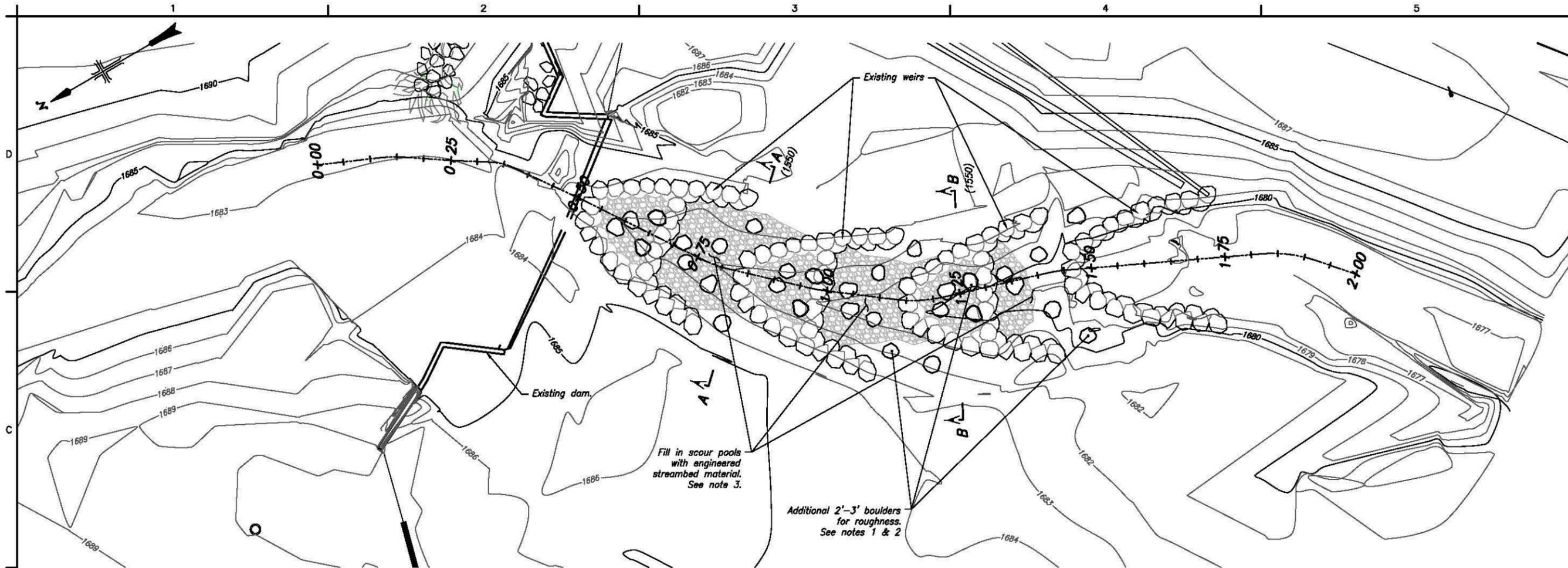
Not For Distribution

BOISE, ID 2011-12-28

EXISTING PLAN
AND PROFILE

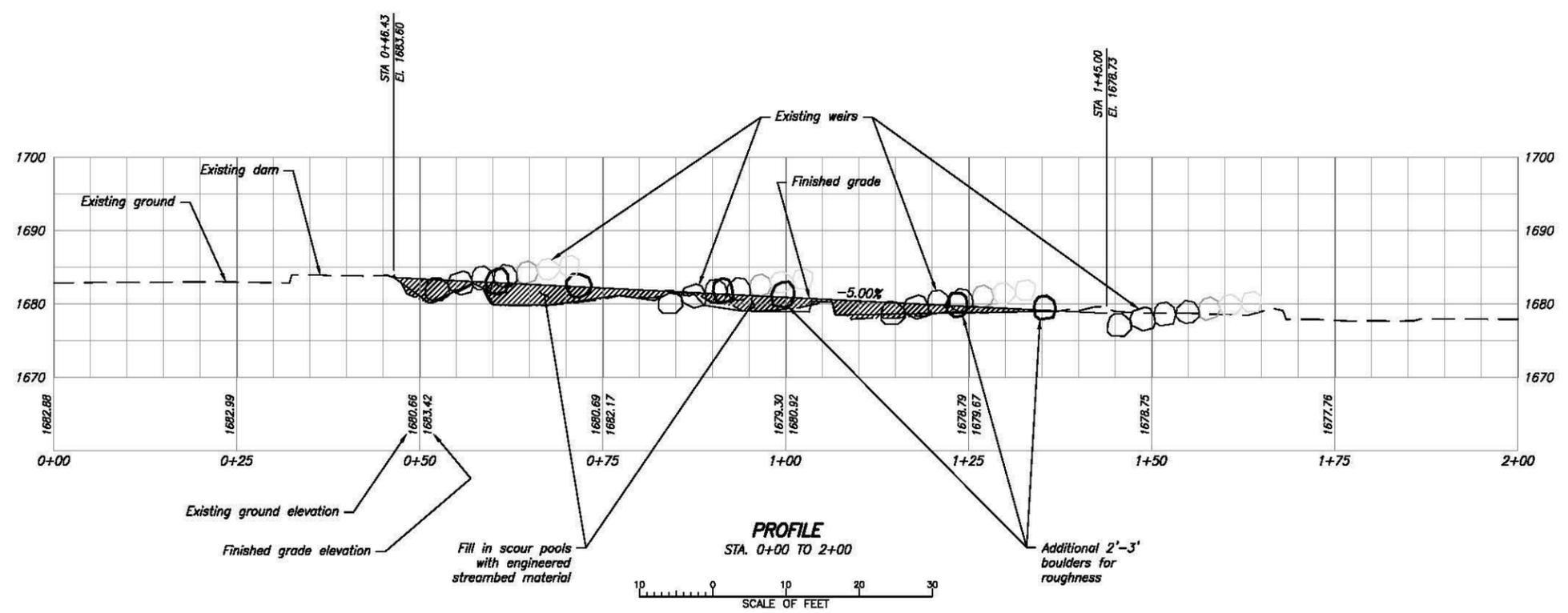
1678-100-1548

SHEET 3 OF 7



PLAN
STA. 0+00 TO 2+00

10 0 10 20 30
SCALE OF FEET



PROFILE
STA. 0+00 TO 2+00

10 0 10 20 30
SCALE OF FEET

- NOTES:**
1. Location of roughness boulders to be field directed.
 2. Typical detail for roughness boulder on drawing 1678-100-1550.
 3. Quantities and gradation of streambed material and boulders on drawing 1678-100-1550.
 4. Contractor to smooth and scarify disturbed surfaces for revegetation to be performed by others.

DATE AND TIME PLOTTED
FEBRUARY 27, 2012 10:06
PLOTTED BY
JUNNELSEN

CAD SYSTEM
CAD USER
CAD PLOTNAME
1678-100-1549.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
FORT THURLOW

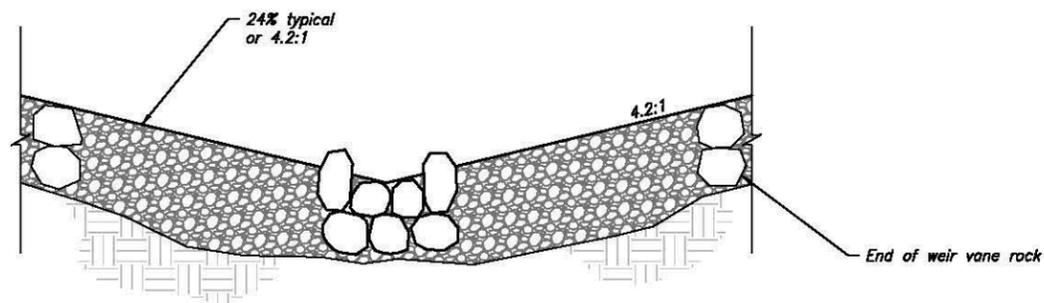
Draft Use Only
Not For Distribution

BOISE, ID 2011-12-28

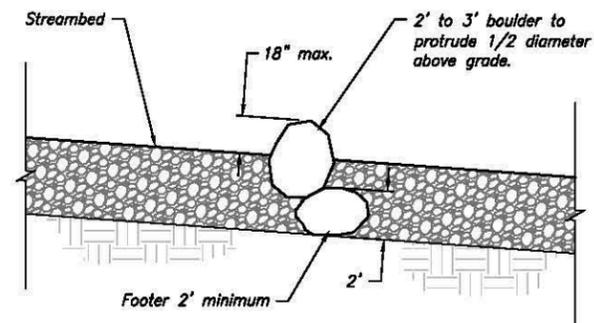
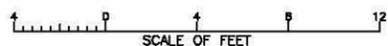
**ROUGHENED CHANNEL
PLAN AND PROFILE**

1678-100-1549

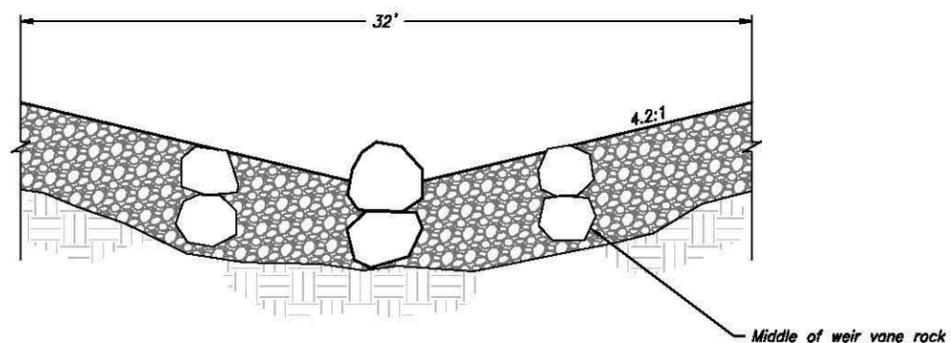
SHEET 4 OF 7



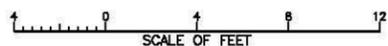
SECTION A-A (1548)



TYPICAL ROUGHNESS BOULDER
DETAIL (1549)



SECTION B-B (1548)



WDFW/Fuller Thompson Substrate Gradations			
Gradation	% of Mix	Angular Rock	Round Rock
D100	16%	1.5 feet	2.1 feet
DB4	34%	0.6 feet	0.8 feet
D50	34%	0.2 feet	0.3 feet
D16	9%	0.21 inches	0.4 inches
DB	7%	0.08 inches	0.1 inches

Estimated Quantities		
Material	Quantity	Units
Streambed Mix	60	CY
2-3 foot Roughness Boulders	31	Each
Approx. Area of Disturbance	0.2	acres

ALWAYS THINK SAFETY
 U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
 COLLEMBIA'S WAK RIVER SALMON RECOVERY PROGRAM
 METHOW SUBBASIN
 BEAVER CREEK
 FOOT THURLOW
 Not For Distribution

DATE AND TIME PLOTTED
 FEBRUARY 27, 2012 15:08
 PLOTTED BY
 JHANELSEN

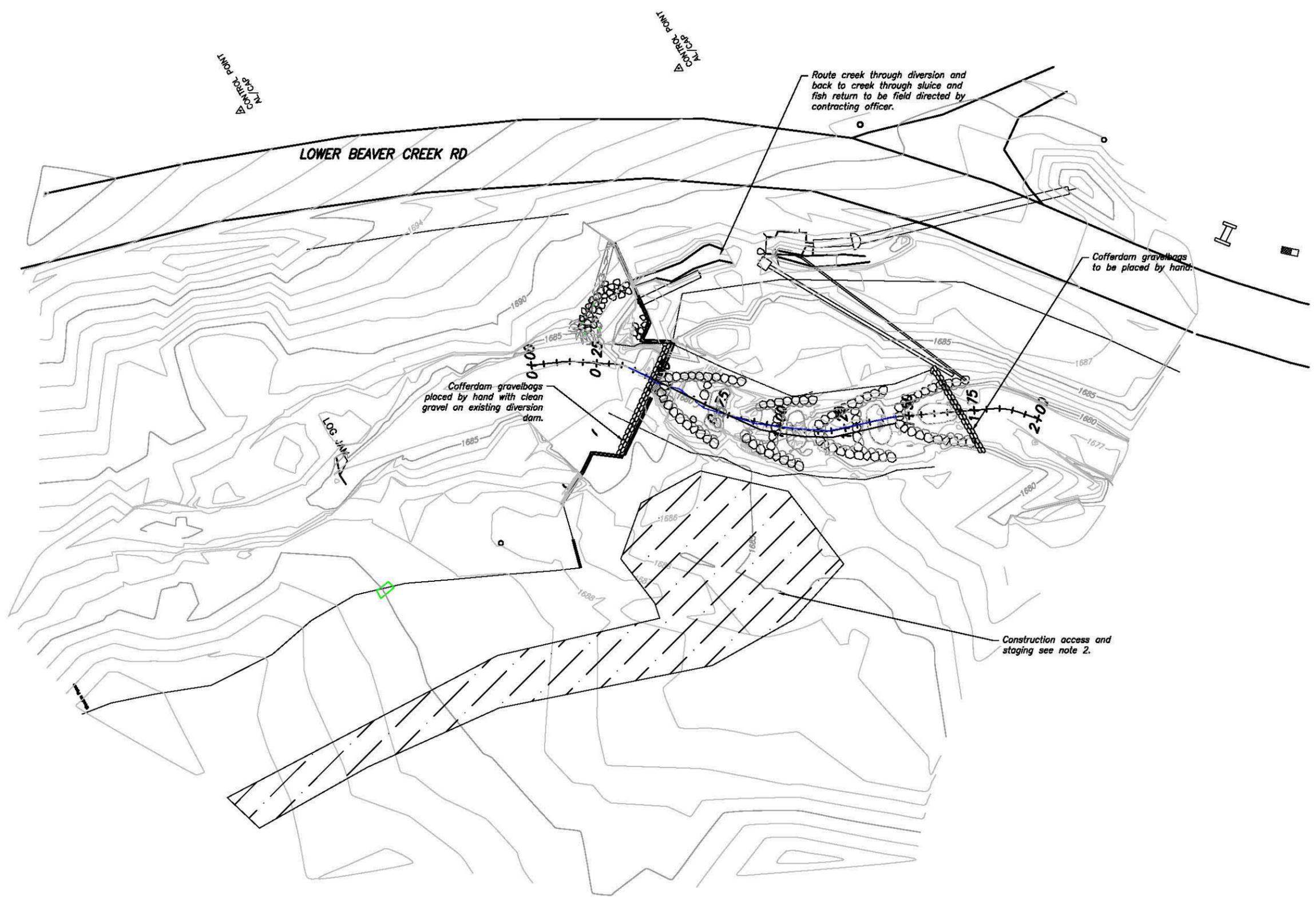
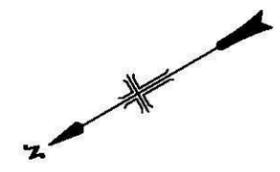
CAD SYSTEM
 CADD 2010 16.2a
 CAD FILENAME
 1678-100-1550.DWG

DESIGNED	
DRAWN	
CHECKED	
TECH. APPR.	NAME, PROF. ABBR.
ADMIN. APPROVAL	
DATE	
TITLE	
BOISE, ID	2011-12-20

SECTIONS AND DETAIL

1678-100-1550

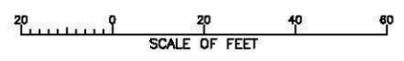
SHEET 5 OF 7



DATE AND TIME PLOTTED
FEBRUARY 21, 2012 1:00P
PLOTTED BY
JANIELSON

CAD SYSTEM
CADD 2010 16.20
CADD PREPARE
1678-100-1548AS1.DWG

ACCESS, STAGING, AND DEWATERING PLAN



- NOTES:**
1. Revegetation of impacted areas to be addressed by others.
 2. Access and staging to be staked by contracting officer.
 3. Defishing to be coordinated by contracting officer.

FOOTPRINT ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FORPS HABITAT IMPROVEMENT PROGRAM

METHOW SUBBASIN
BEAVER CREEK
FORT THURLOW

Not For Distribution

BOISE, ID 2011-12-28

ACCESS, STAGING, AND DEWATERING PLAN

1678-100-1551
SHEET 6 OF 7

Maracci

Construction Activities—Major Tasks

Adjustment of trash rack and intake location

The existing trash rack and intake will be moved into the bank approximately 8 feet to bring it flush with the bank in order to reduce the possibility that it will be impacted by debris flowing down stream. In addition, the structure will be rotated so that it will be facing perpendicular to the flow.

Relocation of the intake structure will require 2 cy of excavation, 30 cf of footing prep/bedding material. See Sheet 1678-100-1559 for more details of the intake structure. Relocation of the intake structure is expected to take 1 day, depending on conditions.

Installation of downstream sill

A grade control sill will be installed at the downstream extent of the project. The intent of this feature is to mitigate any downcutting of the rock ramp or headcutting of the channel from below the rock ramp. The sill will be composed of 2 rows of ~3' angular rock installed at grade. The sill will be keyed into the bank a minimum of 3'.

Construction of the sill will require 12 cy of excavation, and an equal volume of rocks. See sheet 1678-100-1557 for more details of the sill. Construction is expected to take 1 day.

Reconstruction of weir crest

The failed weir crest will be reconstructed in order to maintain the water surface elevation required for the irrigation diversion. This will consist of placing angular rocks to recreate the original crest geometry. Reconstruction of the weir crest will require approximately 4 ~3' rocks, and is expected to take 2 hours.

Construction of rock ramp

A rock ramp will be constructed between the grade control sill and the weir crest. This will add stability to the weir structure while still maintaining fish passage. The engineered streambed material will consist of 40 cy of:

WDFW/Fuller Thompson Substrate Gradations			
Gradation	% of Mix	Angular Rock	Round Rock
D100	16%	1.5 ft	2.1 ft
D84	34%	0.6 ft	0.8 ft
D50	34%	0.2 ft	0.3 ft
D16	9%	0.21 in	0.4 in
D8	7%	0.08 in	0.1 in

The engineered streambed material will be placed by an excavator, bucket compacted, and then to insure that the flow stays on the surface, will be jetted in using a small trash pump that recycles water from a sump dug within the dewatered area.

In addition to the engineered streambed material, larger boulders around 2-3' in diameter will be placed, and countersunk, to add roughness and pockets of slower water to aid in fish passage. See sheet 1678-100-1557 for typical detail.

General Site Conditions

Required Permits

The project Sponsor, Methow Salmon Recovery Foundation (MSRF), will submit the Joint Aquatic Resources Permit Application (JARPA) to obtain the necessary permits from Okanogan County, WDFW, and Washington Department of Ecology. MSRF will also submit the Washington SEPA Environmental Checklist. As required by National Environmental Policy Act (NEPA) and ESA Section 7, Reclamation will consult with NOAA Fisheries and the US Fish and Wildlife Service regarding the project's effects on threatened or endangered species and document potential affects to the environment. The consulting agencies may issue an Incidental Take Permit if they determine threatened or endangered species may be adversely affected by the project.

The contractor will be required to abide by all permit conditions. Should the contractor wish to deviate from the work described herein, the contractor will be responsible for notification of permit agencies to obtain any needed modifications to secured construction permit conditions for any proposed deviation prior to starting construction.

Staging, Fueling, and Stockpiling

Landowner agreements will be in place prior to construction. Following construction, the contractor will remove all equipment and material from the staging area and restore the area to pre-project conditions. If revegetation is required, the contractor will leave the site in a condition suitable for replanting.

Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located a minimum of 150 feet from the Beaver Creek or other flowing stream or water body. Fueling and overnight parking for vehicles will be available on Upper Beaver Creek Road. See Figure 1678-100-1558, Access, Staging, and Dewatering Plan, for more details.

Fueling, other than occasional hand fueling of small tools, will be allowed only on Upper Beaver Creek road, which is more than 150 feet from live flows. The Contracting Officer will inspect and approve the fueling area by prior to its use. No fuel will be stored onsite for use by heavy equipment. Trucks will haul fuel to the approved site as needed for fueling heavy equipment. Five to 10 gallons of fuel in approved containers may be kept at the fueling area in an approved containment vessel for use with hand-held power tools and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. No other fueling sites will be allowed.

Equipment to be used or stored onsite may include an excavator, backhoe, dozer, 10-cy dump trucks, and small tools. Additional equipment may be required as determined by the contractor. This equipment, of an adequate size to move and place the materials necessary for construction, will minimally affect the existing terrain while moving around the site. Equipment operating with hydraulic fluid and used for this project will use only those fluids certified as nontoxic to aquatic organisms while working in or around the stream. Equipment used for this project shall be free of external petroleum-based products. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of the Beaver Creek or any adjacent water body. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities. No special or high-cost equipment will be purchased with project funds.

All stationary power equipment such as generators operated within 150 feet of any water body shall be diapered to prevent leaks unless suitable containment is provided to prevent potential spills from entering the water.

Materials to be stored onsite will include engineered streambed material, large rock, and 30" HDPE pipe sections. All excess materials not used on the job will be removed within 10 days of completion of the project.

Non-native waste materials not reused in construction or reclaimed by the Project Sponsor will be removed by the contractor to a disposal site in accordance with State regulations.

Access from Staging Area to Work Site

Access to the work site would be provided via an existing gravel driveway as shown on Sheet 1678-100-1558.

Sediment Control

The contractor shall divert runoff water to prevent erosion at all sites affected by the work operations. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. The sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment and materials will be stored in the staging area more than 150 ft away from any water sources.

In the Event of High Flow Conditions during Construction

If a high-water-level event occurs after dewatering that threatens to undermine or overtop dewatering structures, pumps will be turned off and work in the area will be suspended until the high water recedes. The contractor will remove all motorized equipment and most tools before leaving the site so that any inundation in the contractor's absence will not pollute the stream. After the high water recedes, qualified biologists will again remove fish from the work area behind the cofferdams, which will then be dewatered as needed for construction. The contractor should also monitor weather and river forecasts and evacuate the site in a timely manner if flows are predicted to affect the project area.

Area Disturbed

The footprint of the proposed construction work would extend from the existing intake to the proposed grade control sill. The construction total area that would be disturbed is approximated to be 0.15 acres. The staging area location has not been confirmed yet, but we anticipate that the staging area will be 120 ft by 40 ft. An area near the site, adjacent to the road, is a possible location.

Site restoration and Revegetation

Rehabilitation goals for the project include minimizing soil disturbance, replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds. Protection of relevant aquatic habitat will be accomplished if these goals are met. The negative effects of project construction on local plant, fish, and wildlife habitat are expected to be temporary. Ground disturbance activities will be limited to the staging area, access routes, and the construction site.

Adaptive Management and Effectiveness Monitoring

Adaptive management will include annual effectiveness monitoring to check conditions at the site and to confirm revegetation success. Survey cross sections of the river will continue at least once

per year to allow changes in the river to be observed and tracked over time. Adaptive work in the river may occur if problems develop or its conditions change in the river to reduce the operational efficiency or required maintenance. Contact with resource agencies would be made prior to any in-water adaptive management efforts.

Proposed Dewatering Plan

Cofferdams

Two cofferdams would be required to isolate work areas from the active flow of the creek; one immediately upstream of the existing intake structure, and one immediately downstream of the work site. Figure 1678-10-1558 shows the conceptual plan for cofferdam placement. It is anticipated that the placement of the cofferdam materials would be conducted by hand. It is anticipated that each of these cofferdams would be comprised of structures formed by clean washed gravel-filled bags (gravelbags) with a synthetic membrane such as PVC or HDPE placed on the outside of the gravelbags, then folded over the top of the gravelbags and secured on both inside and outside of the cofferdam to reduce seepage into the work area.

The footprint of the cofferdams would be as small as possible to accommodate proposed work while minimizing impact to river substrate.

The flows at the time of project construction in early fall are expected to be near base flow levels of approximately 7 cfs. All flow will be routed through the existing diversion, around the project site, and back into the stream immediately below the project site.

Fish Handling and Salvage

Fish handling and salvage will be conducted by professionally qualified and experienced fisheries biologists and technicians. To reduce take of ESA-listed salmonid species and Pacific lamprey, fish removal will be completed for the entire length of the project site prior to any construction activities.

The project site will be gradually isolated from stream flows by gradually directing more and more flow into the diversion structure by gradually placing gravelbags. These gravelbags will be placed immediately upstream of the existing irrigation structure, as shown on the drawings. The gravelbags will be placed to reduce flow into the project location and left overnight. This gradual reduction in flow will encourage fish to leave the area on their own prior to defishing activities.

Once the project site is isolated at the upstream end and flows have been reduced, the downstream cofferdam will be constructed to prevent fish from re-entering the project site. Once both cofferdams are in place, qualified fish biologists will begin to remove any remaining fish using approved methods according to the terms of the NOAA Fisheries Habitat Improvement Project II BiOp Capture and Release Protocol (NOAA Fisheries 2008). It is anticipated that 2 days will be required for a crew of approximately 3 people to complete fish and larval lamprey removal in the project site using the following fish removal sequence:

Day 1 (end of the day):

1. Reduce flows by gradually placing gravel bags

Day 2:

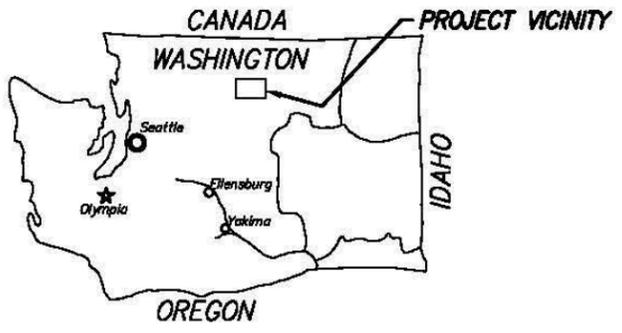
2. Construct downstream cofferdam
3. Make 2 passes with an electro-fisher

Isolation of the Work Area

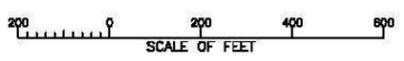
Water would be removed from behind the cofferdams using trash pumps to prevent sediment-laden water from entering the Beaver Creek. The dewatering system would discharge in to a remnant channel on the left bank.

It is anticipated that once the excavation within each cofferdam is complete that dewatering turbidity levels will significantly drop. Following completion of construction, all construction materials within the cofferdams would be removed to the extent practical prior to cofferdam removal. Individual gravelbags comprising the cofferdam would be pulled incrementally to prevent a large pulse of sediment during removal.

All areas of construction that do not extend down to the creek surface ordinary high water level will have silt fencing between the construction area and the river.

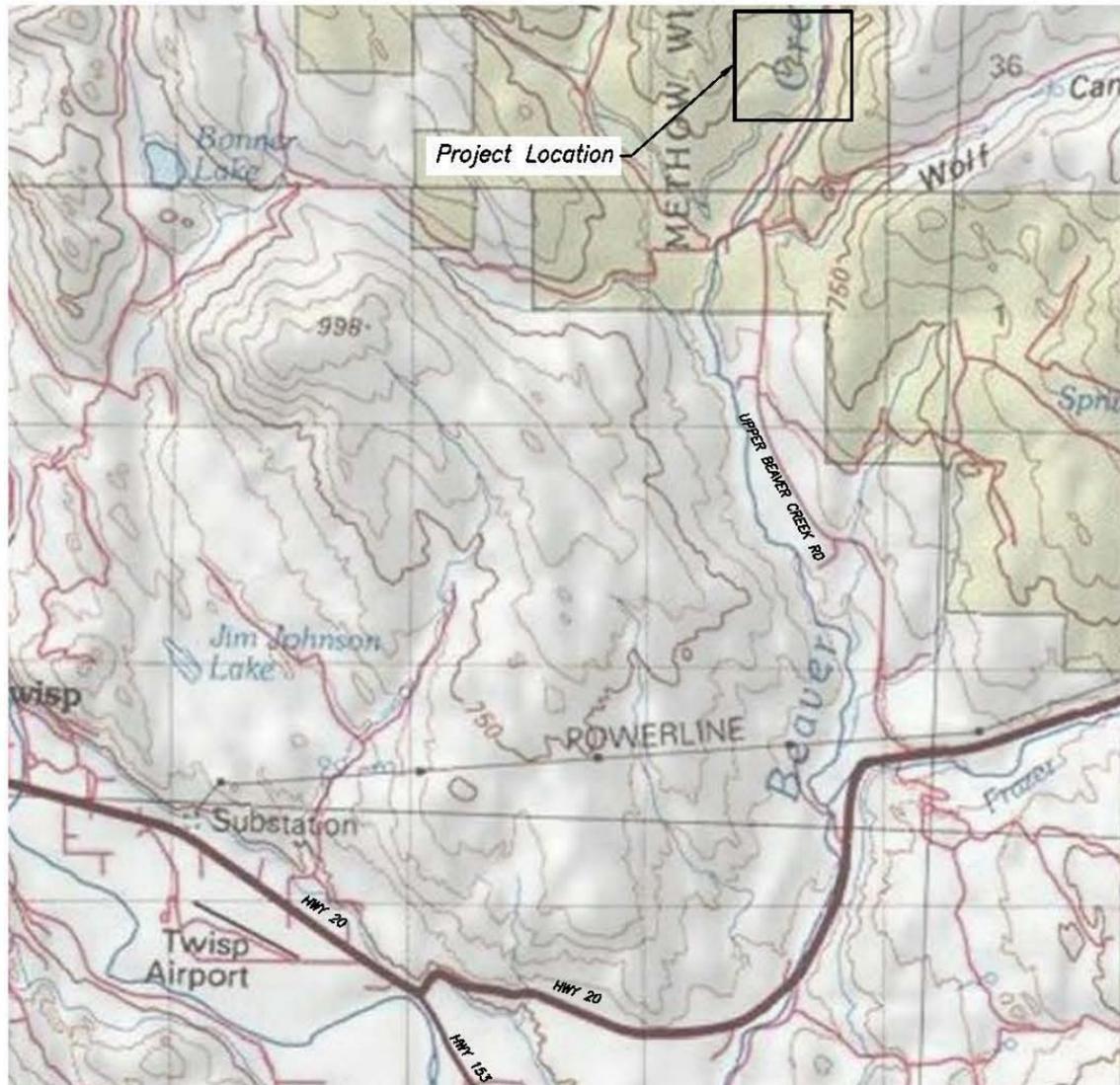


LOCATION MAP

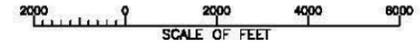


DATE AND TIME PLOTTED
MAY 6, 2013 10:00
PLOTTED BY
AMW/CH

CADD SYSTEM: 10.28
CADD PLOTNAME:
1678-100-1553.DWG



VICINITY MAP



SHEET INDEX	
1678-100-1553	LOCATION MAP
1678-100-1554	GENERAL NOTES, AND LEGEND
1678-100-1555	SITE PLAN AND EXISTING PROFILE
1678-100-1556	ROUGHENED CHANNEL PLAN AND PROFILE
1678-100-1557	SECTIONS AND DETAILS
1678-100-1558	ACCESS, STAGING, AND DEWATERING - PLAN
1678-100-1559	DIVERSION STRUCTURE - PLAN, SECTION, AND DETAIL

SITE SUMMARY

T34N, R22E, Sec. 35
Okanogan County
Twisp, Washington

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN

BEAVER CREEK
MARRACCI DIVERSION

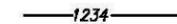
FOR OFFICIAL USE ONLY

Not For Distribution

GENERAL NOTES

1. ALL COMPONENTS OF THE CONTRACT DOCUMENTS SHALL FULLY APPLY TO THE WORK WHETHER SPECIFICALLY REFERENCED IN THE DRAWINGS OR NOT.
2. STATIONING, DISTANCES, AND LENGTHS SHOWN ON THE DRAWINGS ARE BASED ON HORIZONTAL MEASUREMENTS ALONG THE STREAM CENTERLINE. CROSS SECTIONS, CROSSING DETAILS, AND REFERENCES TO LEFT (L) AND RIGHT (R) ON THE DRAWINGS ASSUME LOOKING IN THE DIRECTION OF INCREASING STATION ALONG STREAM CENTERLINE ALIGNMENT (FACING DOWNSTREAM).
3. ALL DIMENSIONS, INCLUDING, BUT NOT LIMITED TO, ELEVATIONS, STATIONS, AND DISTANCES ARE IN STANDARD ENGLISH UNITS.
4. ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND ACTUAL SITE CONDITIONS; OR ANY INCONSISTENCIES OR AMBIGUITIES BETWEEN THE DRAWINGS AND OTHER COMPONENTS OF THE CONTRACT DOCUMENTS SHALL BE IMMEDIATELY REPORTED IN WRITING TO THE ENGINEER. THE ENGINEER WILL PROMPTLY CORRECT INCONSISTENCIES OR AMBIGUITIES IN WRITING. WORK DONE BY THE CONTRACTOR INVOLVING SUCH DISCREPANCIES WITHOUT A WRITTEN REPORT AND RESPONSE FROM THE ENGINEER SHALL BE DONE AT THE CONTRACTOR'S SOLE RISK AND EXPENSE.
5. CONTRACTOR SHALL NOT DISTURB OR DESTROY ANY EXISTING SURVEY MONUMENTS OR BENCHMARKS. ANY BENCHMARKS DISTURBED OR DESTROYED BY THE CONTRACTOR SHALL BE REPLACED TO THE ENGINEER'S SATISFACTION AT THE CONTRACTOR'S SOLE EXPENSE.
6. EXISTING UTILITIES ARE NOT SHOWN ON THE DRAWINGS. UTILITY LOCATION AND PROTECTION IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT TYPE, OWNER, LOCATION, AND ELEVATION OF ALL BURIED AND OVERHEAD UTILITIES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PERFORM THE WORK IN A SAFE MANNER AND IN ACCORDANCE WITH ANY REQUIREMENTS SET FORTH BY THE UTILITY OWNER AND APPLICABLE LAWS AND REGULATIONS.
7. CONTRACTOR IS ADVISED THAT NORTH ARROWS AND ORIENTATION OF PLAN VIEW SHEETS VARY TO ALLOW FOR LEFT-TO-RIGHT STATIONING AND STATIONING IN THE DIRECTION OF STREAM FLOW.
8. CONTRACTOR SHALL NOTIFY UTILITY OWNERS WITHIN THE LIMITS OF CONSTRUCTION A MINIMUM OF TWO WEEKS PRIOR TO EXCAVATION, OR OTHER CONSTRUCTION ACTIVITY THAT MAY IMPACT THE UTILITY. CONTRACTOR SHALL ALSO CONTACT METHOW SALMON RECOVERY FOUNDATION PRIOR TO ANY CONSTRUCTION ACTIVITY IN THE AREA. CONTRACTOR SHALL PROVIDE ACCESS TO UTILITY OWNERS FOR MAINTENANCE AND WORK ON THEIR UTILITIES DURING THE COURSE OF THE WORK.
9. CONTRACTOR SHALL ENSURE THAT OPERATION OF EXISTING IRRIGATION, SEWER, DRAINAGE, DOMESTIC WATER, AND OTHER UTILITY SYSTEMS ARE CONTINUOUS DURING CONSTRUCTION.
10. RELOCATIONS AND/OR REPLACEMENTS OF EXISTING UTILITIES SHALL BE COORDINATED BY THE CONTRACTOR WITH THE UTILITY OWNER. CONTRACTOR SHALL CONTACT, SCHEDULE, AND ESTABLISH UTILITY SHUT DOWN TIMES AND DETERMINE THE RELOCATION AND/OR REPLACEMENT REQUIREMENTS OF EXISTING UTILITIES PRIOR TO THE START OF ANY WORK. THE UTILITY SHALL BE RELOCATED OR REPLACED TO THE SATISFACTION OF THE UTILITY OWNER.
11. IF APPLICABLE, CONSTRUCTION EASEMENTS SHALL NOT BE USED IN ANY MANNER THAT WILL CAUSE PERMANENT DAMAGE TO THE PROPERTY. DESCRIPTIONS OF THE EASEMENTS ACQUIRED FOR THE WORK WILL BE ON FILE AT THE OFFICE OF THE OWNER. CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE EASEMENT AGREEMENTS.
12. FENCING THE WORK AREA FOR PROTECTION OF WORK AND PROPERTY AND PUBLIC SAFETY SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
13. CONTRACTOR SHALL KEEP ALL CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS AND ANY TEMPORARY CONSTRUCTION OR PERMANENT EASEMENTS OBTAINED FOR THIS PROJECT. IF APPLICABLE, THIS INCLUDES, BUT IS NOT LIMITED TO, VEHICLES AND EQUIPMENT, LIMITS OF EXCAVATION, STOCKPILED EXCAVATED AND IMPORTED MATERIAL, BACKFILL MATERIAL, STREAMBED MATERIAL, AND WEIR MATERIAL. IF THE CONTRACTOR REQUIRES ADDITIONAL CONSTRUCTION EASEMENTS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN SUCH EASEMENTS FROM INDIVIDUAL PROPERTY OWNERS AND BEAR ALL ASSOCIATED COSTS.
14. UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR SPECIFICATIONS, ALL EXISTING ITEMS INCLUDING, BUT NOT LIMITED TO, STRUCTURES, IMPROVEMENTS, GROUNDWATER WELLS, SIGNS, FENCES, GATES, CURBS, PAVEMENT, BRIDGES, UTILITIES, IRRIGATION PIPELINES AND DITCHES, ETC. SHALL BE PROTECTED BY THE CONTRACTOR. IF SUCH ITEMS ARE DAMAGED OR MUST BE REMOVED OR MODIFIED TO FACILITATE CONSTRUCTION, CONTRACTOR SHALL FIRST NOTIFY THE OWNER AND THEN REPLACE THE ITEMS TO A LIKE OR BETTER CONDITION AT CONTRACTOR'S EXPENSE TO SATISFACTION OF OWNER OF FACILITIES.
15. REQUIREMENTS RELATED TO THE PROTECTION AND/OR REMOVAL OF TREES, VEGETATION, AND STRUCTURES WITHIN THE WORK AREA ARE DETAILED IN THE SPECIFICATIONS.
16. CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE TRENCH LIMITS NEEDED TO COMPLETE THE WORK IN CONFORMANCE WITH LOCAL, STATE AND FEDERAL CODES GOVERNING SHORING, SHEETING, BRACING OF EXCAVATIONS AND TRENCHES, AND FOR PROTECTION AND SAFETY OF THE WORKERS AND OTHER CONSTRUCTION RELATED PERSONNEL.
17. EXCAVATION SHALL MEET THE REQUIREMENTS OF OSHA 29 CFR PART 1926, SUBPART P, EXCAVATIONS. ACTUAL SLOPES SHALL NOT EXCEED THE MAXIMUM ALLOWABLE SLOPES (SUBPART P, APPENDIX B).
18. HORIZONTAL DATUM IS NAD83/91. HORIZONTAL COORDINATES SHOWN HEREIN ARE WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, US SURVEY FEET.
19. VERTICAL DATUM IS NAVD 88, FEET.
20. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE INDICATED.
21. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
22. THE CONTRACTOR IS RESPONSIBLE FOR PRODUCING, IMPLEMENTING, ADHERING TO, AND MAINTAINING A STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH THE REGULATIONS AND GUIDELINES SET FORTH AND SUBJECT TO APPROVAL BY THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, WATER QUALITY PROGRAM. CONTRACTOR SHALL IMPLEMENT AND DOCUMENT ANY ADDITIONAL MEASURES NECESSARY TO PREVENT ANY EROSION OR HAZARDOUS MATERIALS FROM LEAVING THE SITE, DISCHARGING, BEING ENTRAINED, ABSORBED OR OTHERWISE ENTERING SURFACE WATERS, GROUND WATER OR SOILS.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES AT ALL TIMES. MAINTENANCE OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE CONSIDERED INCIDENTAL.
24. THE CONTRACTOR SHALL BE HELD SOLELY RESPONSIBLE FOR ANY NPDES OR OTHER APPLICABLE ENVIRONMENTAL PERMIT VIOLATIONS AND FINES.

LEGEND

-  1234 EXISTING GRADE CONTOURS
-  1234 FINISH GRADE CONTOURS

ABBREVIATIONS

APPROX	APPROXIMATE
CFS	CUBIC FEET PER SECOND
CONT	CONTINUOUS
CP	CONTROL POINT
CY	CUBIC YARD
E	EAST
EL	ELEVATION
EXST	EXISTING
G	GRADE
H	HORIZONTAL
HWY	HIGHWAY
L	LENGTH
LF	LINEAR FOOT
LS	LUMP SUM
MAX	MAXIMUM
MIN	MINIMUM
MSRF	METHOW SALMON RECOVERY FOUNDATION
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OG	ORDINARY GROUND
OHW	ORDINARY HIGH WATER
PT	POINT
Q	FLOW
RD	ROAD
S	SOUTH
SF	SQUARE FOOT
SPEC	SPECIFICATION
STA	STATION
SY	SQUARE YARD
TYP	TYPICAL
W	WEST
WSE	WATER SURFACE ELEVATION

DATE AND TIME PLOTTED: MAY 6, 2012 10:59 PLOTTED BY: ANTHONY

CADD SYSTEM: CALDWELL 10.29 CADD FIRMWARE: 1678-100-1553&4.DWG

FOOT ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN

BEAVER CREEK

MARRACCI DIVERSION

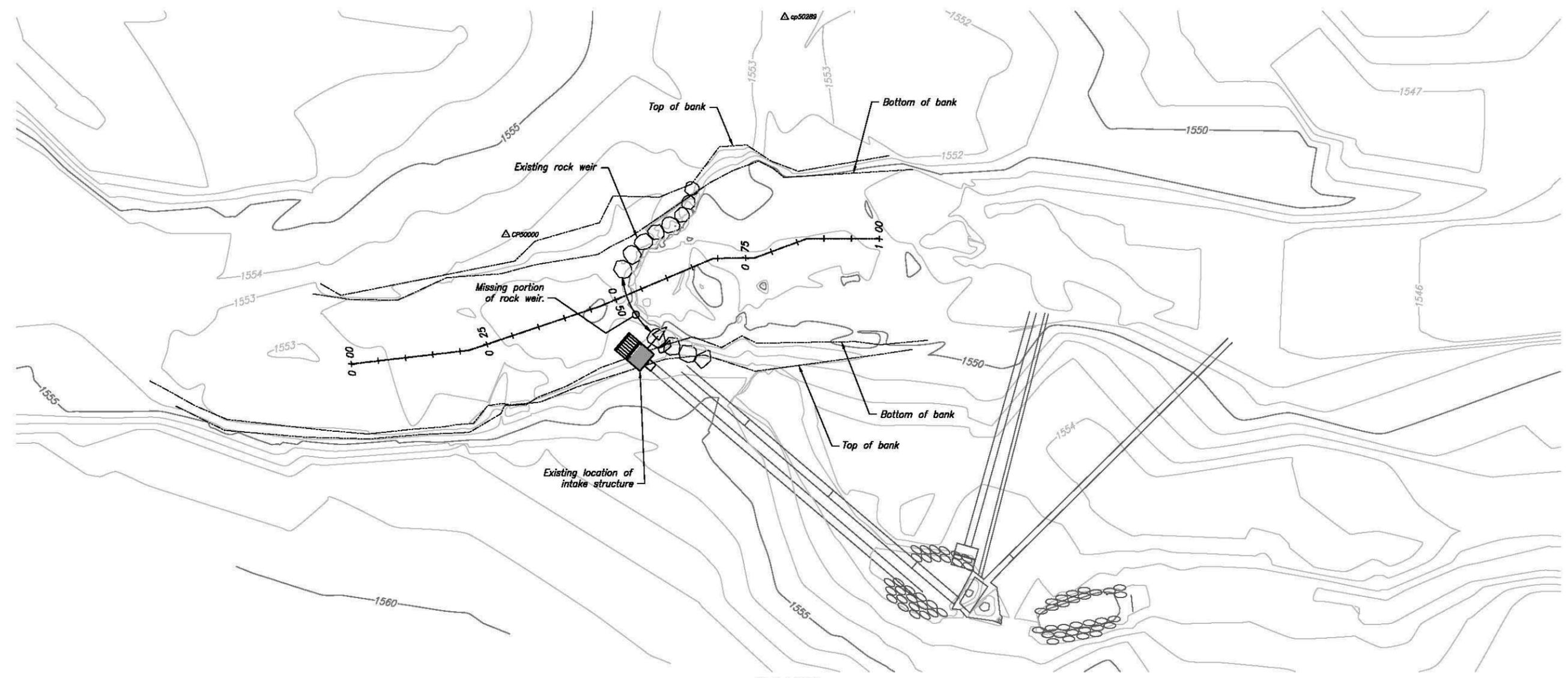
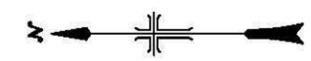
Not For Distribution

BOISE, ID 2011-1-9

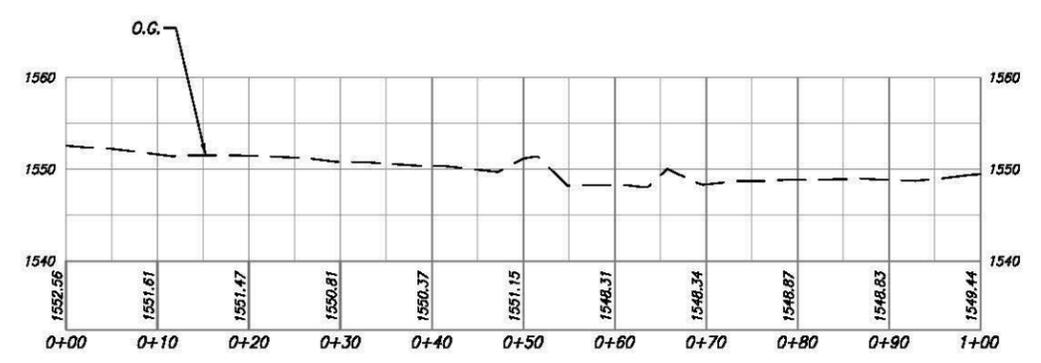
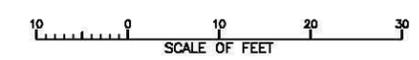
GENERAL NOTES
AND LEGEND

1678-100-1554

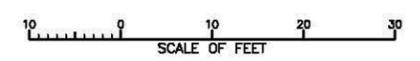
SHEET 2 OF 7



SITE PLAN



EXISTING PROFILE



CONTROL POINTS				
Point #	Description	Northing	Easting	Elevation
50289	cp50289	302229.91	100931.81	1552.97
50000	CP50000	302280.70	100892.37	1553.08

DATE AND TIME PLOTTED
MAY 21 2012 10:08
PLOTTED BY
CROSS/TH

CADD SYSTEM: 18.26
CADD FILENAME: 1678-100-1555.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

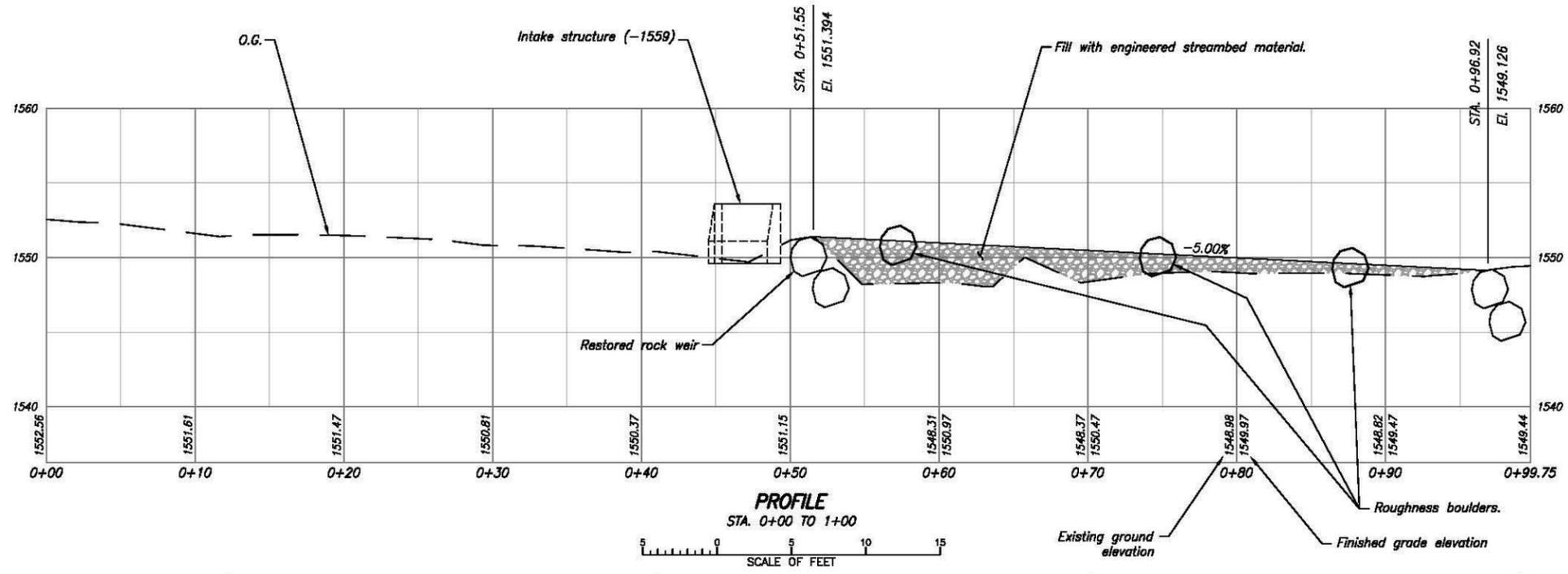
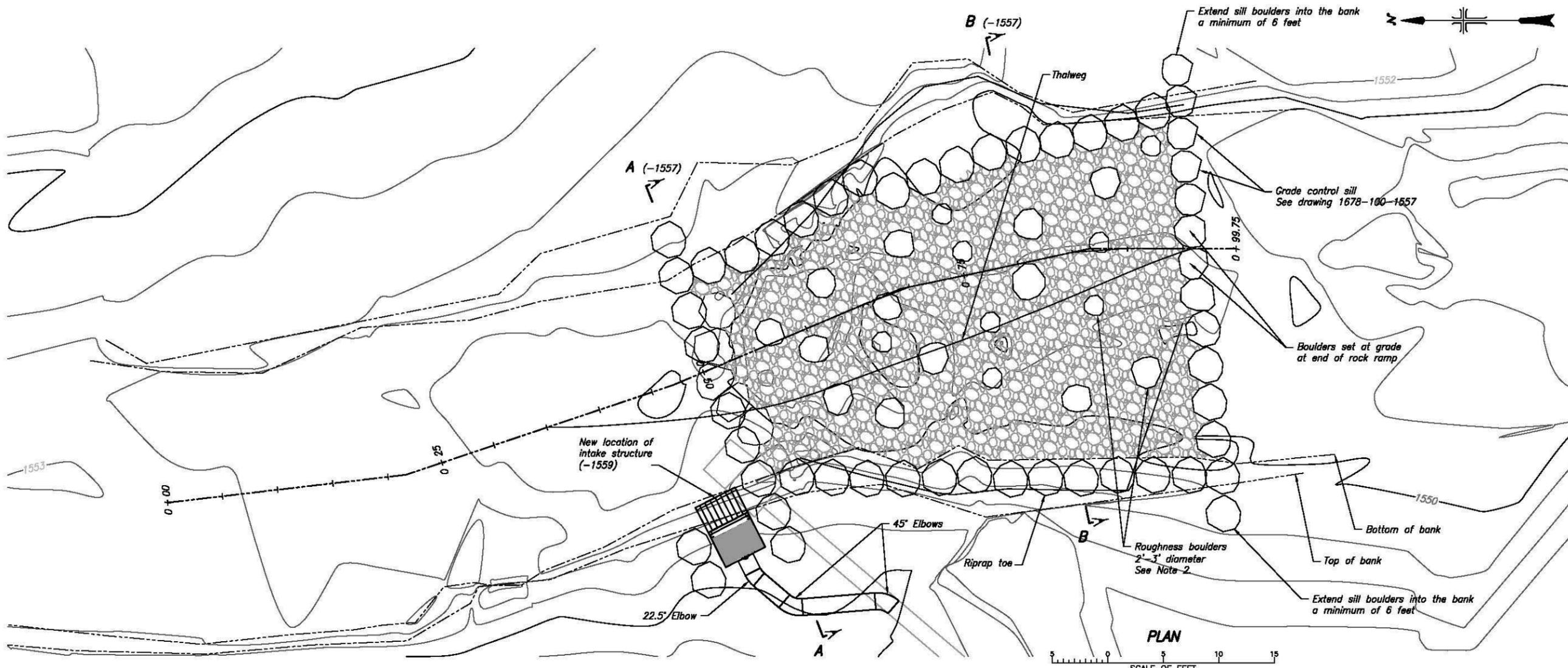
Not For Distribution

BOISE, ID 2012-01-09

**SITE PLAN AND
EXISTING PROFILE**

1678-100-1555

SHEET 3 OF 7



- NOTES:**
1. Location and quantity of roughness boulders to be field directed.
 2. Typical detail for roughness boulder on drawing 1678-100-1557.
 3. Quantities and gradations of streambed material and boulders on drawing 1678-100-1557.
 4. Revegetation to be performed by others.

DATE AND TIME PLOTTED
MAY 21 2012 10:10
PLOTTED BY
CROSS/TH

CAD SYSTEM
CADD/2010/BA
CADD/RENAME
1678-100-1556.DWG

FOOTPRINT Use Only
Not For Distribution

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

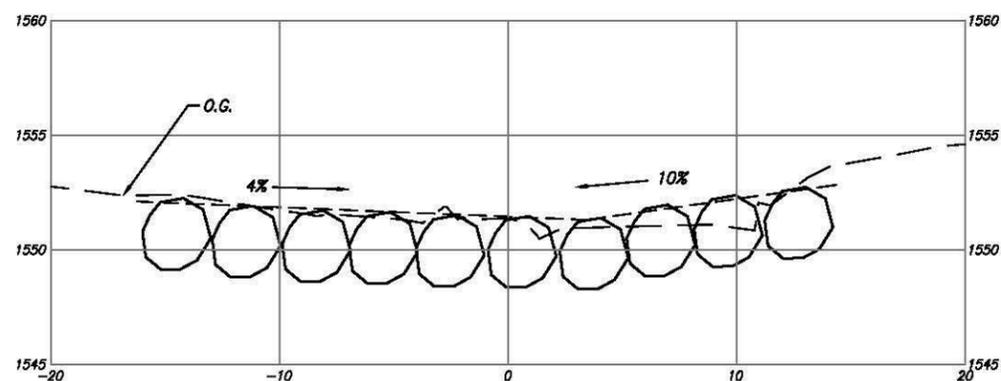
BOISE, ID 2012-01-09

ROUGHENED CHANNEL
PLAN AND PROFILE

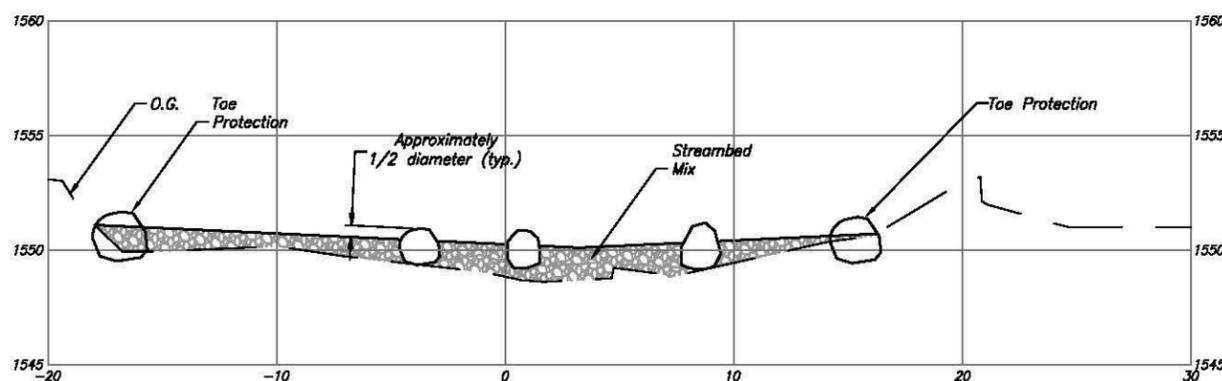
1678-100-1556
SHEET 4 OF 7

Gradation	% of Mix	Angular Rock	Round Rock
D100	16%	1.5 feet	2.1 feet
D64	34%	0.6 feet	0.8 feet
D50	34%	0.2 feet	0.3 feet
D16	9%	0.21 inches	0.4 inches
D8	7%	0.08 inches	0.1 inches

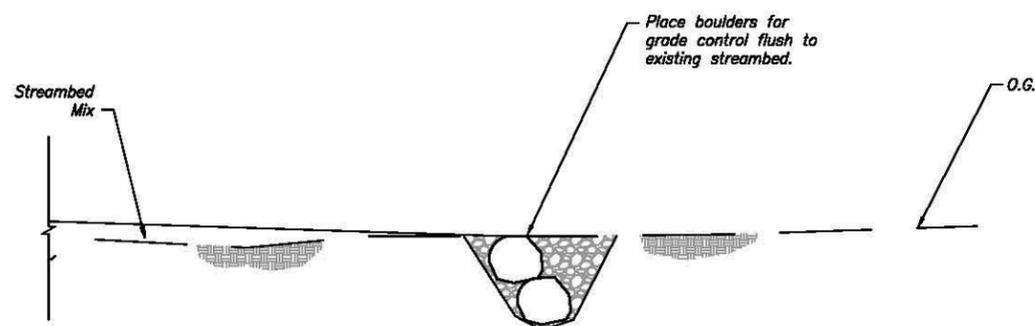
Material	Quantity	Units
Streambed Mix	30	CY
2-3 foot Roughness Boulders	60	Each
Approx. Area of Disturbance in Channel	0.1	acres
Approx. Area of Access and Staging	0.1	acres



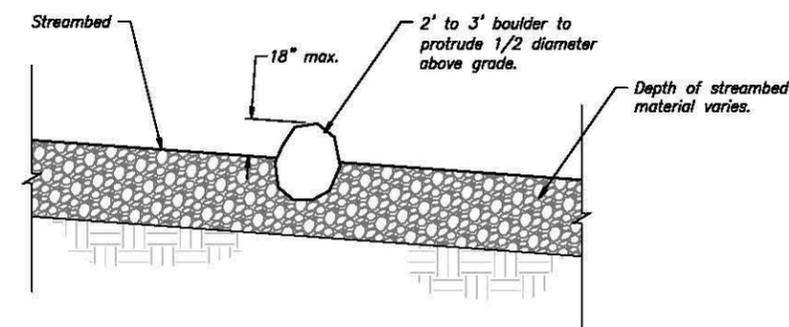
SECTION A-A N.T.S.



SECTION B-B N.T.S.



GRADE CONTROL SILL
DETAIL N.T.S.



TYPICAL ROUGHNESS BOULDER
DETAIL (1556)

DATE AND TIME PLOTTED
MAY 21 2012 10:21
PLOTTED BY
CROSS/TH

CADD SYSTEM: 18.2p
CADD USER: RAL
CADD PLENARY:
1678-100-1557.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN

BEAVER CREEK

MARRACCI DIVERSION

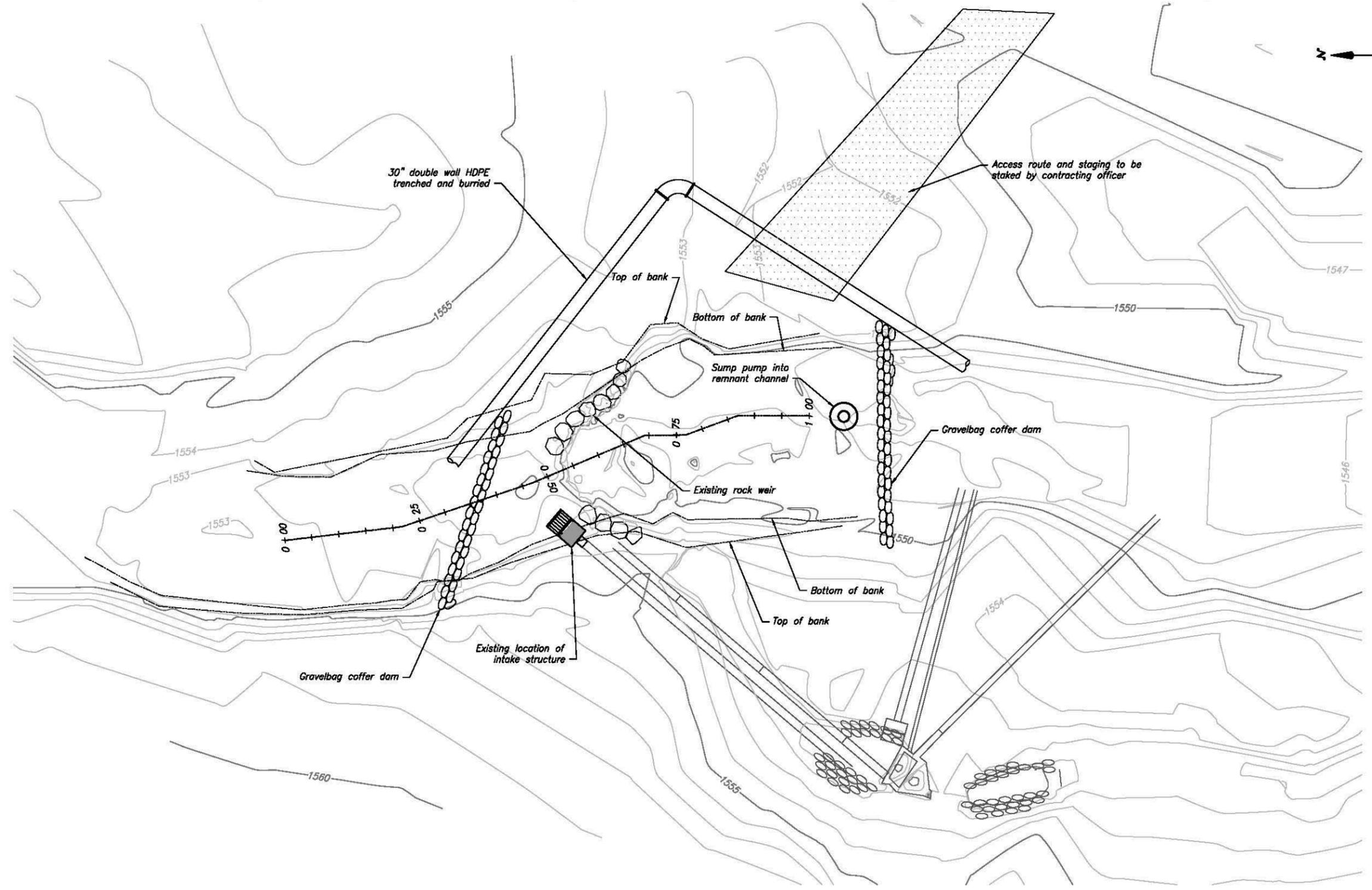
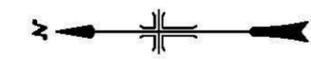
For Official Use Only
Not For Distribution

BOISE, ID 2012-01-00

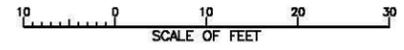
SECTIONS AND DETAIL

1678-100-1557

SHEET 5 OF 7



**ACCESS STAGING AND
DEWATERING PLAN**



DATE AND TIME PLOTTED
MAY 21 2012 10:28
PLOTTED BY
CROSS/TH

CAD SYSTEM
CADD 2010 R4
CADD FILENAME
1678-100-1558.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

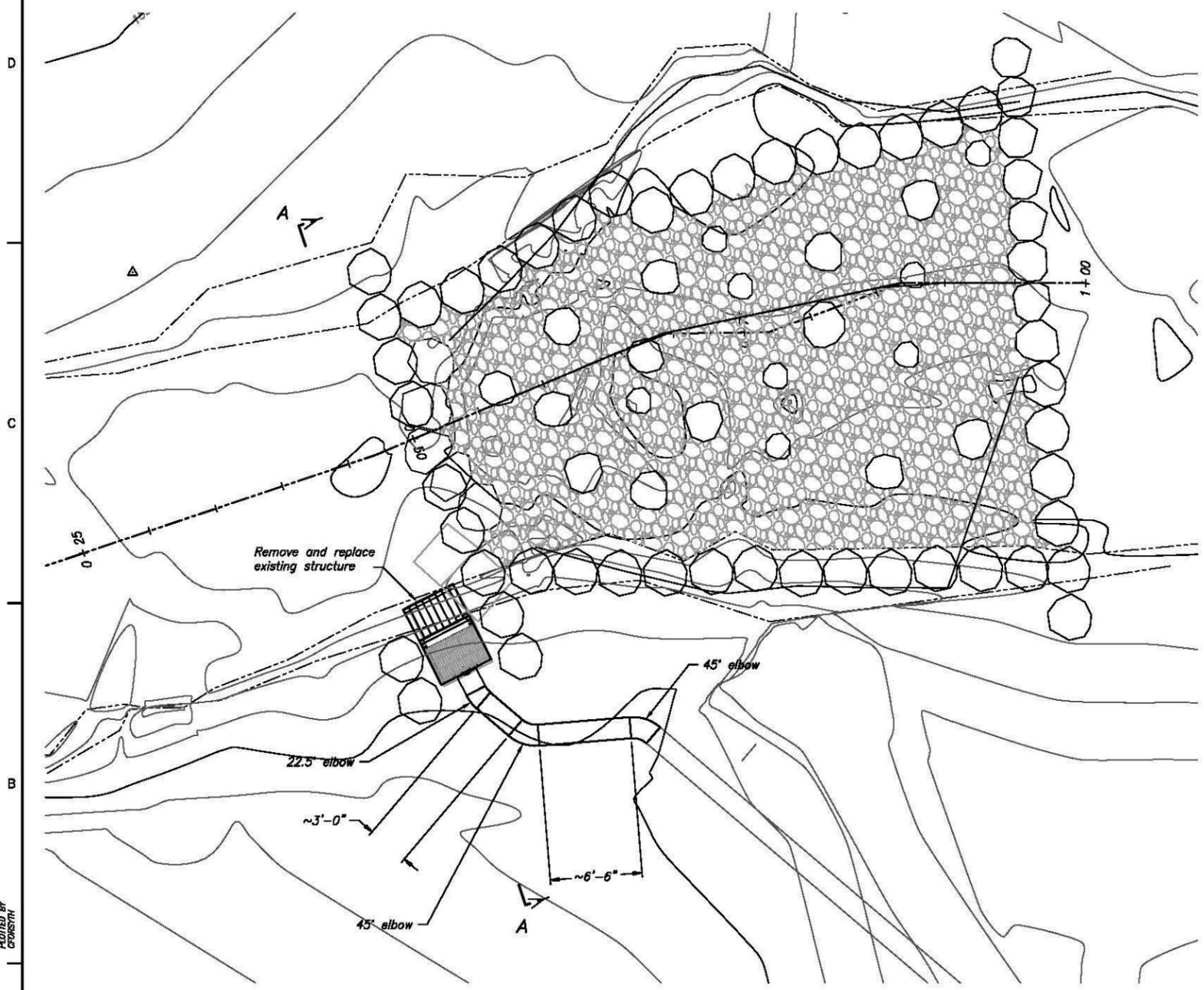
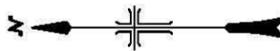
METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

BOISE, ID 2012-01-00

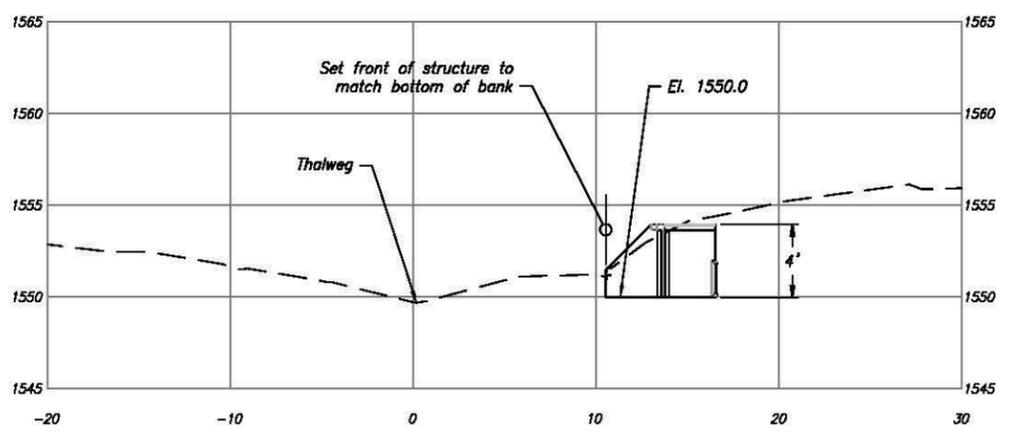
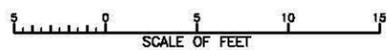
**ACCESS STAGING AND
DEWATERING PLAN**

1678-100-1558

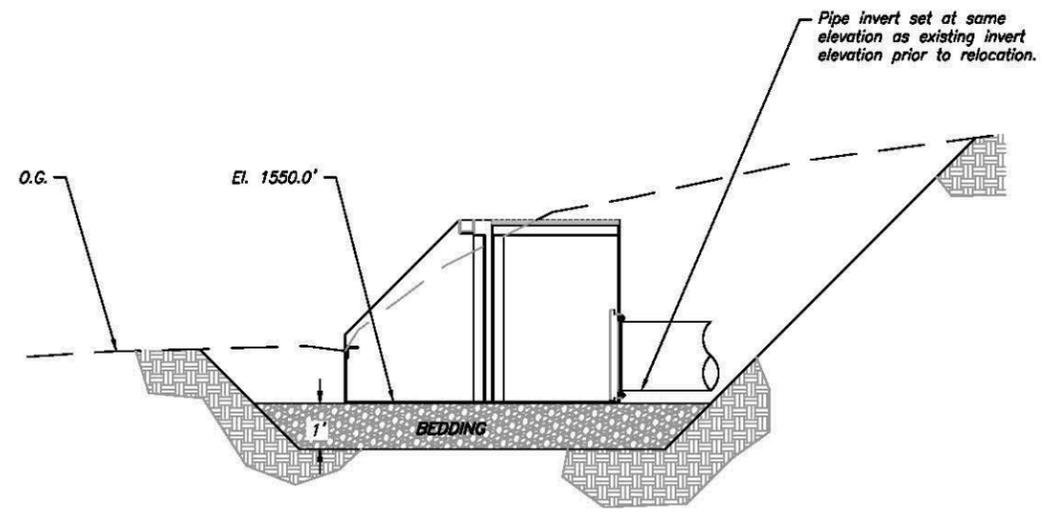
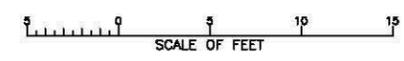
SHEET 6 OF 7



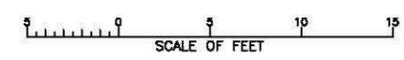
PLAN



SECTION A-A



DIVERSION DETAIL



DATE AND TIME PLOTTED
MAY 21 2012 10:38
PLOTTED BY
CROSS/TH

CNS SYSTEM
CNS 2010 ILM
CNS RELEASE
1678-100-1559.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

Not For Distribution

BOISE, ID 2012-01-00

DIVERSION STRUCTURE
PLAN, SECTION,
AND DETAIL

1678-100-1559

SHEET 7 OF 7

Thurlow Transfer

Construction Activities—Major Tasks

Move location of large boulder

The large boulder that was placed during construction of the original weir will be moved by a track mounted hydraulic excavator to the right bank.

Installation of bioengineering treatment on right bank

A bioengineering treatment will be installed on the right bank from immediately downstream of the re-located large boulder to immediately upstream of the upstream weir. The treatment will extend up to approximately 10' into the channel from the existing bank location. See sheet 1678-100-1564 for typical detail.

Relocate material from gravel bar deposit

The gravel bar deposit that has formed downstream of the large boulder will be repurposed as part of the bioengineering treatment along the right bank. As part of the relocation, the current thalweg will be moved to the middle of the new channel cross section. Approximately 10 cy of material will be relocated.

General Site Conditions

Required Permits

The project Sponsor, Methow Salmon Recovery Foundation (MSRF), will submit the Joint Aquatic Resources Permit Application (JARPA) to obtain the necessary permits from Okanogan County, WDFW, and Washington Department of Ecology. MSRF will also submit the Washington SEPA Environmental Checklist. As required by National Environmental Policy Act (NEPA) and ESA Section 7, Reclamation will consult with NOAA Fisheries and the US Fish and Wildlife Service regarding the project's effects on threatened or endangered species and document potential affects to the environment. The consulting agencies may issue an Incidental Take Permit if they determine threatened or endangered species may be adversely affected by the project.

The contractor will be required to abide by all permit conditions. Should the contractor wish to deviate from the work described herein, the contractor will be responsible for notification of permit agencies to obtain any needed modifications to secured construction permit conditions for any proposed deviation prior to starting construction.

Staging, Fueling, and Stockpiling

Landowner agreements will be in place prior to construction. Following construction, the contractor will remove all equipment and material from the staging area and restore the area to pre-project conditions. If revegetation is required, the contractor will leave the site in a condition suitable for replanting.

Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located a minimum of 150 feet from the Beaver Creek or other flowing stream or water body.

It is not anticipated that fueling will be required during this project. In the unlikely event that it is required, fueling, other than occasional hand fueling of small tools, will be allowed only on Upper Beaver Creek road, which is more than 150 feet from live flows. The Contracting Officer will inspect and approve the fueling area by prior to its use. No fuel will be stored onsite for use by heavy equipment. Trucks will haul fuel to the approved site as needed for fueling heavy equipment. Five to 10 gallons of fuel in approved containers may be kept at the fueling area in an approved containment vessel for use with hand-held power tools and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. No other fueling sites will be allowed.

Equipment to be used or stored onsite may include an excavator and small tools. Additional equipment may be required as determined by the contractor. This equipment, of an adequate size to move and place the materials necessary for construction, will minimally affect the existing terrain while moving around the site. Equipment operating with hydraulic fluid and used for this project will use only those fluids certified as nontoxic to aquatic organisms while working in or around the stream. Equipment used for this project shall be free of external petroleum-based products. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of the Beaver Creek or any adjacent water body. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities. No special or high-cost equipment will be purchased with project funds.

All stationary power equipment such as generators operated within 150 feet of any water body shall be diapered to prevent leaks unless suitable containment is provided to prevent potential spills from entering the water.

Materials to be stored onsite will be limited to bioengineering materials, such as willow stakes and matting. All excess materials not used on the job will be removed within 10 days of completion of the project.

Non-native waste materials not reused in construction or reclaimed by the Project Sponsor will be removed by the contractor to a disposal site in accordance with State regulations.

Access from Staging Area to Work Site

Access to the work site would be provided via an existing gravel road as shown on Sheet 1678-100-1561.

Sediment Control

The contractor shall divert runoff water to prevent erosion at all sites affected by the work operations. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. The sediment fencing will be installed prior to excavation operations and will remain in place until construction is

completed. Equipment will be stored in the staging area more than 150 ft away from any water sources.

In the Event of High Flow Conditions during Construction

If a high-water-level event occurs after dewatering that threatens to undermine or overtop project site, work in the area will be suspended until the high water recedes. The contractor will remove all motorized equipment and most tools before leaving the site so that any inundation in the contractor's absence will not pollute the stream. The contractor should also monitor weather and river forecasts and evacuate the site in a timely manner if flows are predicted to affect the project area.

Area Disturbed

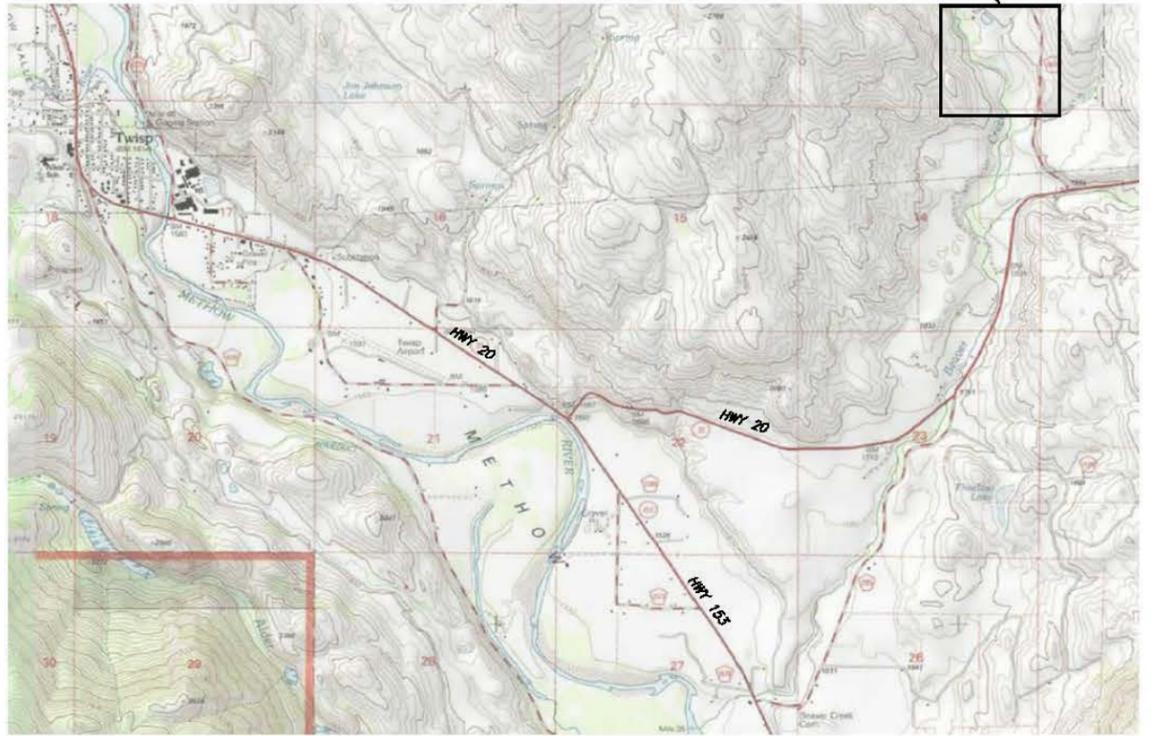
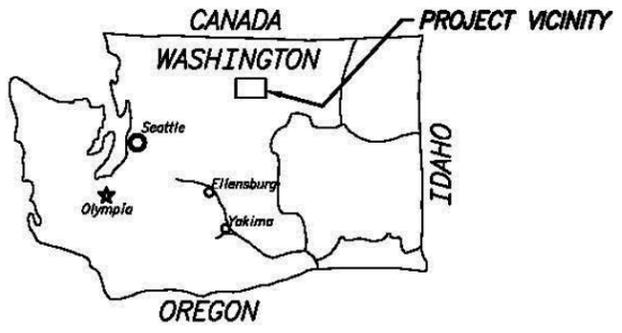
The footprint of the proposed construction work would extend from the large rock downstream to the upstream weir. The construction total area that would be disturbed is approximated to be 0.045 acres. There is no staging area required for this project.

Site restoration and Revegetation

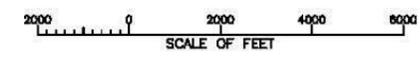
Rehabilitation goals for the project include minimizing soil disturbance, replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds. Protection of relevant aquatic habitat will be accomplished if these goals are met. The negative effects of project construction on local plant, fish, and wildlife habitat are expected to be temporary. Ground disturbance activities will be limited to the staging area, access routes, and the construction site.

Adaptive Management and Effectiveness Monitoring

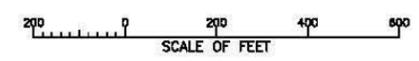
Adaptive management will include annual effectiveness monitoring to check conditions at the site and to confirm revegetation success. Survey cross sections of the river will continue at least once per year to allow changes in the river to be observed and tracked over time. Adaptive work in the river may occur if problems develop or if conditions change in the river to reduce the operational efficiency or required maintenance. Contact with resource agencies would be made prior to any in-water adaptive management efforts.



VICINITY MAP



LOCATION MAP



SHEET INDEX	
1678-100-1560	LOCATION MAP
1678-100-1561	GENERAL NOTES, AND LEGEND
1678-100-1562	EXISTING SITE PLAN
1678-100-1563	CHANNEL MODIFICATION PLAN AND PROFILE
1678-100-1564	SECTIONS
1678-100-1565	PLAN - ACCESS, STAGING, AND DEWATERING
1678-100-1566	BIOENGINEERING DETAIL

SITE SUMMARY
 T33N, R22E, Sec. 11
 Okanogan County
 Twisp, Washington

DATE AND TIME PLOTTED:
 HWY 20 SITE 0717
 PLOTTED BY:
 CPO/SPT/PH

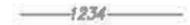
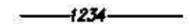
CPO SYSTEM - 16.29
 CAD FILENAME:
 1678-100-1560.dwg, I, I, 718.dwg

ALWAYS THINK SAFETY
 U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
 COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
METHOW SUBBASIN
 BEAVER CREEK
 THURLOW TRANSFER DITCH
 Not For Distribution

GENERAL NOTES

1. ALL COMPONENTS OF THE CONTRACT DOCUMENTS SHALL FULLY APPLY TO THE WORK WHETHER SPECIFICALLY REFERENCED IN THE DRAWINGS OR NOT.
2. STATIONING, DISTANCES, AND LENGTHS SHOWN ON THE DRAWINGS ARE BASED ON HORIZONTAL MEASUREMENTS ALONG THE STREAM CENTERLINE, CROSS SECTIONS, CROSSING DETAILS, AND REFERENCES TO LEFT (L) AND RIGHT (R) ON THE DRAWINGS ASSUME LOOKING IN THE DIRECTION OF INCREASING STATION ALONG STREAM CENTERLINE ALIGNMENT (FACING DOWNSTREAM).
3. ALL DIMENSIONS, INCLUDING, BUT NOT LIMITED TO, ELEVATIONS, STATIONS, AND DISTANCES ARE IN STANDARD ENGLISH UNITS.
4. ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND ACTUAL SITE CONDITIONS; OR ANY INCONSISTENCIES OR AMBIGUITIES BETWEEN THE DRAWINGS AND OTHER COMPONENTS OF THE CONTRACT DOCUMENTS SHALL BE IMMEDIATELY REPORTED IN WRITING TO THE ENGINEER. THE ENGINEER WILL PROMPTLY CORRECT INCONSISTENCIES OR AMBIGUITIES IN WRITING. WORK DONE BY THE CONTRACTOR INVOLVING SUCH DISCREPANCIES WITHOUT A WRITTEN REPORT AND RESPONSE FROM THE ENGINEER SHALL BE DONE AT THE CONTRACTOR'S SOLE RISK AND EXPENSE.
5. CONTRACTOR SHALL NOT DISTURB OR DESTROY ANY EXISTING SURVEY MONUMENTS OR BENCHMARKS. ANY BENCHMARKS DISTURBED OR DESTROYED BY THE CONTRACTOR SHALL BE REPLACED TO THE ENGINEER'S SATISFACTION AT THE CONTRACTOR'S SOLE EXPENSE.
6. EXISTING UTILITIES ARE NOT SHOWN ON THE DRAWINGS. UTILITY LOCATION AND PROTECTION IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT TYPE, OWNER, LOCATION, AND ELEVATION OF ALL BURIED AND OVERHEAD UTILITIES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PERFORM THE WORK IN A SAFE MANNER AND IN ACCORDANCE WITH ANY REQUIREMENTS SET FORTH BY THE UTILITY OWNER AND APPLICABLE LAWS AND REGULATIONS.
7. CONTRACTOR IS ADVISED THAT NORTH ARROWS AND ORIENTATION OF PLAN VIEW SHEETS VARY TO ALLOW FOR LEFT-TO-RIGHT STATIONING AND STATIONING IN THE DIRECTION OF STREAM FLOW.
8. CONTRACTOR SHALL NOTIFY UTILITY OWNERS WITHIN THE LIMITS OF CONSTRUCTION A MINIMUM OF TWO WEEKS PRIOR TO EXCAVATION, OR OTHER CONSTRUCTION ACTIVITY THAT MAY IMPACT THE UTILITY. CONTRACTOR SHALL ALSO CONTACT METHOW SALMON RECOVERY FOUNDATION PRIOR TO ANY CONSTRUCTION ACTIVITY IN THE AREA. CONTRACTOR SHALL PROVIDE ACCESS TO UTILITY OWNERS FOR MAINTENANCE AND WORK ON THEIR UTILITIES DURING THE COURSE OF THE WORK.
9. CONTRACTOR SHALL ENSURE THAT OPERATION OF EXISTING IRRIGATION, SEWER, DRAINAGE, DOMESTIC WATER, AND OTHER UTILITY SYSTEMS ARE CONTINUOUS DURING CONSTRUCTION.
10. RELOCATIONS AND/OR REPLACEMENTS OF EXISTING UTILITIES SHALL BE COORDINATED BY THE CONTRACTOR WITH THE UTILITY OWNER. CONTRACTOR SHALL CONTACT, SCHEDULE, AND ESTABLISH UTILITY SHUT DOWN TIMES AND DETERMINE THE RELOCATION AND/OR REPLACEMENT REQUIREMENTS OF EXISTING UTILITIES PRIOR TO THE START OF ANY WORK. THE UTILITY SHALL BE RELOCATED OR REPLACED TO THE SATISFACTION OF THE UTILITY OWNER.
11. IF APPLICABLE, CONSTRUCTION EASEMENTS SHALL NOT BE USED IN ANY MANNER THAT WILL CAUSE PERMANENT DAMAGE TO THE PROPERTY. DESCRIPTIONS OF THE EASEMENTS ACQUIRED FOR THE WORK WILL BE ON FILE AT THE OFFICE OF THE OWNER. CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE EASEMENT AGREEMENTS.
12. FENCING THE WORK AREA FOR PROTECTION OF WORK AND PROPERTY AND PUBLIC SAFETY SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
13. CONTRACTOR SHALL KEEP ALL CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS AND ANY TEMPORARY CONSTRUCTION OR PERMANENT EASEMENTS OBTAINED FOR THIS PROJECT, IF APPLICABLE THIS INCLUDES, BUT IS NOT LIMITED TO, VEHICLES AND EQUIPMENT, LIMITS OF EXCAVATION, STOCKPILED EXCAVATED AND IMPORTED MATERIAL, BACKFILL MATERIAL, STREAMBED MATERIAL, AND WEIR MATERIAL. IF THE CONTRACTOR REQUIRES ADDITIONAL CONSTRUCTION EASEMENTS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN SUCH EASEMENTS FROM INDIVIDUAL PROPERTY OWNERS AND BEAR ALL ASSOCIATED COSTS.
14. UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR SPECIFICATIONS, ALL EXISTING ITEMS INCLUDING, BUT NOT LIMITED TO, STRUCTURES, IMPROVEMENTS, GROUNDWATER WELLS, SIGNS, FENCES, GATES, CURBS, PAVEMENT, BRIDGES, UTILITIES, IRRIGATION PIPELINES AND DITCHES, ETC. SHALL BE PROTECTED BY THE CONTRACTOR. IF SUCH ITEMS ARE DAMAGED OR MUST BE REMOVED OR MODIFIED TO FACILITATE CONSTRUCTION, CONTRACTOR SHALL FIRST NOTIFY THE OWNER AND THEN REPLACE THE ITEMS TO A LIKE OR BETTER CONDITION AT CONTRACTOR'S EXPENSE TO SATISFACTION OF OWNER OF FACILITIES.
15. REQUIREMENTS RELATED TO THE PROTECTION AND/OR REMOVAL OF TREES, VEGETATION, AND STRUCTURES WITHIN THE WORK AREA ARE DETAILED IN THE SPECIFICATIONS.
16. CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE TRENCH LIMITS NEEDED TO COMPLETE THE WORK IN CONFORMANCE WITH LOCAL, STATE AND FEDERAL CODES GOVERNING SHORING, SHEETING, BRACING OF EXCAVATIONS AND TRENCHES, AND FOR PROTECTION AND SAFETY OF THE WORKERS AND OTHER CONSTRUCTION RELATED PERSONNEL.
17. EXCAVATION SHALL MEET THE REQUIREMENTS OF OSHA 29 CFR PART 1926, SUBPART P, EXCAVATIONS. ACTUAL SLOPES SHALL NOT EXCEED THE MAXIMUM ALLOWABLE SLOPES (SUBPART P, APPENDIX B).
18. HORIZONTAL DATUM IS NAD83/91. HORIZONTAL COORDINATES SHOWN HEREIN ARE WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, US SURVEY FEET.
19. VERTICAL DATUM IS NAVD 88, FEET.
20. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE INDICATED.
21. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
22. THE CONTRACTOR IS RESPONSIBLE FOR PRODUCING, IMPLEMENTING, ADHERING TO, AND MAINTAINING A STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH THE REGULATIONS AND GUIDELINES SET FORTH AND SUBJECT TO APPROVAL BY THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, WATER QUALITY PROGRAM. CONTRACTOR SHALL IMPLEMENT AND DOCUMENT ANY ADDITIONAL MEASURES NECESSARY TO PREVENT ANY EROSION OR HAZARDOUS MATERIALS FROM LEAVING THE SITE, DISCHARGING, BEING ENTRAINED, ABSORBED OR OTHERWISE ENTERING SURFACE WATERS, GROUND WATER OR SOILS.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES AT ALL TIMES. MAINTENANCE OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE CONSIDERED INCIDENTAL.
24. THE CONTRACTOR SHALL BE HELD SOLELY RESPONSIBLE FOR ANY NPDES OR OTHER APPLICABLE ENVIRONMENTAL PERMIT VIOLATIONS AND FINES.

LEGEND

-  1234 EXISTING GRADE CONTOURS
-  1234 FINISH GRADE CONTOURS



N.T.S.

ABBREVIATIONS

APPROX	APPROXIMATE
CFS	CUBIC FEET PER SECOND
CONT	CONTINUOUS
CP	CONTROL POINT
CY	CUBIC YARD
E	EAST
EL	ELEVATION
EXST	EXISTING
G	GRADE
H	HORIZONTAL
HWY	HIGHWAY
L	LENGTH
LF	LINEAR FOOT
LS	LUMP SUM
MAX	MAXIMUM
MIN	MINIMUM
MSRF	METHOW SALMON RECOVERY FOUNDATION
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OG	ORDINARY GROUND
OHW	ORDINARY HIGH WATER
PT	POINT
Q	FLOW
RD	ROAD
S	SOUTH
SF	SQUARE FOOT
SPEC	SPECIFICATION
STA	STATION
SY	SQUARE YARD
TYP	TYPICAL
W	WEST
WSE	WATER SURFACE ELEVATION

DATE AND TIME PLATTED
ANY REVISIONS
CHECKED BY
CROSSCHECK

DATE CHECKED
BY
CHECKED BY
1678-100-1561

FOOT ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SWAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN

BEAVER CREEK

THROWL TRANSFER DITCH

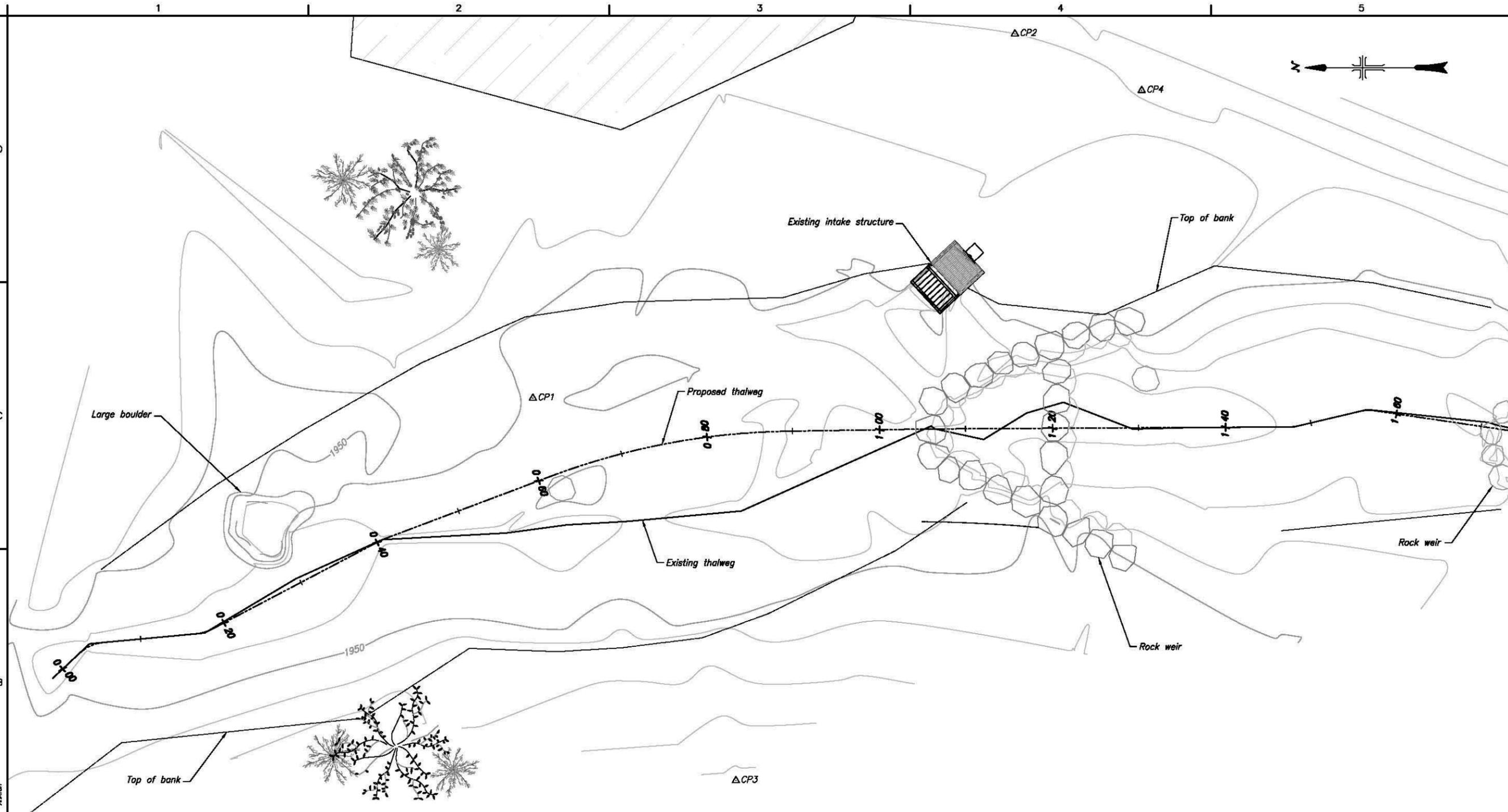
Not For Distribution

ROSS, ID 2011-1-17

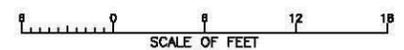
GENERAL NOTES
AND LEGEND

1678-100-1561

SHEET 3 OF 7



EXISTING SITE PLAN



CONTROL POINTS				
Point #	Description	Northing	Easting	Elevation
CP1	CAPPED REBAR	500969.87	1832776.36	1949.95
CP2	CAPPED REBAR	500914.13	1832818.37	1952.00
CP3	CAPPED REBAR	500946.40	1832732.25	1954.28
CP4	CAPPED REBAR	500899.46	1832811.85	1952.54

DATE AND TIME PLOTTED
MAY 6, 2015 10:03
PLOTTED BY
ANWICH

CAD SYSTEM
CADD 2011 10.24
CAD FILENAME
2011_SARRET.DWG

ALWAYS THINK SAFETY
 U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
 COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

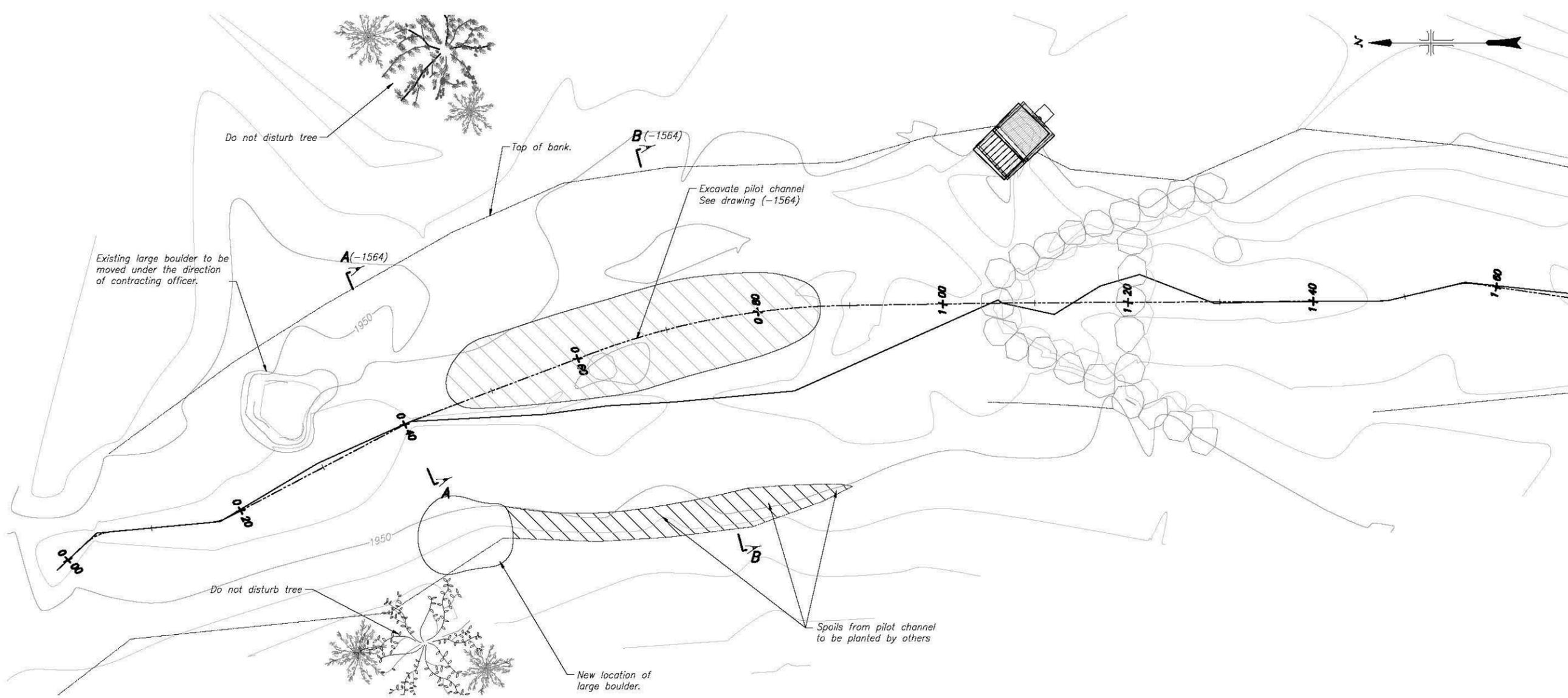
For Official Use Only
 Not For Distribution
 METHOW SUBBASIN
 BEAVER CREEK
 THURLOW TRANSFER DITCH

BOISE, ID 2011-01-17

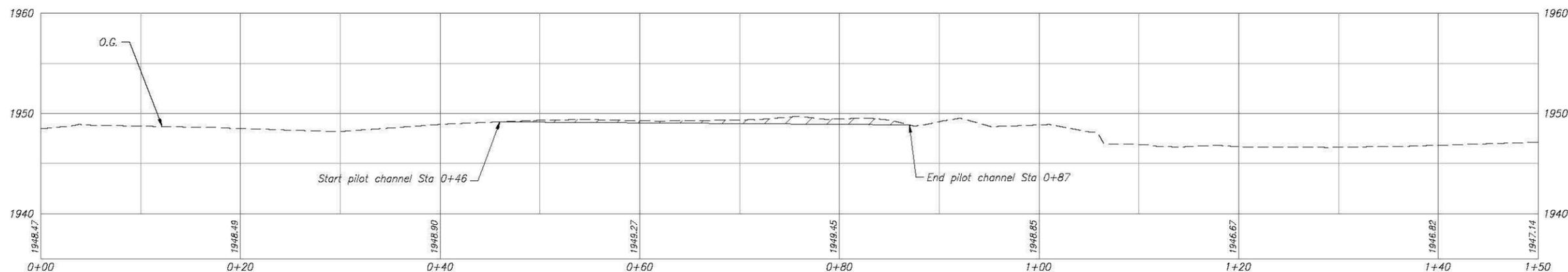
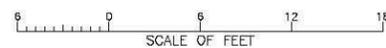
EXISTING SITE PLAN

1678-100-1562

SHEET 3 OF 7
SITE PLAN

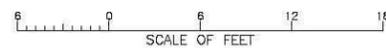


PLAN



PROFILE

STA. 0+00 TO 2+40



DATE AND TIME PLOTTED
MAY 11 2012 15:08
PLOTTED BY
AMATCH

CADD SYSTEM 18.26
CADD FILENAME
2011_SJWRETDWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
THURLOW TRANSFER DITCH

For Official Use Only
Draft
Not For Distribution

BOISE, ID 2011-01-17

CHANNEL MODIFICATION
PLAN AND PROFILE

1678-100-1563

SHEET 4 OF 7

Large boulder to be relocated.

Approximate WSE at low water

E.G.

EXISTING SECTION A-A
(N.T.S.)

F.G.

Approximate new location for Thalweg

Approximate WSE at low water

Large boulder relocated for deposition zone.

Planting to be completed by others

Spoils from pilot channel

PROPOSED SECTION A-A
(N.T.S.)

E.G.

Current thalweg

Approximate WSE at low water

EXISTING SECTION B-B
(N.T.S.)

F.G.

Approximate new location for Thalweg

Approximate WSE at low water

Planting to be completed by others

Spoils from pilot channel

PROPOSED SECTION B-B
(N.T.S.)

DATE AND TIME PLOTTED
MAY 20 2014 06:53
PLOTTED BY
CROWSTON

CAD SYSTEM
CADD 2010
CAD FILENAME
2011_SARNEY_1_1_0802.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
THURLOW TRANSFER DITCH

Not For Distribution

BOISE, ID 2011-01-17

SECTIONS

1678-100-1564

SHEET 5 OF 7

1 2 3 4 5

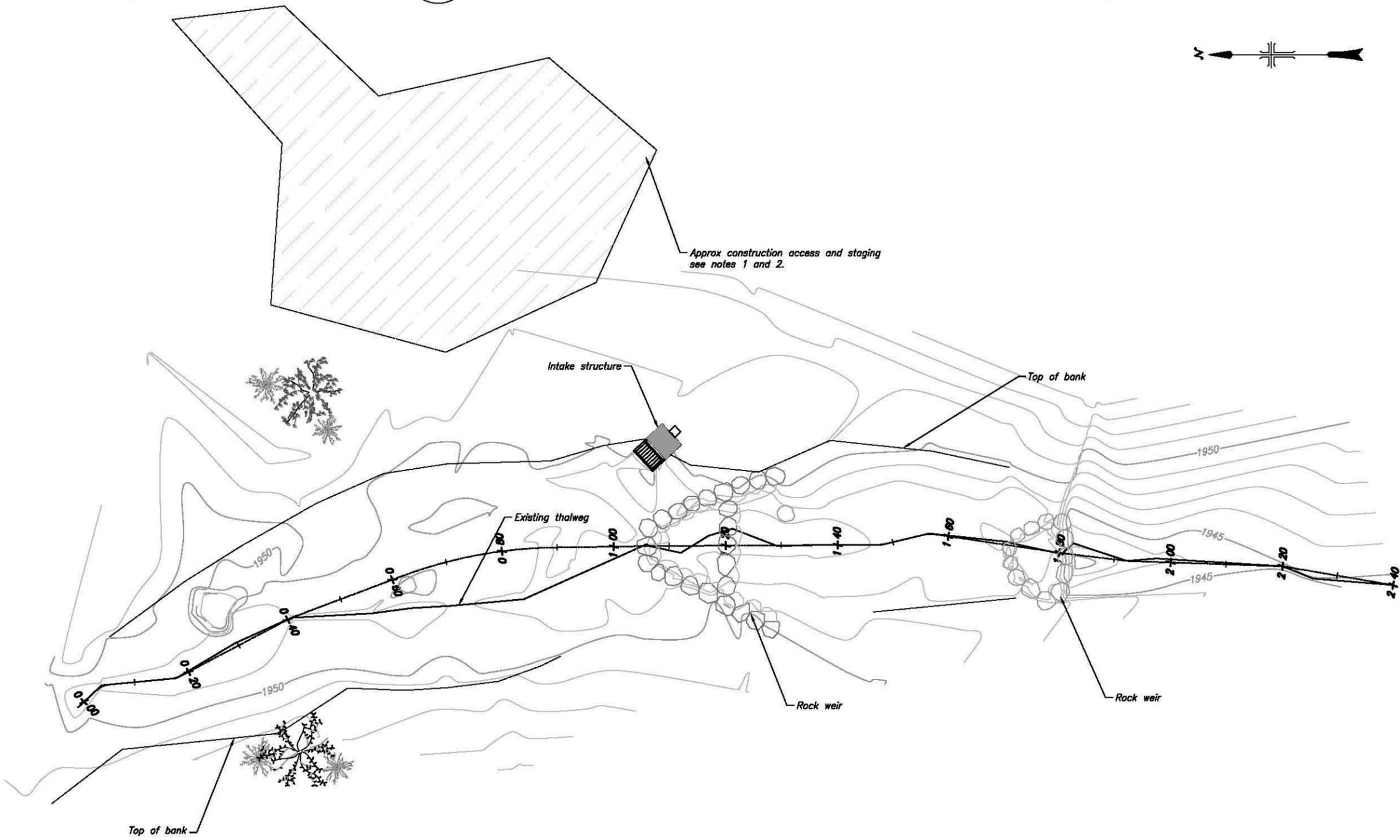


D

C

B

A

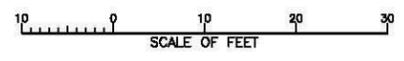


DATE AND TIME PLOTTED
MAY 20 2014 07:24
PLOTTED BY
CROWSTH

CAD SYSTEM
CADD 2010 P4
CAD PERSONNEL
2011 SHARPEZ_I_1_08062.DWG

- NOTES:
1. Access and staging to be staked and directed by contracting officer.
 2. General access is denoted on drawing 1678-100-1561.
 3. Relocation of artificially placed large boulder and partial relocation of gravel bar to be performed under the direction of contracting officer to minimize disturbance.

**ACCESS, STAGING AND
DEWATERING PLAN**



ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
FORT THURLLOW TRANSFER DITCH

ROOSE_ID 2011-01-17

ACCESS, STAGING, AND
DEWATERING PLAN

1678-100-1565

SHEET 6 OF 7
SITE PLAN

1 2 3 4 5

APPENDIX B
PERMITS AND OTHER APPLICATIONS

**State Environmental Policy Act (SEPA) WAC 197-11-340
Determination of Non-Significance (DNS)**

Project Name: "Beaver Creek Weirs Renovation Project" SEPA 2013-3

Proponent(s): Methow Salmon Recovery Foundation **Agent(s):** Chris Johnson
PO Box 755
Twisp, WA 98856

Project Summary

The Marracci diversion at river mile (RM) 6.5 and Fort Thurlow at RM 1.5 have been in use for more than fifty years. Monitoring efforts following high flow runoff in 2011 indicate that constructed weirs had sustained damage so that they no longer met NOAA Fisheries' fish passage criteria for all life states and all flows. The proposed renovations will: 1) restore fish passage in compliance with NOAA criteria for fish passage and 2) maintain intake performance agricultural use and eliminate the need for seasonal instream work by irrigators.

Location

Marracci Diversion Section 35, T34N, R22E, West Meridian, Thurlow Diversion Section 23 T33N, R22E, West Meridian, Okanogan County.

Threshold Determination

- DNS:** Okanogan County Planning & Development issued a Threshold Determination of Non-Significance in accordance with WAC 197-11-340, identifying the proposal would not have a probable, significant, and adverse environmental impact.
- MDNS:** Okanogan County Planning & Development issued a Threshold Mitigated Determination of Non-Significance in accordance with WAC 197-11-350, identifying this proposal would not have a probable, significant, and adverse environmental impact if mitigation measures are imposed.
- DS:** Okanogan County Office of Planning & Development made a Threshold Determination of Significance in accordance with WAC 197-11-360, identifying this proposal would have a probable, significant, and adverse environmental impact.

Comments must be submitted in writing to the Okanogan County Office of Planning & Development, 123 5th Ave N Ste. 130, Okanogan, WA 98840, no later than **July 10, 2013**. Failure to comment by the due date above shall be determined to deny a party standing to appeal the final determination. The date of publication in Okanogan County's legal periodical of record is June 26, 2013.

Administrative Approval

Lead Agency: Okanogan County
Responsible Official: Perry Huston
Position/Title: Director of Planning
Phone: (509) 422-7160
Address: 123 5th Avenue North, Suite 130
..... Okanogan, Washington 98840

Signature:

Perry D Huston
(Perry Huston, Director)

1 6-19-13
Date



US Army Corps
of Engineers®
Seattle District

AGENCY USE ONLY

Date received: _____

Agency reference #: _____

Tax Parcel #(s): _____

WASHINGTON STATE

Joint Aquatic Resources Permit Application (JARPA) Form^{1,2}

USE BLACK OR BLUE INK TO ENTER ANSWERS IN THE WHITE SPACES BELOW.

Part 1–Project Identification

1. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [help]
Beaver Creek Weirs Renovation Project – Marracci Diversion & Fort Thurlow Diversion

Part 2–Applicant

The person and/or organization responsible for the project. [\[help\]](#)

2a. Name (Last, First, Middle)			
Johnson, Chris			
2b. Organization (If applicable)			
Methow Salmon Recovery Foundation			
2c. Mailing Address (Street or PO Box)			
PO Box 755			
2d. City, State, Zip			
Twisp, WA, 98856			
2e. Phone (1)	2f. Phone (2)	2g. Fax	2h. E-mail
(509) 996-2787	(509) 429-1232	(509) 422-1766	chrisj@methowsalmon.org

¹Additional forms may be required for the following permits:

- If your project may qualify for Department of the Army authorization through a Regional General Permit (RGP), contact the U.S. Army Corps of Engineers for application information (206) 764-3495.
- If your project might affect species listed under the Endangered Species Act, you will need to fill out a Specific Project Information Form (SPIF) or prepare a Biological Evaluation. Forms can be found at http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=mainpage_ESA
- Not all cities and counties accept the JARPA for their local Shoreline permits. If you need a Shoreline permit, contact the appropriate city or county government to make sure they accept the JARPA.

²To access an online JARPA form with [help] screens, go to http://www.epermitting.wa.gov/site/alias_resourcecenter/jarpa_jarpa_form/9984/jarpa_form.aspx.

For other help, contact the Governor's Office of Regulatory Assistance at 1-800-917-0043 or help@ora.wa.gov.

Part 3—Authorized Agent or Contact

Person authorized to represent the applicant about the project. (Note: Authorized agent(s) must sign 11b of this application.) [\[help\]](#)

Johnson, Chris			
Methow Salmon Recovery Foundation			
PO Box 755			
Twisp, WA 98856			
(509) 996-2787	(509) 429-1232	(509) 422-1766	chrisj@methowsalmon.org

Part 4—Property Owner(s)

Contact information for people or organizations owning the property(ies) where the project will occur. Consider both **upland and aquatic** ownership because the upland owners may not own the adjacent aquatic land. [\[help\]](#)

- Same as applicant. (Skip to Part 5.)
- Repair or maintenance activities on existing rights-of-way or easements. (Skip to Part 5.)
- There are multiple upland property owners. Complete the section below and fill out [JARPA Attachment A](#) for each additional property owner.
- Your project is on Department of Natural Resources (DNR)-managed aquatic lands. If you don't know, contact the DNR at (360) 902-1100 to determine aquatic land ownership. If yes, complete [JARPA Attachment E](#) to apply for the Aquatic Use Authorization.

Marracci, Susan			
451 Balky Hill Rd			
Twisp, WA 98856			
(509) 997-4291	()	()	

Part 5–Project Location(s)

Identifying information about the property or properties where the project will occur. [\[help\]](#)

- There are multiple project locations (e.g. linear projects). Complete the section below and use [JARPA Attachment B](#) for each additional project location.

5a. Indicate the type of ownership of the property. (Check all that apply.) [help]			
<input checked="" type="checkbox"/> Private <input type="checkbox"/> Federal <input type="checkbox"/> Publicly owned (state, county, city, special districts like schools, ports, etc.) <input type="checkbox"/> Tribal <input type="checkbox"/> Department of Natural Resources (DNR) – managed aquatic lands (Complete JARPA Attachment E)			
5b. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 5p.) [help]			
West of Upper Beaver Creek Road, approximately 3.15 miles north of its intersection with State Route 20			
5c. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [help]			
Twisp, WA 98862			
5d. County [help]			
Okanogan County			
5e. Provide the section, township, and range for the project location. [help]			
¼ Section	Section	Township	Range
SE	35	34N	22E
5f. Provide the latitude and longitude of the project location. [help]			
<ul style="list-style-type: none"> Example: 47.03922 N lat. / -122.89142 W long. (Use decimal degrees - NAD 83) 			
48.40164 N lat/-120.04160 W long			
5g. List the tax parcel number(s) for the project location. [help]			
<ul style="list-style-type: none"> The local county assessor's office can provide this information. 			
3422350029			
5h. Contact information for all adjoining property owners. (If you need more space, use JARPA Attachment C.) [help]			
Name	Mailing Address	Tax Parcel # (if known)	
ACORD, TROY	420 BALKY HILL RD	3322020021	
	TWISP, WA 98856		
ANDERSON, RICHARD	21916 W LOST LK RD	3422350005	
	SNOHOMISH, WA 98296		
HOKSBERGEN, GEORGE & CANDY	448 BALKY HILL RD	3322020029	
	TWISP, WA 98856		
SEE ATTACHMENT C			

5i. List all wetlands on or adjacent to the project location. [help]
There are no wetlands on or adjacent to the project location.
5j. List all waterbodies (other than wetlands) on or adjacent to the project location. [help]
Beaver Creek
5k. Is any part of the project area within a 100-year floodplain? [help]
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Don't know Beaver Creek is not mapped for the 100-year floodplain in the project areas; however, all project areas are within and adjacent to the creek.
5l. Briefly describe the vegetation and habitat conditions on the property. [help]
This project includes areas within Beaver Creek, adjacent deciduous riparian forest, and vegetated uplands. Portions of the project areas were previously disturbed during initial weir construction during and were successfully re-vegetated with a mixture of grass, forb, and shrub species. Beaver Creek is a small snowmelt-fed stream, which provides spawning, rearing, and migration habitat for steelhead, bull trout, spring Chinook salmon, and other fish species. Marracci Diversion: The diversion is located on the right bank of Beaver Creek, where there is a narrow riparian band that quickly leads to shrub-steppe upland hillside. On the left bank, there is a wide riparian zone that extends up and downstream. There is riparian canopy cover providing shade in the project area. For the Fort Thurlow Diversion, see Attachment B.
5m. Describe how the property is currently used. [help]
Marracci Diversion: The property surrounding the immediate area where the project will occur is currently used for agricultural purposes and for recreation. An irrigation diversion (Marracci) diverts flow from Beaver Creek to serve the properties in the project area for agriculture. For the Fort Thurlow Diversion, see Attachment B.
5n. Describe how the adjacent properties are currently used. [help]
Land uses in the surrounding area consist of primarily of agricultural (including hay production and livestock range operations) and rural residential.
5o. Describe the structures (above and below ground) on the property, including their purpose(s) and current condition. [help]
The project is related to two irrigation diversions (Marracci and Fort Thurlow) and associated canals that supply water for agricultural use to properties both inside and outside the project area. Additional structures on the properties include single-family residences with associated domestic ground water wells and appurtenances, and utilities to serve the wells and surrounding uses. Barns and outbuildings are used for livestock and farming operations. These structures will not be impacted by the project.
5p. Provide driving directions from the closest highway to the project location, and attach a map. [help]
Marracci Diversion: From Twisp, travel southeast on SR-20 approximately 5 miles, then turn left (north) onto Upper Beaver Creek Road (County Road 1637) and travel approximately 3.15 miles to an unimproved road on the left. The project site is along the creek at the end of the unimproved road. See Marracci Diversion Drawings - Sheet 1 of 7 (1678-100-1553; Location Map) for a map. For the Fort Thurlow Diversion, see Attachment B

Part 6–Project Description

6a. Briefly summarize the overall project. You can provide more detail in 6b. [\[help\]](#)

Methow Salmon Recovery Foundation (MSRF) proposes to renovate two existing rock weir irrigation diversion complexes in Beaver Creek, a tributary of the Methow River, Okanogan County, WA.

The two irrigation diversions are the Marracci diversion at RM 6.5 and the Fort Thurlow diversion at river mile (RM) 1.5. Both diversions were previously modified with a goal of providing fish passage while maintaining irrigation diversions. The diversions were modified between 2003 and 2005 to include a series of rock vortex weirs designed to improve fish passage. These weir complexes provided a series of drops (each no more than 0.8 ft) to improve fish passage while maintaining adequate water diversion to irrigators and to reduce instream impacts of annual weir construction.

Subsequent monitoring following an unusually high flow spring runoff event in 2011 indicated that a number of the weirs had sustained damage to the point that they no longer met NOAA Fisheries' fish passage criteria for all life stages and all flows. Bureau of Reclamation (Reclamation) engineers reviewed the data and determined that although the weirs had functioned well for several years prior to flood damage, a revised structural design to maintain fish passage at all flows over a longer term was indicated. Reclamation developed revised designs for the affected diversions to address the damage and improve long-term function. These proposed renovations will: 1) restore fish passage in compliance with NOAA criteria for fish passage (0.8 ft. maximum drop) and 2) optimize intake performance for agricultural use, thereby eliminating the need for seasonal instream actions by irrigators, which could hinder fish passage.

Marracci Diversion:

The existing rock weir diversion was constructed in 2005 to provide fish passage. High flows in 2006 displaced two rocks in the weir crest, scoured out and lowered the downstream pool, and eroded the right bank upstream of the diversion. This damage was repaired during low flows in 2006. To prevent head cutting and continued scour in the pool below the weir rocks in the weir crest, another line of large boulders were placed during repairs at the start of the pool tail-out riffle. Extended high flows in 2011 moved several of the large boulders composing the weir and damaged the trash rack. As a result, fish passage is poor and water surface elevation at the diversion intake is too low. A revised design was selected by MSRF and Reclamation to reconstruct the existing weir with a more natural roughened channel structure. This proposed renovation will: 1) restore fish passage in compliance with NOAA criteria for fish passage and 2) optimize intake performance for agricultural use, thereby reducing the need for seasonal instream actions by irrigators, which could hinder fish passage.

Fort Thurlow Diversion:

The existing concrete dam was modified between 2003 and 2005 to include a series of four rock vortex weirs designed to improve fish passage. This weir complex provided a series of drops (each no more than 0.8 ft) for fish passage over the original 5.5 ft-high concrete irrigation diversion dam to improve fish passage while maintaining adequate water diversion to irrigators and to reduce instream impacts of annual weir construction/modification. Subsequent monitoring indicated that the new weirs had sustained damage to the point that they no longer met NOAA Fisheries fish passage criteria for all life stages and all flows. Reclamation engineers determined that although the weir complex had functioned well for several years prior to flood damage, a revised structural design to maintain fish passage at all flows over a longer term was indicated. A revised design was selected by MSRF and Reclamation to reconstruct the drop weirs with a more natural roughened channel structure. This proposed renovation will: 1) restore fish passage in compliance with NOAA's fish passage criteria and 2) optimize intake performance for agricultural use, thereby significantly reducing the need for seasonal instream actions by irrigators, which could hinder fish passage.

The purpose of the project is to restore fish passage at two irrigation diversions on Beaver Creek. Unusually high and sustained spring peak flows in Beaver Creek in 2011 resulted in failure of several of the constructed weirs. Estimates place the flow above a 20-year event (approximately 850 cfs, with the creek above bank full for 6 weeks). The damage sustained by the weir complexes compromised their function and impeded fish passage through increased drops.

Marracci Diversion:

A Reclamation site visit on July 12, 2011 and subsequent topographic survey of the area on July 13, 2011 noted that several boulders from the weir tipped into the scour pool, a large log was located on the river left arm of the weir, and the trash rack was severely damaged. The movement of the weir rocks lowered the water surface elevation at the diversion intake substantially. Failure to address these problems will likely result in further degradation, resulting in increased drop height and decreased diversion for irrigation.

Fort Thurlow Diversion:

A Reclamation topographic survey of the area on Aug. 16, 2011 noted that several boulders from the upstream weirs had moved downstream, compromising the structures. The two upper weirs were undermined, resulting in a combined 2 ft. drop between the damaged weirs, which is well outside of fish passage criteria. Also, the displaced boulders compromise the integrity of the structures, increasing the potential of additional boulders mobilizing downstream. Failure to address these problems will likely result in further degradation, resulting in increased drop heights between structures and decreased diversion for irrigation.

- Commercial
 Residential
 Institutional
 Transportation
 Recreational
 Maintenance
 Environmental Enhancement

<input type="checkbox"/> Aquaculture	<input type="checkbox"/> Culvert	<input type="checkbox"/> Float	<input type="checkbox"/> Retaining Wall (upland)
<input type="checkbox"/> Bank Stabilization	<input type="checkbox"/> Dam / Weir	<input type="checkbox"/> Floating Home	<input type="checkbox"/> Road
<input type="checkbox"/> Boat House	<input type="checkbox"/> Dike / Levee / Jetty	<input type="checkbox"/> Geotechnical Survey	<input type="checkbox"/> Scientific Measurement Device
<input type="checkbox"/> Boat Launch	<input type="checkbox"/> Ditch	<input type="checkbox"/> Land Clearing	<input type="checkbox"/> Stairs
<input type="checkbox"/> Boat Lift	<input type="checkbox"/> Dock / Pier	<input type="checkbox"/> Marina / Moorage	<input type="checkbox"/> Stormwater facility
<input type="checkbox"/> Bridge	<input type="checkbox"/> Dredging	<input type="checkbox"/> Mining	<input type="checkbox"/> Swimming Pool
<input type="checkbox"/> Bulkhead	<input type="checkbox"/> Fence	<input type="checkbox"/> Outfall Structure	<input type="checkbox"/> Utility Line
<input type="checkbox"/> Buoy	<input type="checkbox"/> Ferry Terminal	<input type="checkbox"/> Piling/Dolphin	
<input checked="" type="checkbox"/> Channel Modification	<input type="checkbox"/> Fishway	<input type="checkbox"/> Raft	
<input type="checkbox"/> Other:			

6e. Describe how you plan to construct each project element checked in 6d. Include specific construction methods and equipment to be used. [\[help\]](#)

- Identify where each element will occur in relation to the nearest waterbody.
- Indicate which activities are within the 100-year floodplain.

Beaver Creek is not mapped for the 100-year floodplain in the project areas. The proposed Beaver Creek Weir Renovation Project is located within both the active channel and the estimated 100-year floodplain of Beaver Creek. Project construction on the Marracci diversion will occur in early- to late-October, outside of the irrigation season & during minimal flow conditions to minimize impact to the aquatic environment and surrounding riparian. Project construction on the Fort Thurlow diversion will occur in early- to late-September during minimal flow conditions to minimize impact to the aquatic environment and surrounding riparian. Construction will take place during the irrigation season to allow diverted water to be routed down the irrigation canal until it is below the project area, where it will be routed back to the creek channel through the existing fish bypass. The areas at both Marracci and Fort Thurlow were previously disturbed during initial construction of the projects in 2003 and 2005. Construction at each diversion will take a total of approximately 2-3 weeks to complete.

Marracci Diversion:

Site Access:

Project access will be provided via an existing gravel driveway off of Upper Beaver Creek Road, as shown on Marracci Diversion Drawings - Sheet 6 of 7 (1678-100-1558; Access Staging and Dewatering Plan).

Construction Elements:

NOTE: This section includes brief descriptions of the recommended work area isolation and water control procedures for the project. A recommended dewatering plan is shown on Marracci Diversion Drawings - Sheet 6 of 7 (1678-100-1558; Access Staging and Dewatering Plan). However, the contractor will be responsible for developing the final water control and work area isolation plan. In the event that the contractor's plan deviates significantly from the recommended dewatering plan, the contractor will be required to seek approval from the permitting agencies prior to construction.

Cofferdam Construction:

Two cofferdams will be required to isolate the work area from the active flow of the creek. The upstream dam will be located immediately upstream of the existing intake structure. The lower structure will be constructed immediately downstream of the work site. Marracci Diversion Drawings - Sheet 6 of 7 (1678-100-1558; Access Staging and Dewatering Plan) shows the conceptual plan for cofferdam placement. It is anticipated that the placement of the cofferdam materials would be conducted by hand. The cofferdam structures will likely be formed by clean washed gravel-filled bags (gravel bags) with a synthetic membrane such as PVC or HDPE (plastic sheeting) placed on the outside of the gravel bags, then folded over the top of the gravel bags and secured on both inside and outside of the cofferdam to reduce seepage into the work area. The footprint of the cofferdams would be as small as possible to accommodate proposed work while minimizing impact to river substrate. The flows at the time of project construction in early fall are expected to be near base flow levels of approximately 7 cfs. All flow will be routed through a 30" HDPE bypass pipe, around the project site, and back into the stream immediately below the project site. As such, the site will be fully dewatered.

Dewatering, Fish Handling and Salvage:

Gravel bags will be placed on the existing dam structure and left overnight to gradually reduce stream flow to the project site and to encourage fish to leave the area on their own prior to defishing activities. When this cofferdam is placed, a bypass pipe will be placed to divert upstream water around the project site. A fish salvage crew will be on hand in case flow shuts down more quickly than expected. Fish handling and salvage will be conducted by professionally qualified and experienced fisheries biologists and technicians. To reduce impacts to ESA-listed salmonid species, fish removal will be completed for the entire length of the project site prior to any construction activities. Once the project site is isolated at the upstream end and flows have been reduced, the fish salvage crew will make one downstream pass with the electro-fisher. The downstream end of the site will then be netted off to prevent fish from reentering the area. . Once the project site is isolated, qualified fish biologists will begin to remove any remaining fish using approved methods according to the terms of the

Dewatering and Fish Capture Protocol given in Appendix A of the 2008 U.S. Army Corps of Engineers' Restoration Programmatic for the State of Washington. The project site is not conducive to using seines to salvage fish because of the large rocks in the channel. De-fishing may be coordinated with the USGS so the captured fish can be measured and tagged as part of their on-going monitoring effort in the Methow watershed; de-fishing will not increase the number of fish they handle under their permit. If the de-fishing is coordinated with the USGS, tagging would be done under their existing research permits. Once the de-fishing is largely complete, the upstream and downstream cofferdams will be completed. It is anticipated that dewatering will occur over a period of 2 days; the site will remain dewatered for approximately 2-3 weeks. About 100 feet of channel will be dewatered.

Isolation of Work Area and Sediment Control:

Water will be removed from between the cofferdams using trash pumps to prevent sediment-laden water from entering Beaver Creek. The dewatering system will discharge into a remnant channel on the left bank. Any sediment release into Beaver Creek from the dewatered construction area is anticipated to be minimal. The contractor shall divert runoff water to prevent erosion at all sites affected by the work operations. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. The sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment will be stored along the access and staging area more than 150 ft away from Beaver Creek. Following completion of renovations, all construction materials within the cofferdams will be removed to the extent practical prior to cofferdam removal. Individual gravel bags comprising the cofferdam will be pulled incrementally to prevent a large pulse of sediment during removal. Downstream turbidity is expected to be visible on two different days—one at the beginning of the construction during cofferdam installation, and one at the end of construction during cofferdam removal, while flows are first allowed through the roughened channel. These turbidity events are expected to be light to moderate turbidity visible for less than 500 feet downstream for a short period (less than an hour) when cofferdams are placed and removed, and flows are reintroduced in the new roughened channel. The contractor will be responsible for monitoring downstream sedimentation every 20 minutes during these periods. All areas of construction that do not extend down to the creek surface ordinary high water level will have silt fencing between the construction area and the river.

Adjustment of trash rack and intake location

The existing trash rack and intake will be moved into the bank approximately 8 feet to bring it flush with the bank in order to reduce the possibility that it will be impacted by debris flowing down stream. In addition, the structure will be rotated so that it will be facing perpendicular to the flow. Relocation of the intake structure will require 2 cy of excavation and 1-2 cf of footing prep/bedding material. See Sheet 1678-100-1559 for more details of the intake structure.

Installation of downstream sill

A grade control sill will be installed at the downstream extent of the project. The intent of this feature is to mitigate any downcutting of the rock ramp or headcutting of the channel from below the rock ramp. The sill will be composed of 2 stacked rows of ~3' angular rock installed at grade. The sill will be keyed into the bank a minimum of 3'. Construction of the sill will require 12 cy of excavation, and an equal volume of rocks. See sheet 1678-100-1557 for more details of the sill.

Replacement of weir

The failed weir crest will be replaced with a perpendicular sill in order to maintain the water surface elevation required for the irrigation diversion. This will consist of placing angular rocks to recreate the original crest elevation. Reconstruction of the weir crest will require approximately 10 cy of excavation and an equivalent volume of 3' rocks.

Construction of rock ramp

A rock ramp will be constructed between the grade control sills. This will add stability to the weir structure while still maintaining fish passage. The existing scour hole will be filled in order to spread out the flow of water to more accurately mimic the natural geometry of Beaver Creek. As this will increase the tractive forces on the toes of the bank through the project site, a combination of rock and bioengineering techniques will be applied to the toes. The scour holes will be filled with an engineered streambed material. The engineered streambed material will consist of 40 cubic yards of material. The engineered streambed material will be placed by an

excavator, bucket compacted, and then to ensure that the flow stays on the surface, will be jetted in using a small trash pump that recycles water from a sump dug within the dewatered area. In addition to the engineered streambed material, larger boulders around 2-3' in diameter will be placed, and countersunk, to add roughness and pockets of slower water to aid in fish passage. See sheet 1678-100-1557 for typical detail.

Site Restoration and Revegetation:

Rehabilitation goals for the projects include minimizing soil disturbance, replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds. Protection of aquatic habitat will be accomplished if these goals are met. The negative effects of project construction on local plant, fish, and wildlife habitat are expected to be temporary. Ground disturbance activities will be limited to the staging areas, access routes, and construction sites.

Staging, Fueling, Stockpiling, and Demobilization:

Landowner agreements will be in place prior to construction. Following construction, the contractor will remove all equipment and material from the staging area and restore the area to pre-project conditions. If revegetation is required, the contractor will leave the site in a condition suitable for replanting.

Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located a minimum of 150 feet from Beaver Creek or other flowing stream or water body. Fueling and overnight parking for vehicles will be available on Upper Beaver Creek Road. See Marracci Diversion Drawings - Sheet 6 of 7 (1678-100-1558; Access Staging and Dewatering Plan), for more details. Fueling, other than occasional hand fueling of small tools, will be allowed only on Upper Beaver Creek road, which is more than 150 feet from live flows. The Contracting Officer will inspect and approve the fueling area by prior to its use. No fuel will be stored onsite for use by heavy equipment. Trucks will haul fuel to the approved site as needed for fueling heavy equipment. Five to 10 gallons of fuel in approved containers may be kept at the fueling area in an approved containment vessel for use with hand-held power tools and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. No other fueling sites will be allowed.

Equipment to be used or stored onsite may include an excavator, backhoe, dozer, 10-cy dump trucks, and small tools. Additional equipment may be required as determined by the contractor. This equipment, of an adequate size to move and place the materials necessary for construction, will minimally affect the existing terrain while moving around the site. Equipment operating with hydraulic fluid and used for this project will use only those fluids certified as nontoxic to aquatic organisms while working in or around the stream. Equipment used for this project shall be free of external petroleum-based products. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of the Beaver Creek or any adjacent water body. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities. No special or high-cost equipment will be purchased with project funds.

All stationary power equipment such as generators operated within 150 feet of any water body shall be diapered to prevent leaks unless suitable containment is provided to prevent potential spills from entering the water. Materials to be stored onsite will include engineered streambed material, large rock, and 30" HDPE pipe sections. All excess materials not used on the job will be removed within 10 days of completion of the project. Non-native waste materials not reused in construction or reclaimed by the Project Sponsor will be removed by the contractor to a disposal site in accordance with State regulations.

Area Disturbed:

The footprint of the proposed construction work would extend from the existing intake to the proposed grade control sill. The construction total area that would be disturbed is approximated to be 0.4 acres. The staging area location has not been confirmed yet, but we anticipate that the staging area will be approximately 120 ft by 40 ft. An area near the site, adjacent to the road, is a possible location.

Fort Thurlow Diversion:

Site Access:

Project access will be provided along an existing road from the Tice Ranch. The area along Lower Beaver Creek Road may be used for parking passenger vehicles.

Construction Elements:

NOTE: This section includes brief descriptions of the recommended work area isolation and water control procedures for the project. A recommended dewatering plan is shown on Fort-Thurlow Adaptive Management Project Drawings – Sheet 4 (1678-100-1549, Access, Staging, and Dewatering Plan). However, the contractor will be responsible for developing the final water control and work area isolation plan. In the event that the contractor's plan deviates significantly from the recommended dewatering plan, the contractor will be required to seek approval from the permitting agencies prior to construction.

Cofferdam Construction:

Two cofferdams will be required to isolate the work area from the active flow of the creek. The upstream cofferdam will be located directly on the existing dam structure. The lower cofferdam will be constructed immediately upstream of the fish return and sluice (Figure 4). It is anticipated that each of these cofferdams will be formed by clean washed gravel-filled bags (gravel bags) with plastic sheeting placed on the outside of the gravel bags, folded over the top, then secured on both sides of the cofferdam to reduce seepage into the work area. Placement of cofferdam materials could be constructed by hand or with the assistance of a machine working from the bank; the footprint of the cofferdams will be as small as possible to accommodate proposed work while minimizing impact to river substrate. The flows at the time of project construction in late fall are expected to be near base flow levels of approximately 5-10 cfs at Fort-Thurlow. All surface flow will be routed through the existing irrigation diversion, around the project site, and back into the stream immediately below the project site. As such, the site will be fully dewatered of surface flows.

Dewatering, Fish Handling and Salvage:

NOTE: Throughout dewatering, de-fishing, and construction, flows will be routed through the existing irrigation fish bypass. Downstream fish passage will be available through the bypass; upstream passage at the diversion is not available under current low-flow conditions and will not be restored until construction is complete.

Gravel bags will be placed on the existing dam structure and left overnight to gradually reduce stream flow to the project site and to encourage fish to leave the area on their own prior to de-fishing activities. A fish salvage crew will be on hand in case flow shuts down more quickly than expected. Fish handling and salvage will be conducted by professionally qualified and experienced fisheries biologists and technicians. To reduce impacts to ESA-listed species, fish removal will be completed for the entire length of the project site prior to any construction activities. Once the project site is isolated at the upstream end and flows have been reduced, the fish salvage crew will make one downstream pass with the electro-fisher. The downstream end of the project site will then be netted off to prevent fish from re-entering the project site. Once the project site is isolated, qualified fish biologists will begin to remove any remaining fish using approved methods according to the terms of the Dewatering and Fish Capture Protocol given in Appendix A of the 2008 U.S. Army Corps of Engineers' Restoration Programmatic for the State of Washington. The project site is not conducive to using seines to salvage fish because of the large rocks in the channel. De-fishing may be coordinated with the USGS so the captured fish can be measured and tagged as part of their on-going monitoring effort in the Methow watershed; de-fishing will not increase the number of fish they handle under their permit. If the de-fishing is coordinated with the USGS, tagging would be done under their existing research permits. Once the de-fishing is largely complete, the upstream and downstream cofferdams will be completed. It is anticipated that dewatering will occur over a period of 2 days; the site will remain dewatered for approximately 2-3 weeks. About 120 feet of channel will be dewatered.

Isolation of Work Area and Sediment Control:

Water will be removed from between the cofferdams using trash pumps to prevent sediment-laden water from entering Beaver Creek. Use of the existing concrete dam as the coffer base will ensure that very little water will re-enter the project site. The dewatering system will discharge into a settling area and/or filtering system on the adjacent bank. Any sediment release into Beaver Creek from the dewatered construction area is anticipated to

be minimal. The contractor shall divert runoff water to prevent erosion at the site. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. The sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment will be stored along the access and staging area more than 150 ft away from Beaver Creek. Materials will be staged in the upland staging area adjacent to the work site. Following completion of renovations, all construction materials within the cofferdams will be removed to the extent practical prior to cofferdam removal. Individual gravel bags comprising the cofferdam will be pulled incrementally to prevent a large pulse of sediment during removal. Any release of fines washed from the new rock ramp will be minimized by this incremental, gradual reintroduction of water to the dewatered site, and will be of short duration. Downstream turbidity is expected to be visible on two different days—one at the beginning of the construction during cofferdam installation, and one at the end of construction during cofferdam removal, while flows are first allowed through the roughened channel. These turbidity events are expected to be light to moderate turbidity visible for less than 500 feet downstream for a short period (less than an hour) when cofferdams are placed and removed, and flows are reintroduced in the new roughened channel. The contractor will be responsible for monitoring downstream sedimentation every 20 minutes during these periods.

Partially deconstruct rock weirs

The three existing A-weirs will be partially deconstructed, with only their footer boulders remaining. Approximately 60-70 cy of excavated material will be generated, which will be reused for construction of the rock ramp and channel roughening. Large boulders exceeding 2 ft diameter will be used to construct the rock sills and provide stability to the toes of the bank. Smaller material will be used if it meets the gradation requirements of Engineered Streambed Material (ESM) for filling scour holes and roughening of the channel.

Construction of rock ramp and roughening

A rock ramp will be constructed between the existing concrete dam and the downstream-most weir crest. This will add stability to the project reach while maintaining fish passage. Three rock sills will be constructed as shown in Drawings 5-7. The uppermost sill is intended to backwater the existing concrete dam crest, facilitating fish passage at low flow. The middle and lower sills are intended to provide structural stability to the rock ramp. The middle sill has a rock barb built into the sill on the left bank to dissipate energy. The lower sill will be incorporated into the lower-most weir and will act as grade control while providing for a resting scour pool at the bottom of the ramp. The scour holes corresponding to the partially deconstructed A-weirs will be filled in order to spread out the flow of water to more accurately mimic the natural geometry of Beaver Creek. The scour holes will be filled and the rock ramp constructed of approximately 60 cy of engineered streambed material (including material excavated during weir dismantling) mixed from gradations of round and angular rock. No grout or other synthetic materials will be used. The engineered streambed material will be placed by an excavator bucket and compacted. A small trash pump that recycles water from a sump dug within the dewatered area will be employed to drive sediment into the bed to create a seal. This installation procedure will ensure that stream flow stays on the surface of the rock ramp. In addition to the engineered streambed material, approximately 60 angular boulders of ~2-4 ft. diameter will be placed and countersunk to add roughness and pockets of slower water to aid in fish passage. Total area expected to be impacted during repairs will be approximately 0.2 acres.

Site Restoration and Revegetation:

Rehabilitation goals for the projects include minimizing soil disturbance, replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds. Protection of aquatic habitat will be accomplished if these goals are met. The negative effects of project construction on local plant, fish, and wildlife habitat are expected to be temporary. Ground disturbance activities will be limited to the staging areas, access routes, and construction sites.

Staging, Fueling, Stockpiling, and Demobilization:

Landowner agreements for use of staging and stockpiling areas will be in place prior to construction. Following construction, the contractor will remove all equipment and material from the staging area and restore the area to pre-project conditions. Where re-vegetation is required, the contractor will leave the site in a condition suitable for replanting. Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located a minimum of 150 feet from Beaver Creek or other flowing stream or water body. The Contracting Officer will inspect and approve the fueling area prior to use. No fuel will be stored onsite for use by heavy equipment; trucks will haul fuel to the approved site when required. Five to 10 gallons of fuel in approved containers may be kept at the

fueling area in an approved containment vessel for use with hand-held power tools and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. No other fueling sites will be allowed.

Area Disturbed:

The approximate footprint of the proposed construction work will extend from the existing dam structure to the downstream grade control sill. Total disturbed area (including staging area) will be approximately 0.2 acres.

All Project Locations

Equipment and Materials:

Equipment to be used or stored onsite may include an excavator, backhoe, dozer, 10-cy dump trucks, and small tools. Additional equipment may be required as determined by the contractor. All hydraulic fluid used by equipment operating in or near the stream will be certified as nontoxic to aquatic organisms; equipment shall be free of external petroleum-based products. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of Beaver Creek or any adjacent water body. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities. All stationary power equipment such as generators operated within 150 feet of any water body shall be diapered to prevent leaks, unless suitable containment is provided to prevent potential spills from entering the water. Materials to be stored onsite will include engineered streambed material, large rock, sediment fencing, straw bales, and native plants for vegetation treatments. All excess materials not used on the job will be removed within 10 days of completion of the project. Non-native waste materials not reused in construction or reclaimed by the Project Sponsor will be removed by the contractor to a disposal site in accordance with State regulations.

In the Event of High Flow Conditions:

If a high-water-level event occurs during construction that threatens to overtop the project site, work in the area will be suspended until the high water recedes. The contractor will remove all motorized equipment and most tools before leaving the site so that any inundation in the contractor's absence will not pollute the stream. The contractor will be required by Contract to monitor weather and river forecasts and evacuate the site in a timely manner if flows are predicted to affect the project area. If a high water event occurs that leads to site inundation, the project sponsor will again arrange for qualified biologists to remove fish from the work area behind the cofferdams after high water recedes. The area will then be dewatered as needed to resume construction.

Adaptive Management and Effectiveness Monitoring:

Adaptive management is proposed to include annual effectiveness monitoring for three subsequent years to check conditions at each site and to confirm re-vegetation success. Survey cross sections of the creek will continue at least once per year during this period to track changes over time. Adaptive work in the creek may be required if problems develop or if conditions change to reduce the operational performance of the structures. Contact with resource agencies would be made prior to any in-water adaptive management efforts.

Marracci Diversion:

Start date: No earlier than September 1, 2013

End date: No later than November 30, 2013 See JARPA Attachment D

Start date will be dependent on irrigation shut-off; actual construction expected to take 2-3 weeks

Fort Thurlow Diversion:

Start date: No earlier than September 1, 2013

End date: No later than November 30, 2013 See JARPA Attachment D

Start date will be dependent on creek flows and irrigation; actual construction expected to take 2-3 weeks

\$100,000

Yes No Don't know

The project is funded by the Bureau of Reclamation

Part 7–Wetlands: Impacts and Mitigation

Check here if there are wetlands or wetland buffers on or adjacent to the project area.
(If there are none, skip to Part 8.) [\[help\]](#)

Not applicable

Yes No Don't know

Yes No Don't know

Yes No

Yes No Don't know

Yes No Not applicable

No wetlands are present within or adjacent to the project areas

7g. Summarize what the mitigation plan is meant to accomplish, and describe how a watershed approach was used to design the plan. [\[help\]](#)

N/A

7h. Use the table below to list the type and rating of each wetland impacted, the extent and duration of the impact, and the type and amount of mitigation proposed. Or if you are submitting a mitigation plan with a similar table, you can state (below) where we can find this information in the plan. [\[help\]](#)

Activity (fill, drain, excavate, flood, etc.)	Wetland Name ¹	Wetland type and rating category ²	Impact area (sq. ft. or Acres)	Duration of impact ³	Proposed mitigation type ⁴	Wetland mitigation area (sq. ft. or acres)
N/A						

¹ If no official name for the wetland exists, create a unique name (such as "Wetland 1"). The name should be consistent with other project documents, such as a wetland delineation report.

² Ecology wetland category based on current Western Washington or Eastern Washington Wetland Rating System. Provide the wetland rating forms with the JARPA package.

³ Indicate the days, months or years the wetland will be measurably impacted by the activity. Enter "permanent" if applicable.

⁴ Creation (C), Re-establishment/Rehabilitation (R), Enhancement (E), Preservation (P), Mitigation Bank/In-lieu fee (B)

Page number(s) for similar information in the mitigation plan, if available: NA

7i. For all filling activities identified in 7h, describe the source and nature of the fill material, the amount in cubic yards that will be used, and how and where it will be placed into the wetland. [\[help\]](#)

N/A

7j. For all excavating activities identified in 7h, describe the excavation method, type and amount of material in cubic yards you will remove, and where the material will be disposed. [\[help\]](#)

N/A

Part 8—Waterbodies (other than wetlands): Impacts and Mitigation

In Part 8, “waterbodies” refers to non-wetland waterbodies. (See Part 7 for information related to wetlands.) [\[help\]](#)

Check here if there are waterbodies on or adjacent to the project area. (If there are none, skip to Part 9.)

8a. Describe how the project is designed to avoid and minimize adverse impacts to the aquatic environment.

[\[help\]](#)

Not applicable

The completed project is designed to restore fish passage over two existing irrigation diversion dams where fish passage has been compromised by past high water impacts. No long-term adverse impacts to the aquatic environment are expected from the project, and construction details have been specifically developed to avoid and minimize temporary impacts.

The project will be constructed between September and November during low flow conditions to minimize impacts to the stream. The contractor(s) will be required to implement best management practices for surface erosion control and water control to minimize negative impacts to the aquatic environment. Vehicle staging and fueling will be located 150 feet or more away from any water bodies, and spill containment measures for all equipment used will be implemented. No fuel will be stored onsite for use by heavy equipment; however, 5 to 10 gallons of fuel in approved containers will be available onsite for use with handheld power tools, dewater pumps, generators, and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. Any fuel cans stored onsite will be required to be maintained in an approved containment area. No other fueling sites will be allowed. Equipment operating with hydraulic fluid and used for this project will use only those fluids certified as nontoxic to aquatic organisms while working in or around the stream. Equipment used for this project shall be free of external petroleum-based products. All disturbed areas will be revegetated to existing standards or better. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing and/or straw bales will be utilized along the shoreline in the work areas to control sediment releases into the water as needed

8b. Will your project impact a waterbody or the area around a waterbody? [\[help\]](#)

Yes No

8c. Have you prepared a mitigation plan to compensate for the project’s adverse impacts to non-wetland waterbodies? [\[help\]](#)

- If Yes, submit the plan with the JARPA package and answer 8d.
- If No, or Not applicable, explain below why a mitigation plan should not be required.

Yes No Not applicable

The purpose of this project is to restore fish passage in this section of Beaver Creek, and it is therefore self-mitigating.

8d. Summarize what the mitigation plan is meant to accomplish. Describe how a watershed approach was used to design the plan.

- If you already completed 7g you do not need to restate your answer here. [\[help\]](#)

This project will conduct maintenance of two previous projects in order to maintain project benefits through time. The initial projects were identified during a comprehensive barrier assessment of the Beaver Creek Watershed in which fish passage barriers were prioritized and addressed.

Activity (clear, dredge, fill, pile drive, etc.)	Waterbody name ¹	Impact location ²	Duration of impact ³	Amount of material (cubic yards) to be placed in or removed from waterbody	Area (sq. ft. or linear ft.) of waterbody directly affected
Marracci Diversion:					
Adjustment of trash rack and intake location	Beaver Creek	Activity occurs within waterbody	Permanent	2 cubic yards removed, 1-2 cubic yards placed, no net fill	100 linear feet
Installation of downstream sill	Beaver Creek	Activity occurs within waterbody	Permanent	12 cubic yards removed, 12 cubic yards placed, no net fill	100 linear feet
Replace Weir	Beaver Creek	Activity occurs within waterbody	Permanent	10 cubic yards removed, 10 cubic yards placed, no net fill	100 linear feet
Construction of rock ramp	Beaver Creek	Activity occurs within waterbody	Permanent	140 cubic yards placed	100 linear feet
Cofferdam placement and removal for dewatering and worksite isolation	Beaver Creek	Activity occurs within waterbody	5-10 days	30 cubic yards (gravel bags for cofferdams), placed and then removed, no net fill	100 linear feet
Fort Thurlow Diversion:					
Partially Deconstruct Weirs	Beaver Creek	Activity occurs within waterbody	Permanent	60-70 cubic yards removed	120 linear feet
Construction of Rock Ramp and Channel Roughening	Beaver Creek	Activity occurs within waterbody	Permanent	170 cubic yards placed	120 linear feet
Cofferdam placement and removal for dewatering and worksite isolation	Beaver Creek	Activity occurs within waterbody	5-10 days	30 cubic yards (gravel bags for cofferdams) placed and then removed, no net fill	120 linear feet
¹ If no official name for the waterbody exists, create a unique name (such as "Stream 1") The name should be consistent with other documents provided. ² Indicate whether the impact will occur in or adjacent to the waterbody. If adjacent, provide the distance between the impact and the waterbody and indicate whether the impact will occur within the 100-year flood plain. ³ Indicate the days, months or years the waterbody will be measurably impacted by the work. Enter "permanent" if applicable.					

8f. For all activities identified in 8e, describe the source and nature of the fill material, amount (in cubic yards) you will use, and how and where it will be placed into the waterbody. [\[help\]](#)

Marracci

Approximately 1-2 cy of footing prep/bedding material will be used in the relocation of the intake structure and the trash rack. Approximately 12 cy of rocks will be used in the installation of the downstream sill, which will serve as a grade control structure to mitigate any downcutting of the rock ramp or headcutting of the channel from below the rock ramp. The downstream sill will be composed of 2 stacked rows of approximately 3' angular rock installed at a grade, which will be keyed into the bank a minimum of 3'. Approximately 10 cy of 3' rocks will be used to replace the upstream failed weir crest with a perpendicular sill to recreate the original crest elevation required for irrigation diversion. The rock ramp will be composed of approximately 140 cy of material – approximately 60 cy of engineered streambed material, approximately 60 cy of angular boulders, and approximately 20 cy of fines. The 60 cy of engineered streambed material used to construct the rock ramp will be composed of the following gradation:

D100 4'
D84 2.5'
D50 1'
D16 2.25"
D8 0.75"

In addition to the engineered streambed material in the rock ramp, approximately 60 angular boulders of 2.5-4' diameter (approximately 60 cy) will be placed and countersunk to add roughness and pockets of slower water to aid in fish passage, and 20 cy of fines will be used to fill in the interstitial spaces between the rocks to reduce the impact of the tractive forces on the cobble bed. No grout or other synthetic materials will be used. The material will be placed by an excavator, bucket compacted, and then to ensure that the flow stays on the surface, the fines will be jetted in using a small trash pump that recycles water from a sump dug within the dewatered area.

An estimated 24 cy of material will be excavated during the above work at the project site. Dependent on the gradation and suitability of the excavated material, it will be reused on site to meet the design specifications for construction. Additional material will be imported by the contractor from an approved local source as needed to meet design specifications. Two temporary cofferdams constructed of gravel bags will be placed by hand to isolate the work area. The bags will be filled with clean washed gravel or native material, and will equal approximately 30 cy of material.

Fort Thurlow

The rock ramp will be composed of approximately 170 cy of material – approximately 75 cy of engineered streambed material, approximately 70 cy of angular boulders, and approximately 25 cy of fines. Approximately 75 cy of engineered streambed material will be used in the construction of the rock ramp and roughening of the channel, composed of the following gradation:

D84 2.5'
D50 1'
D16 2.25"
D8 0.75"

In addition to the engineered streambed material, 70 angular boulders of 2.5-4 ft. diameter (approximately 70 cy) will be used to add roughness and pockets of slower water to aid in fish passage, and 25 cy of fines will be used to fill in the interstitial spaces between the rocks to reduce the impact of the tractive forces on the cobble bed. No grout or other synthetic materials will be used. The material will be placed by an excavator, bucket compacted, and then to ensure that the flow stays on the surface, the fines will be jetted in using a small trash pump that recycles water from a sump dug within the dewatered area.

An estimated 60-70 cy of material will be excavated during the above work at the project site. Dependent on the gradation and suitability of the excavated material, it will be reused on site to meet the design specifications for construction. Additional material will be imported by the contractor from an approved local source as needed to meet design specifications. Two temporary cofferdams constructed of gravel bags will be placed by hand or by a machine working from the bank to isolate the work area. The bags will be filled with clean washed gravel or native material, and will equal approximately 30 cy of material.

8g. For all excavating or dredging activities identified in 8e, describe the method for excavating or dredging, type and amount of material you will remove, and where the material will be disposed. [\[help\]](#)

Marracci

Approximately 24 cy of material will be excavated from the stream during construction. This material is estimated to be 70% large boulders brought in during initial weir construction, 15% imported streambed gravels, and 15% native streambed gravels. The gravels are estimated to be a well mixed 6" minus material consisting of cobbles, gravels, and sands. The excavated material will all be stored temporarily on the staging area, then reused for construction of the rock ramp. If this material for some reason does not meet the specifications for construction, it will be hauled off by the contractor. The material will be removed by an excavator working from the bank or in the dewatered channel, as appropriate to accomplish the work and reduce impacts to riparian vegetation.

Fort Thurlow

Approximately 60-70 cy of excavated streambed material will be removed from the stream during de-construction of the existing weirs. This material is estimated to be 70% large boulders brought in during initial weir construction, 15% imported streambed gravels, and 15% native streambed gravels. The gravels are estimated to be a well mixed 6" minus material consisting of cobbles, gravels, and sands. The excavated material will all be stored temporarily on the staging area, then reused for construction of the rock ramp and channel roughening. If this material for some reason does not meet the specifications for construction, it will be hauled off by the contractor. The material will be removed by an excavator working from the bank or in the dewatered channel, as appropriate to accomplish the work and reduce impacts to riparian vegetation.

Part 9—Additional Information

Any additional information you can provide helps the reviewer(s) understand your project. Complete as much of this section as you can. It is ok if you cannot answer a question.

9a. If you have already worked with any government agencies on this project, list them below. [\[help\]](#)

Agency Name	Contact Name	Phone	Most Recent Date of Contact
NOAA Fisheries	Dale Bambrick	(509) 962-8911 x221	September 2012
	Sean Gross	(509) 962-8911 x225	September 2012
USFWS	Karl Halupka	(509) 665-3508 x11	September 2012
WDFW	Lynda Hofmann	(509) 997-9428	January 2013
	Gina McCoy	(509) 996-8248	January 2013
US Army Corps of Engineers	Maryann Baird	(206) 764-5531	September 2012

9b. Are any of the wetlands or waterbodies identified in Part 7 or Part 8 of this JARPA on the Washington Department of Ecology's 303(d) List? [\[help\]](#)

- If **Yes**, list the parameter(s) below.
- If you don't know, use Washington Department of Ecology's Water Quality Assessment tools at: <http://www.ecy.wa.gov/programs/wq/303d/>.

Yes No

Beaver Creek was listed on the 303(d) list, but was moved to the newly defined Category 4c in 2004. Category 4c waters are "impaired by a non-pollutant" that cannot be addressed through a TMDL. Beaver Creek does not meet the criteria for adequate instream flow.

<p>9c. What U.S. Geological Survey Hydrological Unit Code (HUC) is the project in? [help]</p> <ul style="list-style-type: none"> Go to http://cfpub.epa.gov/surf/locate/index.cfm to help identify the HUC.
17020008, Methow
<p>9d. What Water Resource Inventory Area Number (WRIA #) is the project in? [help]</p> <ul style="list-style-type: none"> Go to http://www.ecy.wa.gov/services/gis/maps/wria/wria.htm to find the WRIA #.
48, Methow
<p>9e. Will the in-water construction work comply with the State of Washington water quality standards for turbidity? [help]</p> <ul style="list-style-type: none"> Go to http://www.ecy.wa.gov/programs/wq/swqs/criteria.html for the standards.
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable
<p>9f. If the project is within the jurisdiction of the Shoreline Management Act, what is the local shoreline environment designation? [help]</p> <ul style="list-style-type: none"> If you don't know, contact the local planning department. For more information, go to: http://www.ecy.wa.gov/programs/sea/sma/laws_rules/173-26/211_designations.html.
<input checked="" type="checkbox"/> Rural <input type="checkbox"/> Urban <input type="checkbox"/> Natural <input type="checkbox"/> Aquatic <input type="checkbox"/> Conservancy <input type="checkbox"/> Other _____
<p>9g. What is the Washington Department of Natural Resources Water Type? [help]</p> <ul style="list-style-type: none"> Go to http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesApplications/Pages/fp_watertyping.aspx for the Forest Practices Water Typing System.
<input checked="" type="checkbox"/> Shoreline <input type="checkbox"/> Fish <input type="checkbox"/> Non-Fish Perennial <input type="checkbox"/> Non-Fish Seasonal
<p>9h. Will this project be designed to meet the Washington Department of Ecology's most current stormwater manual? [help]</p> <ul style="list-style-type: none"> If No, provide the name of the manual your project is designed to meet.
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Name of manual: NA
<p>9i. Does the project site have known contaminated sediment? [help]</p> <ul style="list-style-type: none"> If Yes, please describe below.
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
NA
<p>9j. If you know what the property was used for in the past, describe below. [help]</p>
Historically these properties has been used for agricultural purposes
<p>9k. Has a cultural resource (archaeological) survey been performed on the project area? [help]</p> <ul style="list-style-type: none"> If Yes, attach it to your JARPA package.
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Archaeological survey completed and consultation with the WA DAHP and the Colville and Yakama tribes was completed by the Bureau of Reclamation. For more information, contact the Bureau of Reclamation's Regional Archaeologist, Dr. Sean Hess (208) 378-5316.
<p>9l. Name each species listed under the federal Endangered Species Act that occurs in the vicinity of the project area or might be affected by the proposed work. [help]</p>
Beaver Creek and its tributaries contain habitat suitable for the following ESA-listed fish species: Upper

Columbia River (UCR) steelhead (*Oncorhynchus mykiss*), an isolated Columbia River (CR) bull trout (*Salvelinus confluentus*) population in the headwater tributaries, and UCR spring Chinook salmon (*Oncorhynchus tshawytscha*).

9m. Name each species or habitat on the Washington Department of Fish and Wildlife's Priority Habitats and Species List that might be affected by the proposed work. [\[help\]](#)

Species:

Fish—Rainbow/Steelhead/Inland Redband Trout, Chinook Salmon, Bull Trout
Amphibians—Columbia Spotted Frog
Birds—Pileated Woodpecker, Golden Eagle, Sooty Grouse
Mammals—Rocky Mountain Mule Deer, Gray Wolf
Butterflies—Silver-bordered Fritillary (unknown occurrence, habitat present)

Habitats:

Riparian

Part 10—SEPA Compliance and Permits

Use the resources and checklist below to identify the permits you are applying for.

- Online Project Questionnaire at <http://apps.ecy.wa.gov/opus/>.
- Governor's Office of Regulatory Assistance at (800) 917-0043 or help@ora.wa.gov.
- For a list of addresses to send your JARPA to, click on [agency addresses for completed JARPA](#).

10a. Compliance with the State Environmental Policy Act (SEPA). (Check all that apply.) [\[help\]](#)

- For more information about SEPA, go to www.ecy.wa.gov/programs/sea/sepa/e-review.html.

- A copy of the SEPA determination or letter of exemption is included with this application.
- A SEPA determination will be pending with Okanogan County (lead agency). We anticipate submitting the SEPA before March 31st, 2013. The expected decision date is approximately June 1, 2013.
- I am applying for a Fish Habitat Enhancement Exemption. (Check the box below in 10b.) [\[help\]](#)
- This project is exempt (choose type of exemption below).
- Categorical Exemption. Under what section of the SEPA administrative code (WAC) is it exempt?

- Other: _____
- SEPA is pre-empted by federal law.

10b. Indicate the permits you are applying for. (Check all that apply.) [\[help\]](#)

LOCAL GOVERNMENT

Local Government Shoreline permits:

- Substantial Development Conditional Use Variance
- Shoreline Exemption Type (explain): B. (ii) - Normal maintenance or repair of existing structures or developments, including damage by accident, fire or elements; also, B. (v) - Construction and practices normal or necessary for farming, irrigation, and ranching activities,...including maintenance of irrigation structures _____

Other city/county permits:

- Floodplain Development Permit Critical Areas Ordinance

STATE GOVERNMENT

Washington Department of Fish and Wildlife:

- Hydraulic Project Approval (HPA) Fish Habitat Enhancement Exemption – [Attach Exemption Form](#)

Effective July 10, 2012, you must submit a check for \$150 to Washington Department of Fish and Wildlife, unless your project qualifies for an exemption or alternative payment method below. **Do not send cash.**

Check the appropriate boxes:

- \$150 check enclosed. (Check # _____)
Attach check made payable to Washington Department of Fish and Wildlife.
- Charge to billing account under agreement with WDFW. (Agreement # _____)
- My project is exempt from the application fee. (Check appropriate exemption)
- HPA processing is conducted by applicant-funded WDFW staff.
(Agreement # _____)
 - Mineral prospecting and mining.
 - Project occurs on farm and agricultural land.
(Attach a copy of current land use classification recorded with the county auditor, or other proof of current land use.)
 - Project is a modification of an existing HPA originally applied for, prior to July 10, 2012.
(HPA # _____)

Washington Department of Natural Resources:

- Aquatic Use Authorization
Complete [JARPA Attachment E](#) and submit a check for \$25 payable to the Washington Department of Natural Resources.
Do not send cash.

Washington Department of Ecology:

- Section 401 Water Quality Certification

FEDERAL GOVERNMENT

United States Department of the Army permits (U.S. Army Corps of Engineers):

- Section 404 (discharges into waters of the U.S.) Section 10 (work in navigable waters)

United States Coast Guard permits:

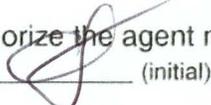
- General Bridge Act Permit Private Aids to Navigation (for non-bridge projects)

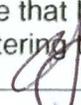
Part 11—Authorizing Signatures

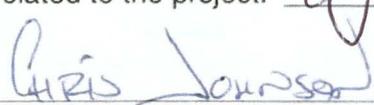
Signatures are required before submitting the JARPA package. The JARPA package includes the JARPA form, project plans, photos, etc. [\[help\]](#)

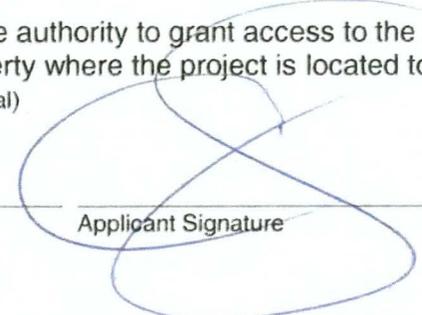
11a. Applicant Signature (required) [\[help\]](#)

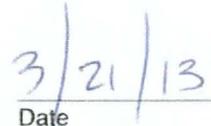
I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities, and I agree to start work only after I have received all necessary permits.

I hereby authorize the agent named in Part 3 of this application to act on my behalf in matters related to this application.  (initial)

By initialing here, I state that I have the authority to grant access to the property. I also give my consent to the permitting agencies entering the property where the project is located to inspect the project site or any work related to the project.  (initial)

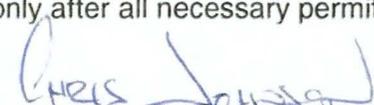

Applicant Printed Name

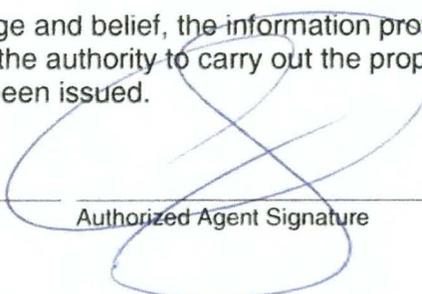

Applicant Signature

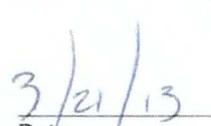

Date

11b. Authorized Agent Signature [\[help\]](#)

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities and I agree to start work only after all necessary permits have been issued.


Authorized Agent Printed Name

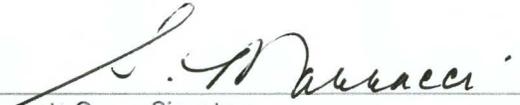

Authorized Agent Signature

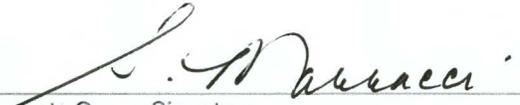

Date

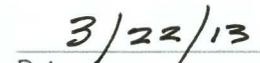
11c. Property Owner Signature (if not applicant). [\[help\]](#)

Not required if project is on existing rights-of-way or easements.

I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.


Property Owner Printed Name


Property Owner Signature


Date

18 U.S.C §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than 5 years or both.

If you require this document in another format, contact the Governor's Office of Regulatory Assistance (ORA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORA publication number: ENV-019-09 rev. 06-12

Beaver Creek Weir Renovation Project: Marracci Diversion & Fort Thurlow Diversion

JARPA Attachments

Marracci Diversion

Attachment 1: Marracci 30% Drawing Set

Note: Sheet numbers are located on the lower right hand corner of each drawing.

Sheet 1 of 7 (1678-100-1553): Location Map

Sheet 2 of 7 (1678-100-1554): General Notes and Legend

Sheet 3 of 7 (1678-100-1555): Existing Plan and Profile

Sheet 4 of 7 (1678-100-1556): Access, Staging, and Dewatering Plan

Sheet 5 of 7 (1678-100-1557): Roughened Channel Plan and Profile

Sheet 6 of 7 (1678-100-1558): Roughened Channel Details and Sections

Sheet 7 of 7 (1678-100-1559): Engineered Streambed Material

Attachment 2: Marracci Documentation of HPA Fee Exemption

Page from County Assessor Web Site Showing Current Land Use:

Land Use Code: 83 – Resource - Agricultural

JARPA Attachment C: Adjoining Property Owners – Marracci Diversion

Fort Thurlow Diversion

Attachment 3: Fort Thurlow Permit Drawing Set

Drawing 1 (1678-100-1546): Location Map

Drawing 2 (1678-100-1547): General Notes and Legend

Drawing 3 (1678-100-1548): Existing Plan and Profile

Drawing 4 (1678-100-1549): Access, Staging, and Dewatering Plan

Drawing 5 (1678-100-1550): Roughened Channel Plan and Profile

Drawing 6 (1678-100-1551): Roughened Channel Details and Sections

Drawing 7 (1678-100-1552): Engineered Streambed Material

Attachment 4: Fort Thurlow Documentation of HPA Fee Exemption

Page from County Assessor Web Site Showing Current Land Use:

Land Use Code: 83 – Resource - Agricultural

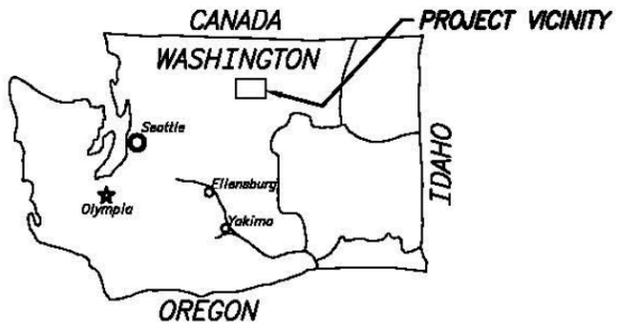
JARPA Attachment A: Additional Property Owners – Fort Thurlow Diversion

JARPA Attachment B: Additional Project Locations – Fort Thurlow Diversion

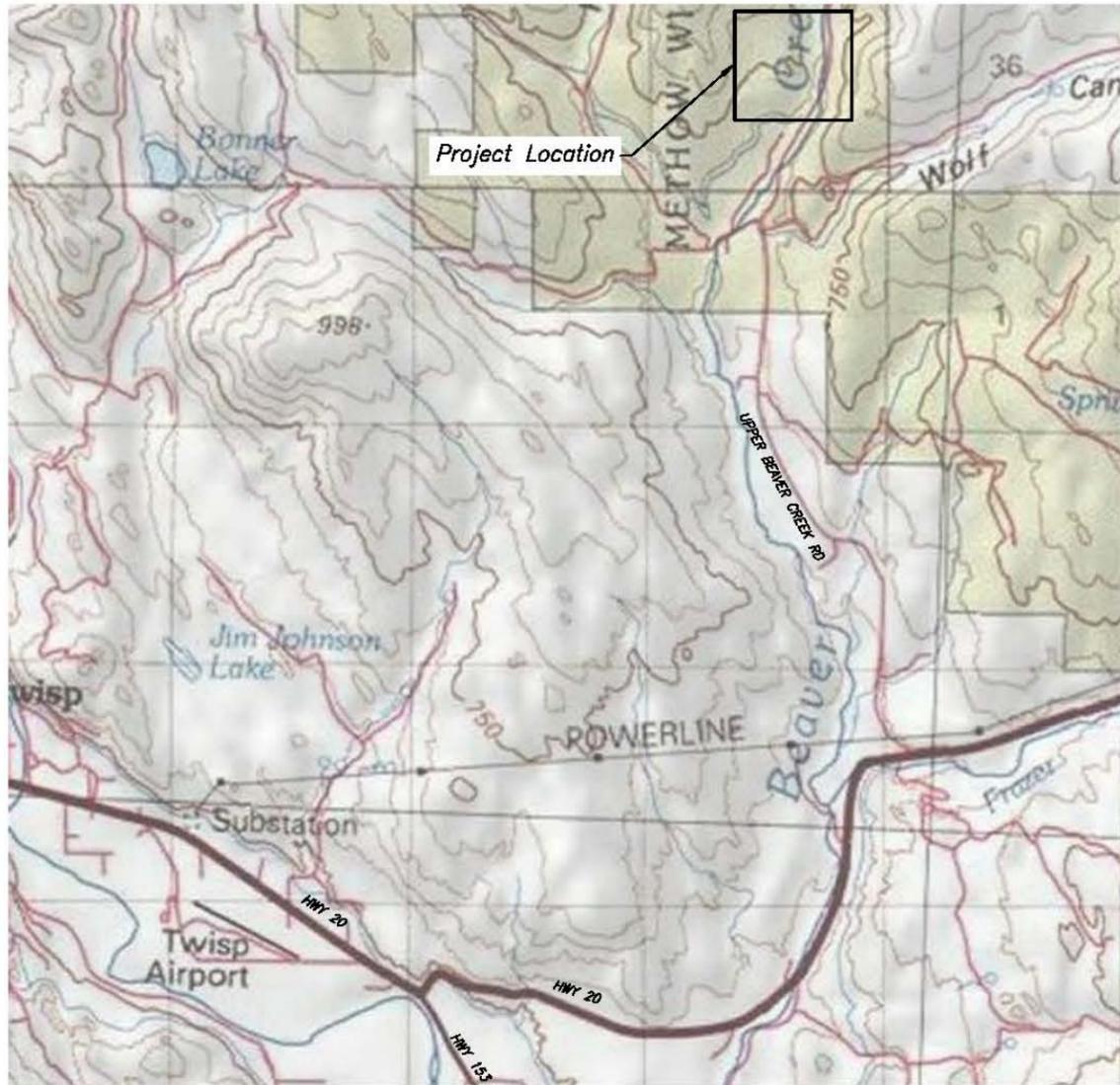
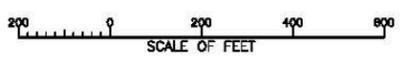
JARPA Attachment C: Adjoining Property Owners – Fort Thurlow Diversion

JARPA Attachment 1

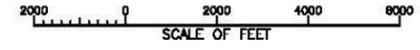
Marracci 30% Drawing Set



LOCATION MAP



VICINITY MAP



SHEET INDEX

Sheet Number	Description
1678-100-1553	LOCATION MAP
1678-100-1554	GENERAL NOTES, AND LEGEND
1678-100-1555	SITE PLAN AND EXISTING PROFILE
1678-100-1556	ROUGHENED CHANNEL PLAN AND PROFILE
1678-100-1557	SECTIONS AND DETAILS
1678-100-1558	ACCESS, STAGING, AND DEWATERING - PLAN
1678-100-1559	DIVERSION STRUCTURE - PLAN, SECTION, AND DETAIL

SITE SUMMARY

T34N, R22E, Sec. 35
Okanogon County
Twisp, Washington

DATE AND TIME PLOTTED: FEBRUARY 11, 2010 11:07 AM
PLOTTER: JAMES SEN

CADD SYSTEM: 18.04
CADD PLOTTER: HP
1678-100-1553-DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

Not For Distribution

BOISE, ID 2011-1-6

LOCATION MAP

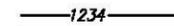
1678-100-1553

SHEET 1 OF 7

GENERAL NOTES

1. ALL COMPONENTS OF THE CONTRACT DOCUMENTS SHALL FULLY APPLY TO THE WORK WHETHER SPECIFICALLY REFERENCED IN THE DRAWINGS OR NOT.
2. STATIONING, DISTANCES, AND LENGTHS SHOWN ON THE DRAWINGS ARE BASED ON HORIZONTAL MEASUREMENTS ALONG THE STREAM CENTERLINE. CROSS SECTIONS, CROSSING DETAILS, AND REFERENCES TO LEFT (L) AND RIGHT (R) ON THE DRAWINGS ASSUME LOOKING IN THE DIRECTION OF INCREASING STATION ALONG STREAM CENTERLINE ALIGNMENT (FACING DOWNSTREAM).
3. ALL DIMENSIONS, INCLUDING, BUT NOT LIMITED TO, ELEVATIONS, STATIONS, AND DISTANCES ARE IN STANDARD ENGLISH UNITS.
4. ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND ACTUAL SITE CONDITIONS; OR ANY INCONSISTENCIES OR AMBIGUITIES BETWEEN THE DRAWINGS AND OTHER COMPONENTS OF THE CONTRACT DOCUMENTS SHALL BE IMMEDIATELY REPORTED IN WRITING TO THE ENGINEER. THE ENGINEER WILL PROMPTLY CORRECT INCONSISTENCIES OR AMBIGUITIES IN WRITING. WORK DONE BY THE CONTRACTOR INVOLVING SUCH DISCREPANCIES WITHOUT A WRITTEN REPORT AND RESPONSE FROM THE ENGINEER SHALL BE DONE AT THE CONTRACTOR'S SOLE RISK AND EXPENSE.
5. CONTRACTOR SHALL NOT DISTURB OR DESTROY ANY EXISTING SURVEY MONUMENTS OR BENCHMARKS. ANY BENCHMARKS DISTURBED OR DESTROYED BY THE CONTRACTOR SHALL BE REPLACED TO THE ENGINEER'S SATISFACTION AT THE CONTRACTOR'S SOLE EXPENSE.
6. EXISTING UTILITIES ARE NOT SHOWN ON THE DRAWINGS. UTILITY LOCATION AND PROTECTION IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT TYPE, OWNER, LOCATION, AND ELEVATION OF ALL BURIED AND OVERHEAD UTILITIES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PERFORM THE WORK IN A SAFE MANNER AND IN ACCORDANCE WITH ANY REQUIREMENTS SET FORTH BY THE UTILITY OWNER AND APPLICABLE LAWS AND REGULATIONS.
7. CONTRACTOR IS ADVISED THAT NORTH ARROWS AND ORIENTATION OF PLAN VIEW SHEETS VARY TO ALLOW FOR LEFT-TO-RIGHT STATIONING AND STATIONING IN THE DIRECTION OF STREAM FLOW.
8. CONTRACTOR SHALL NOTIFY UTILITY OWNERS WITHIN THE LIMITS OF CONSTRUCTION A MINIMUM OF TWO WEEKS PRIOR TO EXCAVATION, OR OTHER CONSTRUCTION ACTIVITY THAT MAY IMPACT THE UTILITY. CONTRACTOR SHALL ALSO CONTACT METHOW SALMON RECOVERY FOUNDATION PRIOR TO ANY CONSTRUCTION ACTIVITY IN THE AREA. CONTRACTOR SHALL PROVIDE ACCESS TO UTILITY OWNERS FOR MAINTENANCE AND WORK ON THEIR UTILITIES DURING THE COURSE OF THE WORK.
9. CONTRACTOR SHALL ENSURE THAT OPERATION OF EXISTING IRRIGATION, SEWER, DRAINAGE, DOMESTIC WATER, AND OTHER UTILITY SYSTEMS ARE CONTINUOUS DURING CONSTRUCTION.
10. RELOCATIONS AND/OR REPLACEMENTS OF EXISTING UTILITIES SHALL BE COORDINATED BY THE CONTRACTOR WITH THE UTILITY OWNER. CONTRACTOR SHALL CONTACT, SCHEDULE, AND ESTABLISH UTILITY SHUT DOWN TIMES AND DETERMINE THE RELOCATION AND/OR REPLACEMENT REQUIREMENTS OF EXISTING UTILITIES PRIOR TO THE START OF ANY WORK. THE UTILITY SHALL BE RELOCATED OR REPLACED TO THE SATISFACTION OF THE UTILITY OWNER.
11. IF APPLICABLE, CONSTRUCTION EASEMENTS SHALL NOT BE USED IN ANY MANNER THAT WILL CAUSE PERMANENT DAMAGE TO THE PROPERTY. DESCRIPTIONS OF THE EASEMENTS ACQUIRED FOR THE WORK WILL BE ON FILE AT THE OFFICE OF THE OWNER. CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE EASEMENT AGREEMENTS.
12. FENCING THE WORK AREA FOR PROTECTION OF WORK AND PROPERTY AND PUBLIC SAFETY SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
13. CONTRACTOR SHALL KEEP ALL CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS AND ANY TEMPORARY CONSTRUCTION OR PERMANENT EASEMENTS OBTAINED FOR THIS PROJECT. IF APPLICABLE, THIS INCLUDES, BUT IS NOT LIMITED TO, VEHICLES AND EQUIPMENT, LIMITS OF EXCAVATION, STOCKPILED EXCAVATED AND IMPORTED MATERIAL, BACKFILL MATERIAL, STREAMBED MATERIAL, AND WEIR MATERIAL. IF THE CONTRACTOR REQUIRES ADDITIONAL CONSTRUCTION EASEMENTS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN SUCH EASEMENTS FROM INDIVIDUAL PROPERTY OWNERS AND BEAR ALL ASSOCIATED COSTS.
14. UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR SPECIFICATIONS, ALL EXISTING ITEMS INCLUDING, BUT NOT LIMITED TO, STRUCTURES, IMPROVEMENTS, GROUNDWATER WELLS, SIGNS, FENCES, GATES, CURBS, PAVEMENT, BRIDGES, UTILITIES, IRRIGATION PIPELINES AND DITCHES, ETC. SHALL BE PROTECTED BY THE CONTRACTOR. IF SUCH ITEMS ARE DAMAGED OR MUST BE REMOVED OR MODIFIED TO FACILITATE CONSTRUCTION, CONTRACTOR SHALL FIRST NOTIFY THE OWNER AND THEN REPLACE THE ITEMS TO A LIKE OR BETTER CONDITION AT CONTRACTOR'S EXPENSE TO SATISFACTION OF OWNER OF FACILITIES.
15. REQUIREMENTS RELATED TO THE PROTECTION AND/OR REMOVAL OF TREES, VEGETATION, AND STRUCTURES WITHIN THE WORK AREA ARE DETAILED IN THE SPECIFICATIONS.
16. CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE TRENCH LIMITS NEEDED TO COMPLETE THE WORK IN CONFORMANCE WITH LOCAL, STATE AND FEDERAL CODES GOVERNING SHORING, SHEETING, BRACING OF EXCAVATIONS AND TRENCHES, AND FOR PROTECTION AND SAFETY OF THE WORKERS AND OTHER CONSTRUCTION RELATED PERSONNEL.
17. EXCAVATION SHALL MEET THE REQUIREMENTS OF OSHA 29 CFR PART 1926, SUBPART P, EXCAVATIONS. ACTUAL SLOPES SHALL NOT EXCEED THE MAXIMUM ALLOWABLE SLOPES (SUBPART P, APPENDIX B).
18. HORIZONTAL DATUM IS NAD83/91. HORIZONTAL COORDINATES SHOWN HEREIN ARE WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, US SURVEY FEET.
19. VERTICAL DATUM IS NAVD 88, FEET.
20. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE INDICATED.
21. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
22. THE CONTRACTOR IS RESPONSIBLE FOR PRODUCING, IMPLEMENTING, ADHERING TO, AND MAINTAINING A STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH THE REGULATIONS AND GUIDELINES SET FORTH AND SUBJECT TO APPROVAL BY THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, WATER QUALITY PROGRAM. CONTRACTOR SHALL IMPLEMENT AND DOCUMENT ANY ADDITIONAL MEASURES NECESSARY TO PREVENT ANY EROSION OR HAZARDOUS MATERIALS FROM LEAVING THE SITE, DISCHARGING, BEING ENTRAINED, ABSORBED OR OTHERWISE ENTERING SURFACE WATERS, GROUND WATER OR SOILS.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES AT ALL TIMES. MAINTENANCE OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE CONSIDERED INCIDENTAL.
24. THE CONTRACTOR SHALL BE HELD SOLELY RESPONSIBLE FOR ANY NPDES OR OTHER APPLICABLE ENVIRONMENTAL PERMIT VIOLATIONS AND FINES.

LEGEND

-  1234 EXISTING GRADE CONTOURS
-  1234 FINISH GRADE CONTOURS

ABBREVIATIONS

APPROX	APPROXIMATE
CFS	CUBIC FEET PER SECOND
CONT	CONTINUOUS
CP	CONTROL POINT
CY	CUBIC YARD
E	EAST
EL	ELEVATION
EXST	EXISTING
G	GRADE
H	HORIZONTAL
HWY	HIGHWAY
L	LENGTH
LF	LINEAR FOOT
LS	LUMP SUM
MAX	MAXIMUM
MIN	MINIMUM
MSRF	METHOW SALMON RECOVERY FOUNDATION
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OG	ORDINARY GROUND
OHW	ORDINARY HIGH WATER
PT	POINT
Q	FLOW
RD	ROAD
S	SOUTH
SF	SQUARE FOOT
SPEC	SPECIFICATION
STA	STATION
SY	SQUARE YARD
TYP	TYPICAL
W	WEST
WSE	WATER SURFACE ELEVATION

DATE AND TIME PLOTTED: FEBRUARY 11, 2015 11:08 AM
PLOTTED BY: JAWELSON

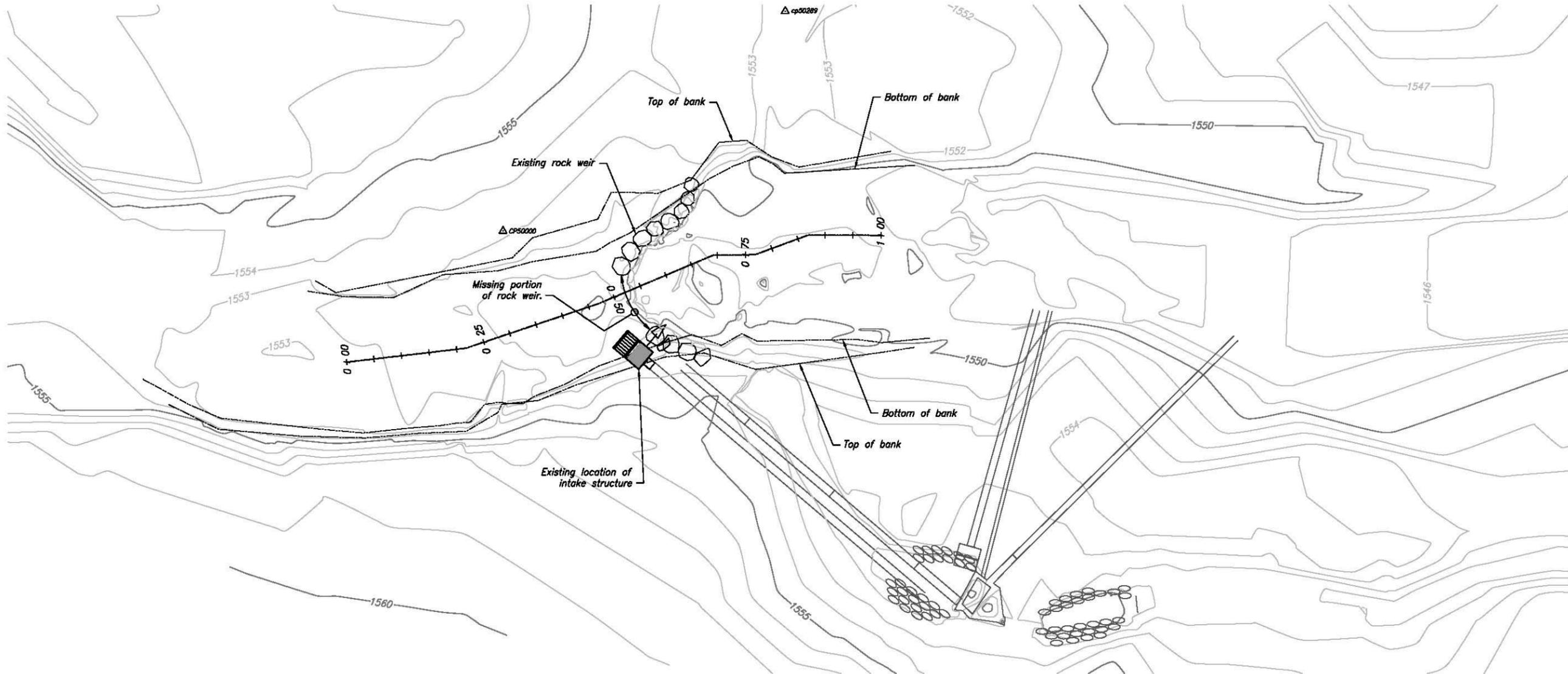
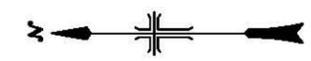
CAD SYSTEM: MICROSTATION 10.00
CAD FILENAME: 1678-100-1553A.DWG

FOOTPRINT ALWAYS THINK SAFETY
 U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
 COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
 METHOW SUBBASIN
 BEAVER CREEK
 MARRACCI DIVERSION
 Not For Distribution

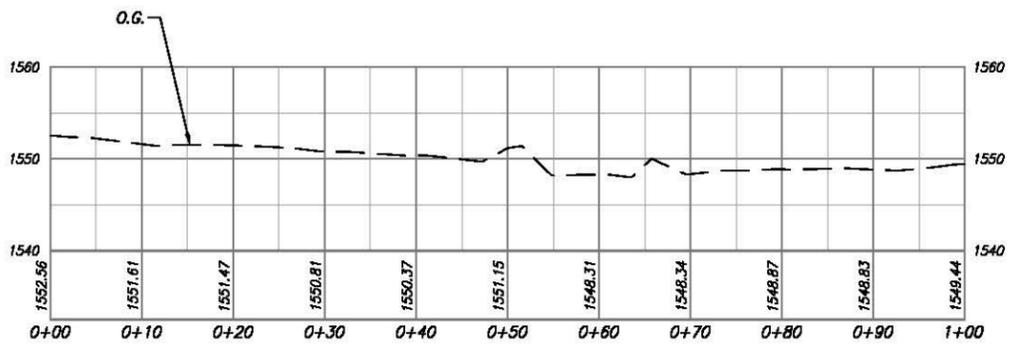
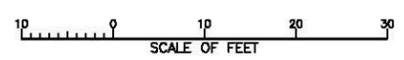
BOISE, ID 2011-1-0

GENERAL NOTES AND LEGEND

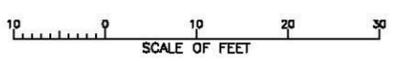
1678-100-1554



SITE PLAN



EXISTING PROFILE



CONTROL POINTS				
Point #	Description	Northing	Eastng	Elevation
50289	cp50289	302229.91	100931.81	1552.97
50000	CP50000	302280.70	100892.37	1553.08

DATE AND TIME PLOTTED: FEBRUARY 11, 2015 11:00 AM
PLOTTED BY: JMWELSEN

CAD SYSTEM: CALDWELL 18.04
CAD FILENAME: 1678-100-1555.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

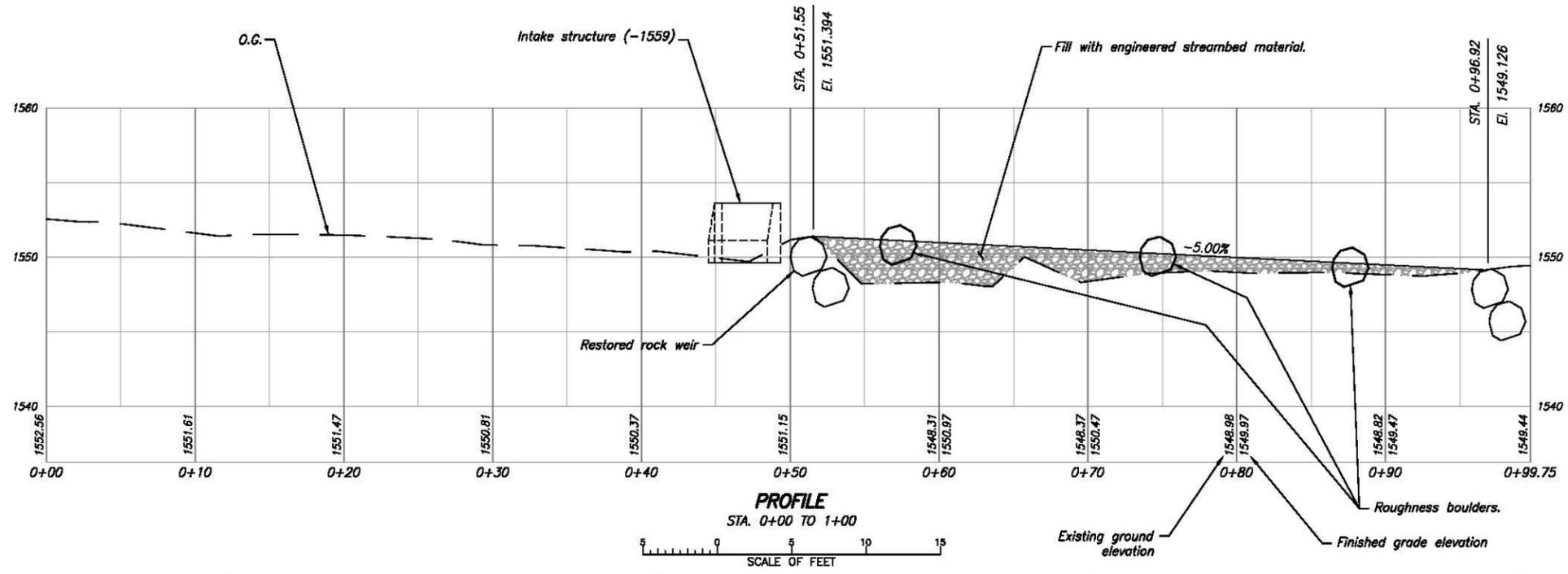
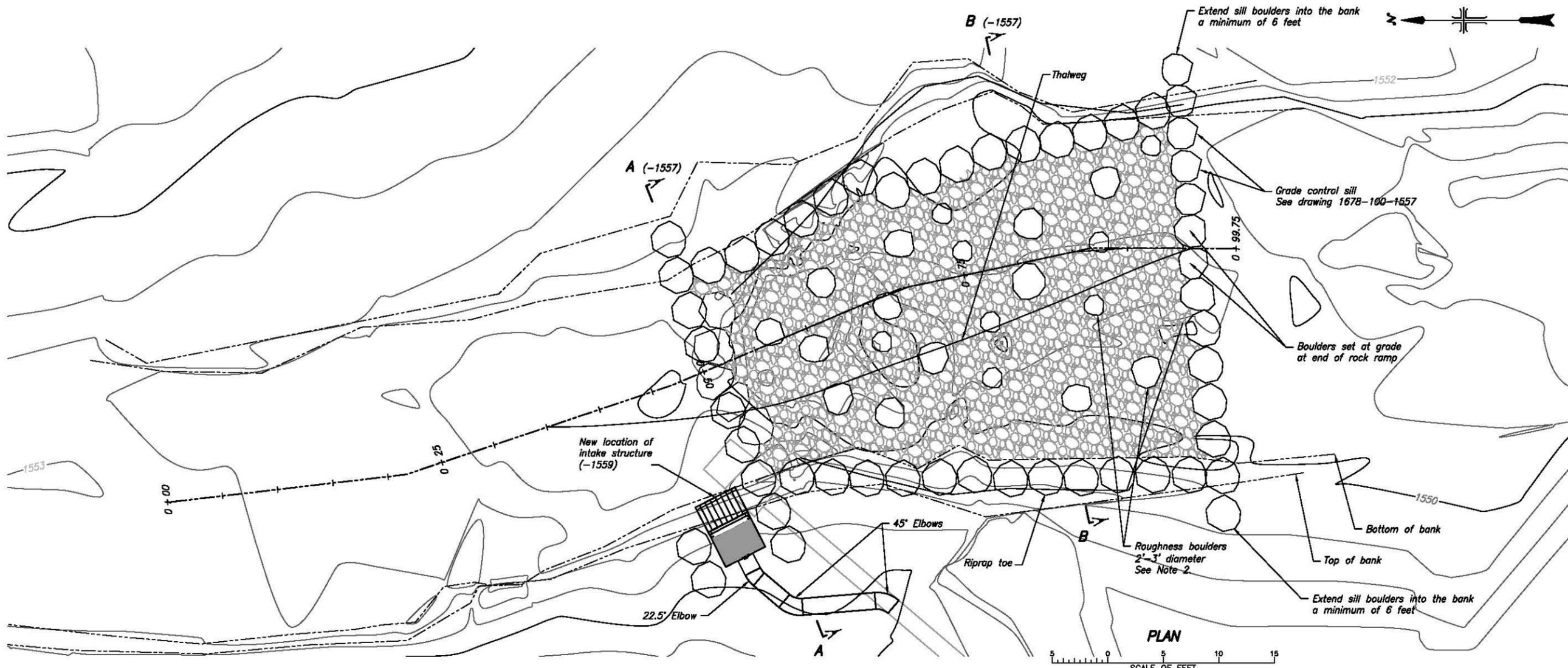
Not For Distribution

BOISE, ID 2012-01-09

**SITE PLAN AND
EXISTING PROFILE**

1678-100-1555

SHEET 3 OF 7



- NOTES:**
1. Location and quantity of roughness boulders to be field directed.
 2. Typical detail for roughness boulder on drawing 1678-100-1557.
 3. Quantities and gradations of streambed material and boulders on drawing 1678-100-1557.
 4. Revegetation to be performed by others.

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

BOISE, ID 2012-01-09

**ROUGHENED CHANNEL
PLAN AND PROFILE**

1678-100-1556

SHEET 4 OF 7

DATE AND TIME PLOTTED:
CELEBRITY 11, 2015 17:10
PLOTTED BY:
JUNNELSEN

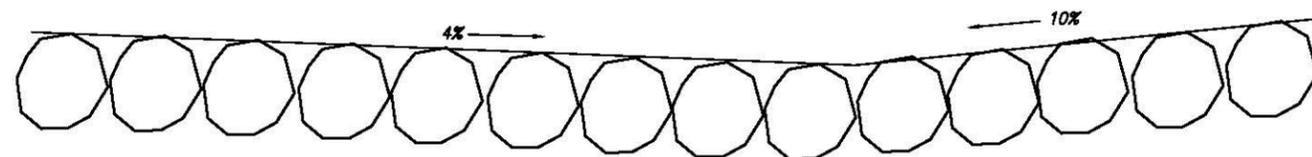
CAD SYSTEM:
CAD FILENAME:
1678-100-1556.DWG

ENGINEERED STREAMBED MATERIAL (ESM)		
Gradation	% of Mix	Size
*D100	16%	4 feet
*D84	34%	2.5 feet
D50	34%	1 foot
D16	8%	2.25 inch
D8	8%	0.75 inches

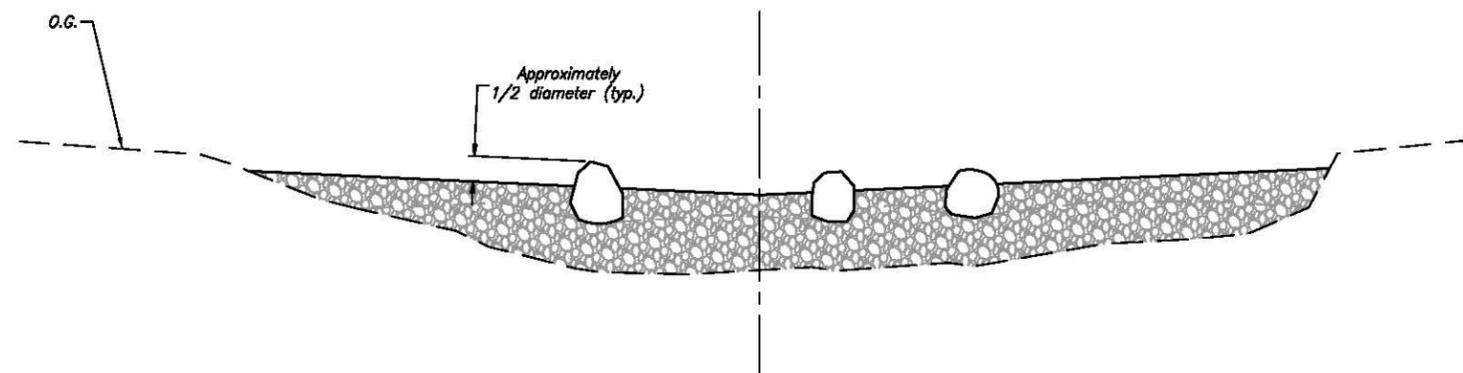
*Roughness and grade control boulders are considered D100–D84 of ESM.

FINES (USCS SILTY SAND)		
Gradation	% of Mix	US Sieve Size
D100	15% retained	No. 4
D85	55% retained	No. 200
D30	30% passing	No. 200

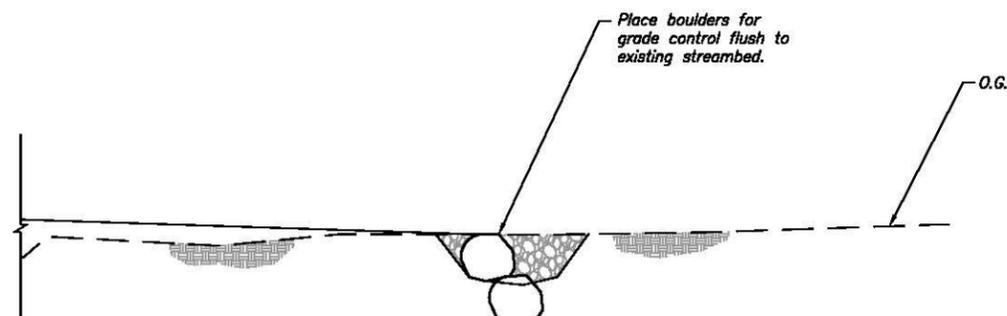
ESTIMATED QUANTITIES		
Material	Quantity	Units
Grade Control and Roughness Boulders	60	EA
ESM D84 minus	60	CY
Fines	20	CY
Approx. Area of Disturbance	0.4	acres



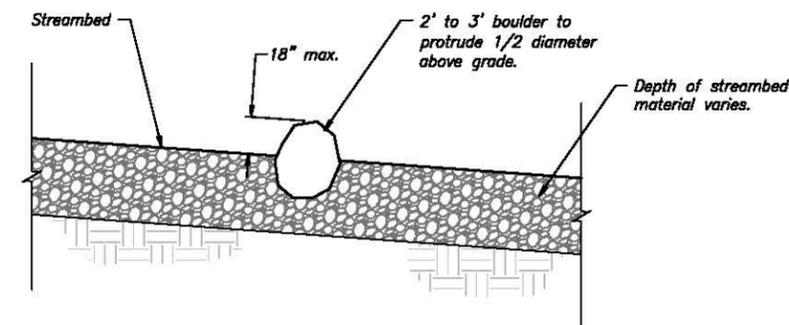
SECTION A-A N.T.S.



SECTION B-B N.T.S.



GRADE CONTROL SILL
DETAIL N.T.S.



TYPICAL ROUGHNESS BOULDER
DETAIL (1556)

DATE AND TIME PLOTTED
MARCH 12, 2013 11:02 AM
PLOTTED BY
JANIELSON

CAD SYSTEM: 18.0a
CADD: JLD
CADD FILENAME:
1678-100-1557.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN

BEAVER CREEK

MARRACCI DIVERSION

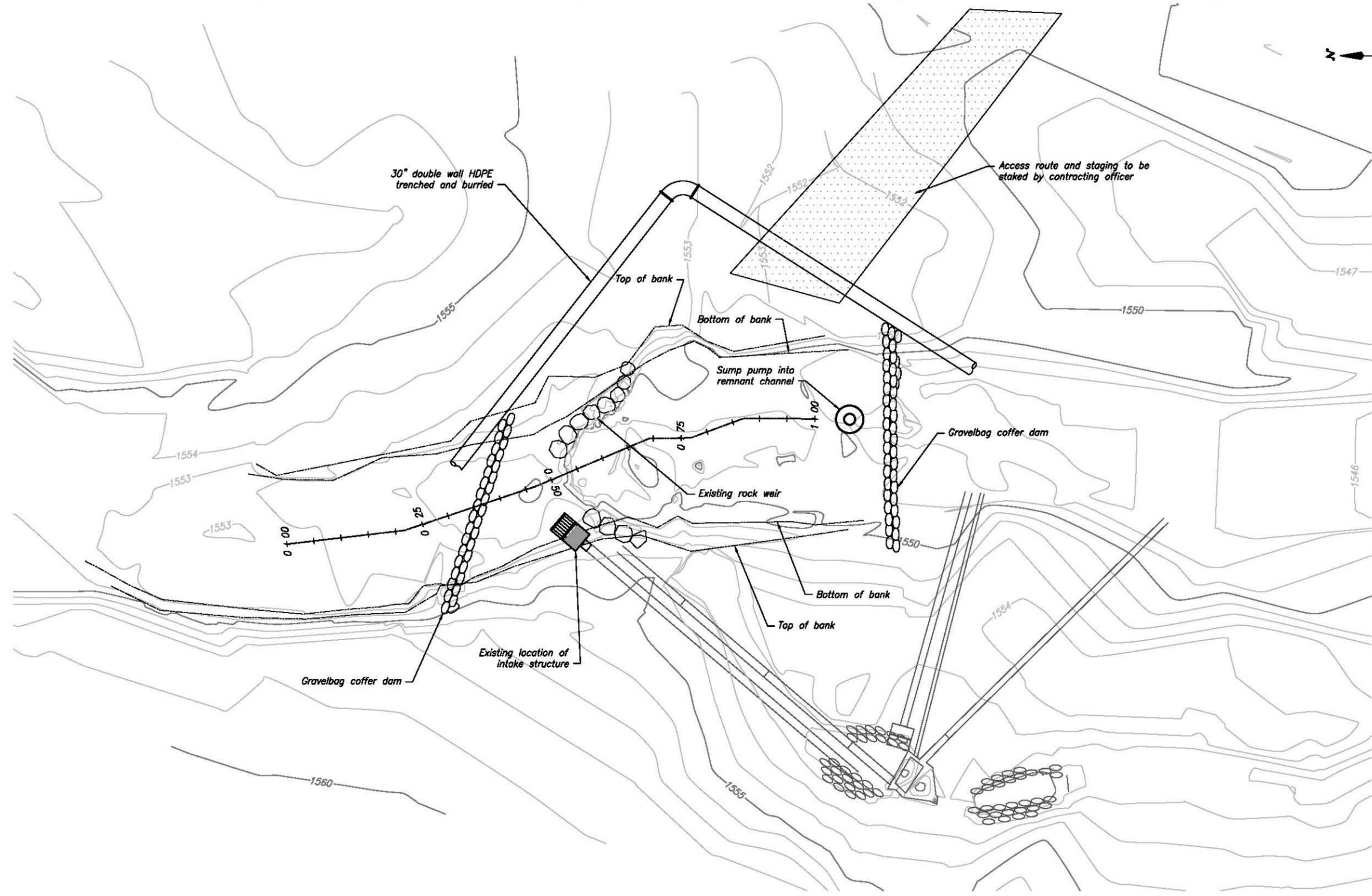
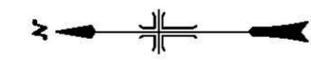
For Official Use Only
Not For Distribution

BOISE, ID 2012-01-00

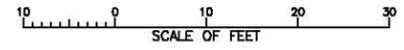
SECTIONS AND DETAIL

1678-100-1557

SHEET 5 OF 7



ACCESS STAGING AND DEWATERING PLAN



DATE AND TIME PLOTTED
FEBRUARY 11, 2013 17:14
PLOTTED BY
JANIELSON

CAD SYSTEM: 18.0m
CAD USER: JAM
CAD FILENAME:
1678-100-1558.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

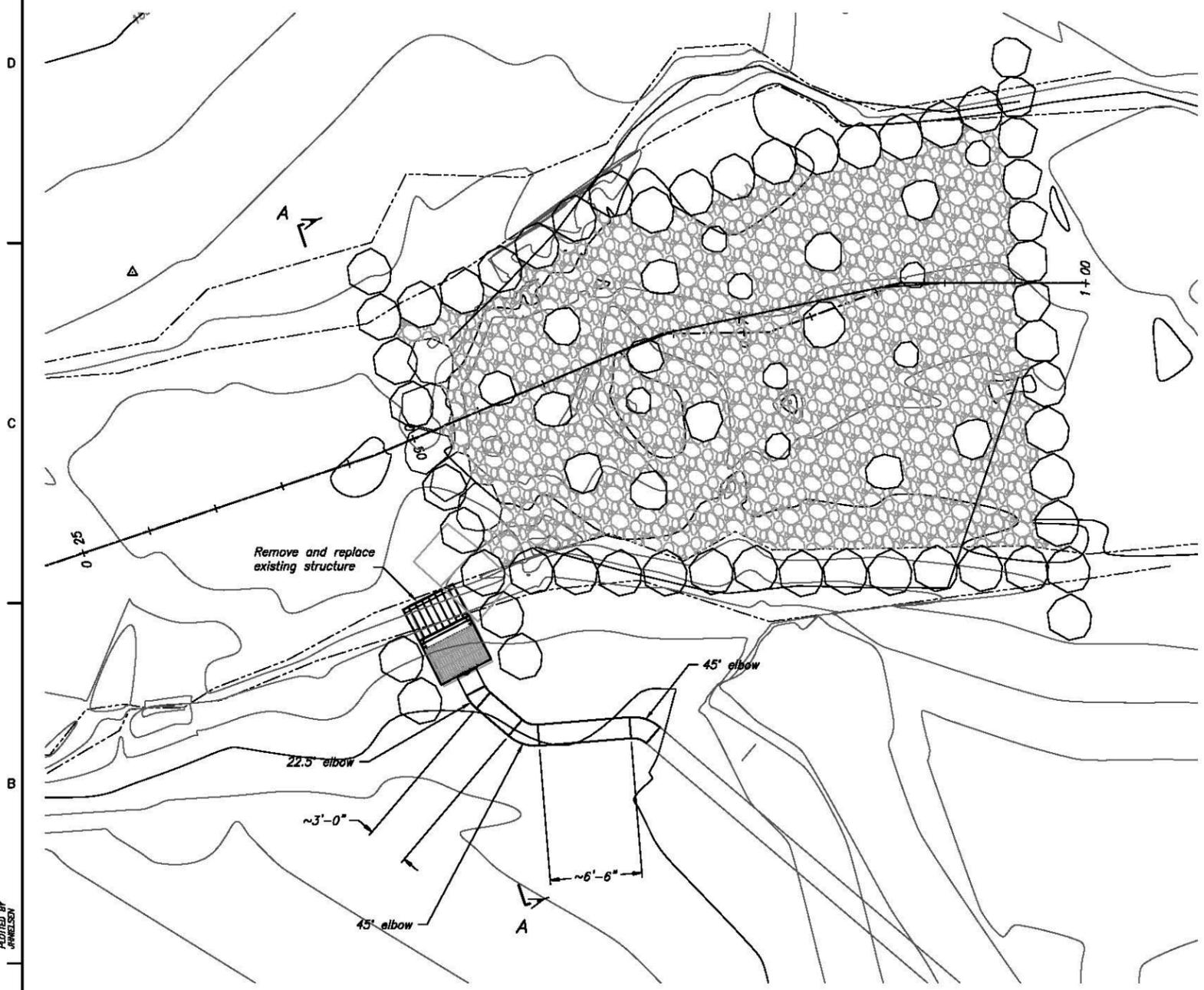
METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

BOISE, ID 2012-01-00

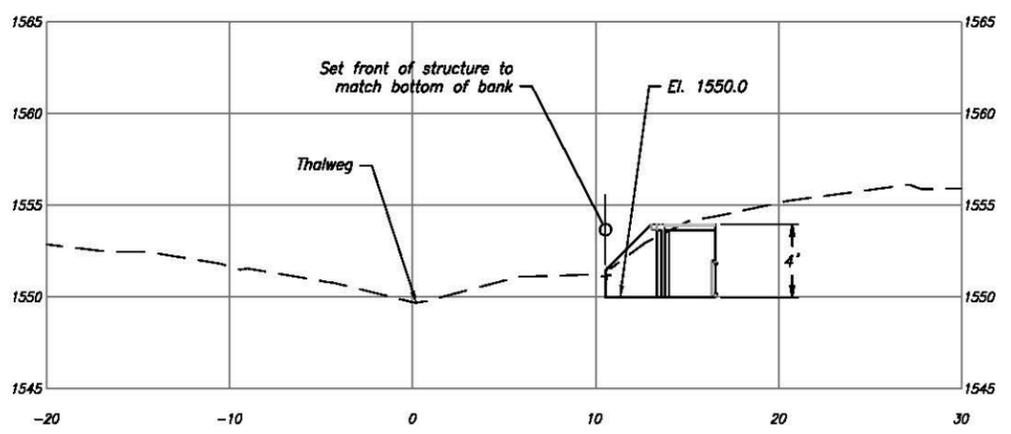
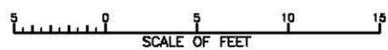
ACCESS STAGING AND DEWATERING PLAN

1678-100-1558

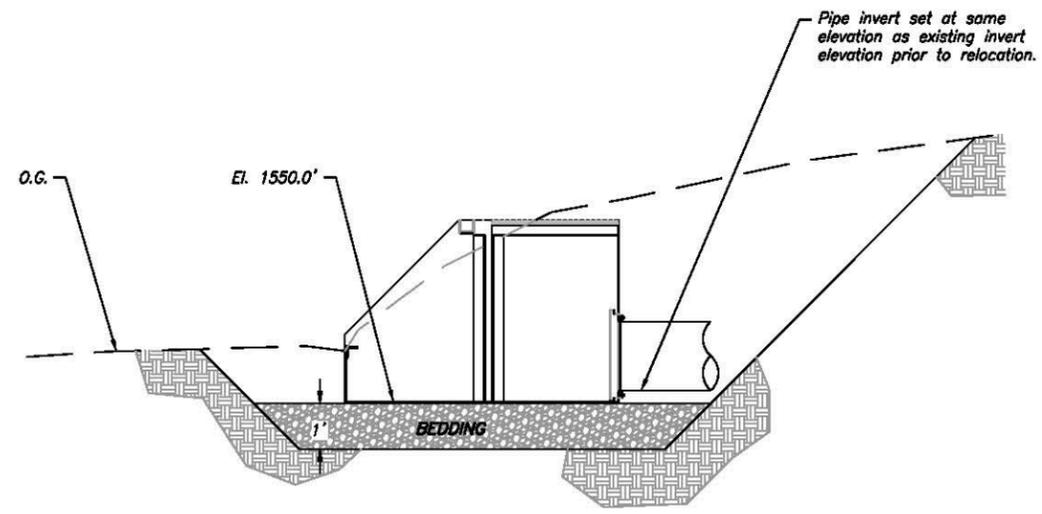
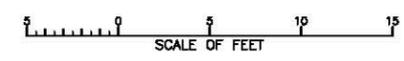
SHEET 6 OF 7



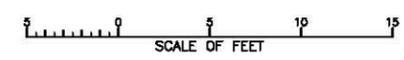
PLAN



SECTION A-A



DIVERSION DETAIL



DATE AND TIME PLOTTED: FEBRUARY 11, 2015 17:15
PLOTTED BY: JARWELSON

CAD SYSTEM: 10.0a
CAD FILENAME: 1678-100-1559.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM

METHOW SUBBASIN
BEAVER CREEK
MARRACCI DIVERSION

Not For Distribution

BOISE, ID 2012-01-00

DIVERSION STRUCTURE
PLAN, SECTION,
AND DETAIL

1678-100-1559

SHEET 7 OF 7

JARPA Attachment 2

Marracci Documentation of HPA Fee Exemption



OKANOGAN COUNTY WASHINGTON



TAXSIFTER

[SIMPLE SEARCH](#) [SALES SEARCH](#) [REETSIFTER](#) [COUNTY HOME PAGE](#) [CONTACT](#) [DISCLAIMER](#)

Scott D. Furman
Okanogan County Assessor 149 3rd North Avenue, Room 202 Okanogan, WA 98840

Assessor **Treasurer** **Appraisal** **MapSifter**

Parcel

Parcel#: 3422350029 **Owner Name:** MARRACCI, SUSAN
Land Use Code: 83 - Resource - Agriculture Current Use **Address1:**
Situs: **Address2:** 451 BALKY HILL RD
Map Number: 34-22-35 **City, State:** TWISP WA
Status: **Zip:** 98856
Description: TAX 29 PT SE SW, PT SW SE, PT NW SE W/RD VALUED W/3322020017
Comment: LAND IS IRRIG ALF, PAY 2011

Land

Land - Land

Land Code	Unit Type	Units	Land Shape	Width	Depth
Land1	Acres	23.43000000	Rectangular		
Land5	Acres	1.00000000	Rectangular		
Land5	Acres	11.62000000	Rectangular		
Land5	Acres	19.00000000	Rectangular		
FirePatrol	Fire Acres	20.00000000	Rectangle		

Miscellaneous Improvements

Misc Improvements

Improvement	Year In	Size
HAY - GABLE ROOF HAY/RV CO	0	Units - 2100.00

JARPA Attachment C

Adjoining Property Owners – Marracci Diversion



US Army Corps
of Engineers
Seattle District

WASHINGTON STATE Joint Aquatic Resources Permit Application (JARPA) [\[help\]](#)

AGENCY USE ONLY

Date received:

Agency reference #: _____

Tax Parcel #(s): _____

TO BE COMPLETED BY APPLICANT [\[help\]](#)

Project Name: Beaver Creek Weirs
Renovation Project – Marracci
Diversion & Forth Thurlow Diversion

Location Name (if applicable): Marracci
Diversion

Attachment C: Contact information for adjoining property owners. [\[help\]](#)

Use this attachment only if you have more than four adjoining property owners.

Use black or blue ink to enter answers in white spaces below.

1. Contact information for all adjoining property owners. [\[help\]](#)

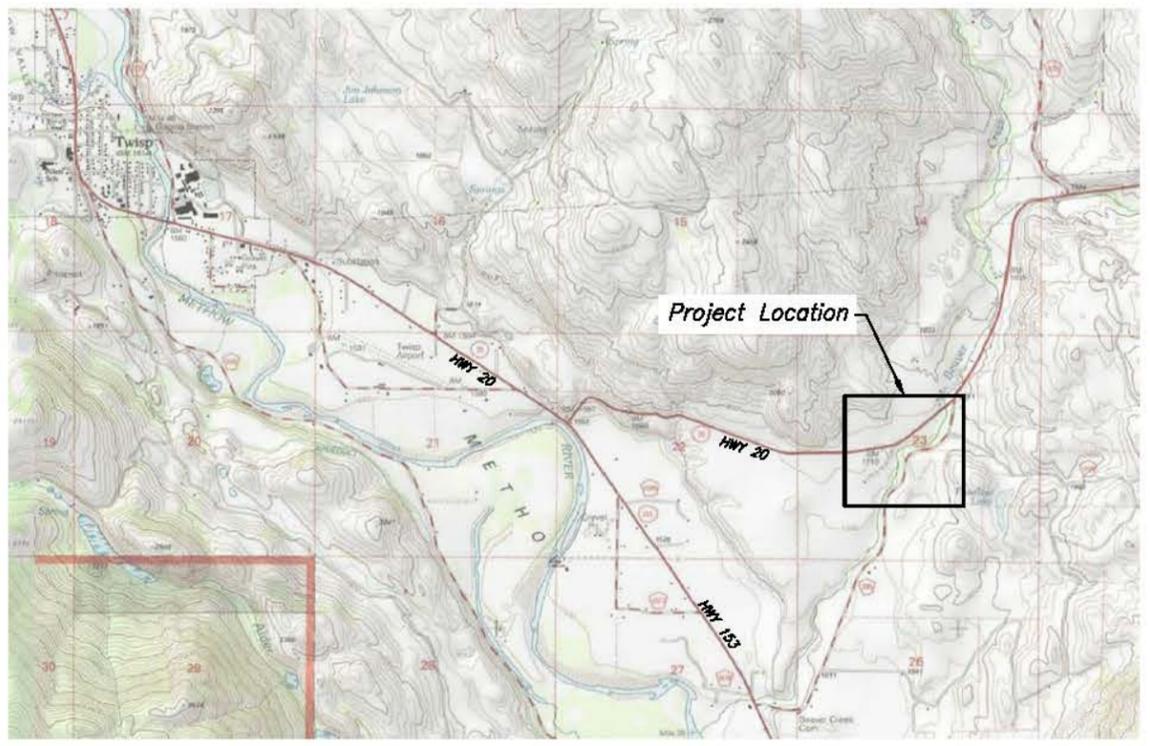
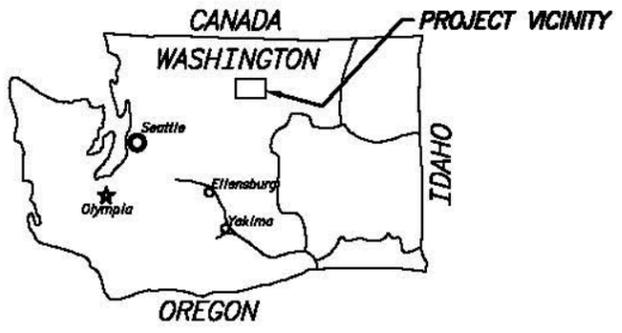
Name	Mailing Address	Tax Parcel # (if known)
HOPKINS, CHRISTIAN & FRY, LAURIE	53 STORER CREEK RD TWISP, WA 98856	3322020035
HOPKINS, DAVID	40 WAGNER RD TWISP, WA 98856	3322020022
NEVILLE, BRIAN ETUX	PO BOX 1201 EVERETT, WA 98206	3422350023
PIRZIO-BIROLI, LUCIA ETUX	PO BOX 554 TWISP, WA 98856	3422350022
THOMAS, JAMES E	435 BALKY HILL RD TWISP, WA 98856	3322020009
WA STATE DEPT OF WILDLIFE	600 N CAPITOL WAY OLYMPIA, WA 98501	3422354005, 3422354003 3422351005, 3422353004 3422353003, 3322020004

If you require this document in another format, contact the Governor's Office of Regulatory Assistance (ORA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341.
ORA publication number: ENV-022-09 rev. 06-12

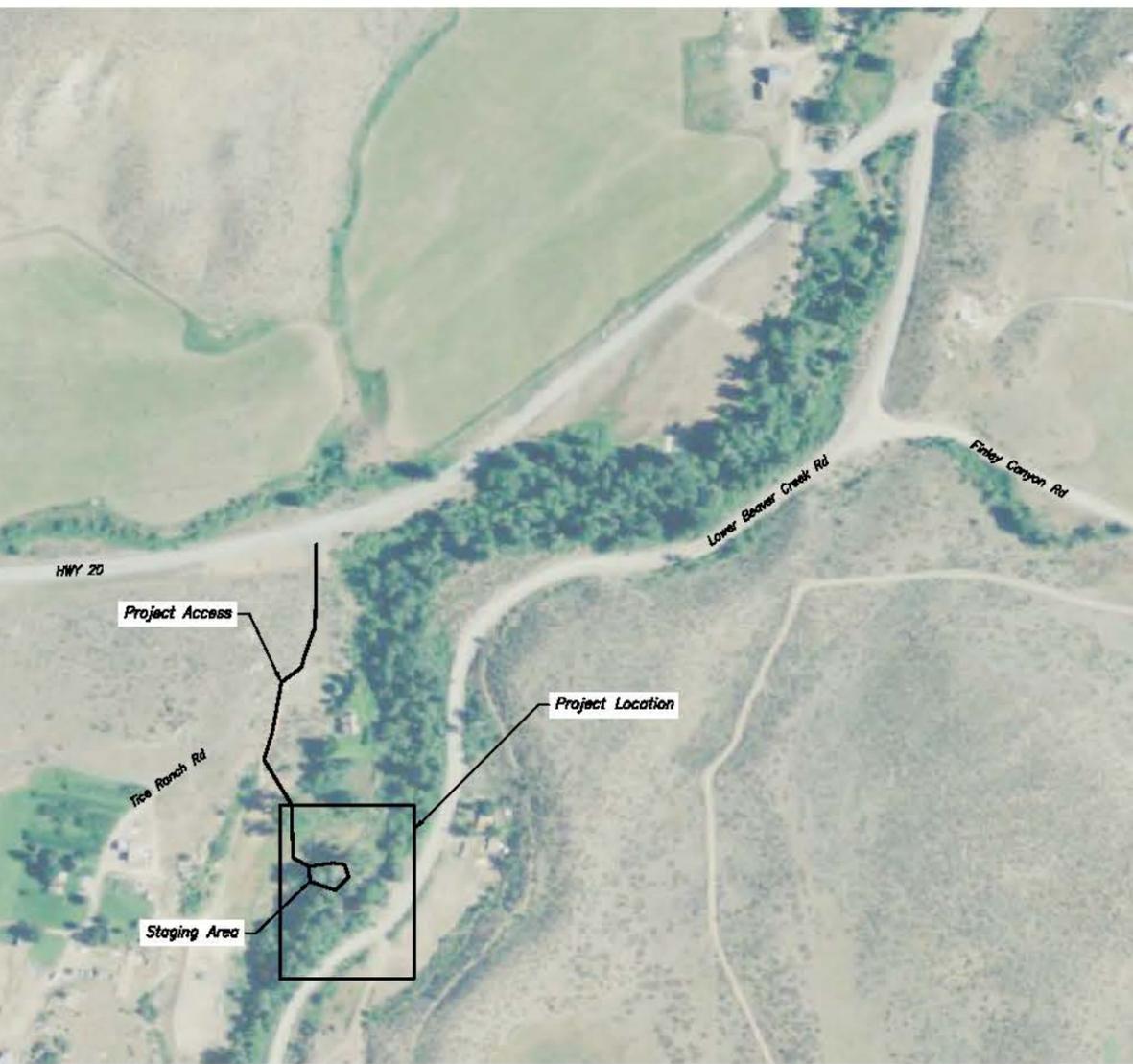
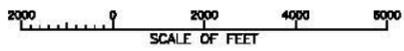
JARPA Attachment 3

Fort Thurlow Permit Drawing Set

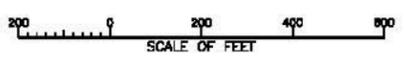
1 2 3 4 5



VICINITY MAP



LOCATION MAP



SHEET INDEX	
1678-100-1546	LOCATION MAP
1678-100-1547	GENERAL NOTES AND LEGEND
1678-100-1548	EXISTING PLAN AND PROFILE
1678-100-1549	ACCESS, STAGING, AND DEWATERING PLAN
1678-100-1550	ROUGHENED CHANNEL PLAN AND PROFILE
1678-100-1551	ROUGHENED CHANNEL DETAILS AND SECTIONS
1678-100-1552	ENGINEERED STREAMBED MATERIAL

SITE SUMMARY

T33N, R22E, Sec. 23
Okanogan County
Twisp, Washington

ALWAYS THINK SAFETY
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
FCRPS HABITAT IMPROVEMENT PROGRAM
METHOW SUBBASIN
BEAVER CREEK
FORT-THURLOW ADAPTIVE MANAGEMENT PROJECT

JUSTIN NIELSEN
DESIGNED
J. E. THOMAS
DRAWN
MIKE KNUTSON
CHECKED
MIKE KNUTSON P.E.
TECH. APPR.
SHARON PARKINSON P.E.
ADMIN. APPR.
MIKE KNUTSON P.E.
FIELD SUPERVISOR
BUREAU OF RECLAMATION

DATE: 2018-08-02

LOCATION MAP

1678-100-1546

SHEET 1 OF 1

DATE AND TIME PLOTTED:
AUGUST 1, 2018 1:51 PM
PLOTTED BY:
JANESBEN

DATE PLOTTED: 08/01/2018
DRAWN BY: CHU
CHECKED BY: CHU
PROJECT: 1678-100-1546.DWG

1 2 3 4 5

GENERAL NOTES

1. ALL COMPONENTS OF THE CONTRACT DOCUMENTS SHALL FULLY APPLY TO THE WORK WHETHER SPECIFICALLY REFERENCED IN THE DRAWINGS OR NOT.
2. STATIONING, DISTANCES, AND LENGTHS SHOWN ON THE DRAWINGS ARE BASED ON HORIZONTAL MEASUREMENTS ALONG THE STREAM CENTERLINE, CROSS SECTIONS, CROSSING DETAILS, AND REFERENCES TO LEFT (L) AND RIGHT (R) ON THE DRAWINGS ASSUME LOOKING IN THE DIRECTION OF INCREASING STATION ALONG STREAM CENTERLINE ALIGNMENT (FACING DOWNSTREAM).
3. ALL DIMENSIONS, INCLUDING, BUT NOT LIMITED TO, ELEVATIONS, STATIONS, AND DISTANCES ARE IN STANDARD ENGLISH UNITS.
4. ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND ACTUAL SITE CONDITIONS; OR ANY INCONSISTENCIES OR AMBIGUITIES BETWEEN THE DRAWINGS AND OTHER COMPONENTS OF THE CONTRACT DOCUMENTS SHALL BE IMMEDIATELY REPORTED IN WRITING TO THE ENGINEER. THE ENGINEER WILL PROMPTLY CORRECT INCONSISTENCIES OR AMBIGUITIES IN WRITING. WORK DONE BY THE CONTRACTOR INVOLVING SUCH DISCREPANCIES WITHOUT A WRITTEN REPORT AND RESPONSE FROM THE ENGINEER SHALL BE DONE AT THE CONTRACTOR'S SOLE RISK AND EXPENSE.
5. CONTRACTOR SHALL NOT DISTURB OR DESTROY ANY EXISTING SURVEY MONUMENTS OR BENCHMARKS. ANY BENCHMARKS DISTURBED OR DESTROYED BY THE CONTRACTOR SHALL BE REPLACED TO THE ENGINEER'S SATISFACTION AT THE CONTRACTOR'S SOLE EXPENSE.
6. EXISTING UTILITIES ARE NOT SHOWN ON THE DRAWINGS. UTILITY LOCATION AND PROTECTION IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT TYPE, OWNER, LOCATION, AND ELEVATION OF ALL BURIED AND OVERHEAD UTILITIES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PERFORM THE WORK IN A SAFE MANNER AND IN ACCORDANCE WITH ANY REQUIREMENTS SET FORTH BY THE UTILITY OWNER AND APPLICABLE LAWS AND REGULATIONS.
7. CONTRACTOR IS ADVISED THAT NORTH ARROWS AND ORIENTATION OF PLAN VIEW SHEETS VARY TO ALLOW FOR LEFT-TO-RIGHT STATIONING AND STATIONING IN THE DIRECTION OF STREAM FLOW.
8. CONTRACTOR SHALL NOTIFY UTILITY OWNERS WITHIN THE LIMITS OF CONSTRUCTION A MINIMUM OF TWO WEEKS PRIOR TO EXCAVATION, OR OTHER CONSTRUCTION ACTIVITY THAT MAY IMPACT THE UTILITY. CONTRACTOR SHALL ALSO CONTACT METHOW SALMON RECOVERY FOUNDATION PRIOR TO ANY CONSTRUCTION ACTIVITY IN THE AREA. CONTRACTOR SHALL PROVIDE ACCESS TO UTILITY OWNERS FOR MAINTENANCE AND WORK ON THEIR UTILITIES DURING THE COURSE OF THE WORK.
9. CONTRACTOR SHALL ENSURE THAT OPERATION OF EXISTING IRRIGATION, SEWER, DRAINAGE, DOMESTIC WATER, AND OTHER UTILITY SYSTEMS ARE CONTINUOUS DURING CONSTRUCTION.
10. RELOCATIONS AND/OR REPLACEMENTS OF EXISTING UTILITIES SHALL BE COORDINATED BY THE CONTRACTOR WITH THE UTILITY OWNER. CONTRACTOR SHALL CONTACT, SCHEDULE, AND ESTABLISH UTILITY SHUT DOWN TIMES AND DETERMINE THE RELOCATION AND/OR REPLACEMENT REQUIREMENTS OF EXISTING UTILITIES PRIOR TO THE START OF ANY WORK. THE UTILITY SHALL BE RELOCATED OR REPLACED TO THE SATISFACTION OF THE UTILITY OWNER.
11. IF APPLICABLE, CONSTRUCTION EASEMENTS SHALL NOT BE USED IN ANY MANNER THAT WILL CAUSE PERMANENT DAMAGE TO THE PROPERTY. DESCRIPTIONS OF THE EASEMENTS ACQUIRED FOR THE WORK WILL BE ON FILE AT THE OFFICE OF THE OWNER. CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE EASEMENT AGREEMENTS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
13. CONTRACTOR SHALL KEEP ALL CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS AND ANY TEMPORARY CONSTRUCTION OR PERMANENT EASEMENTS OBTAINED FOR THIS PROJECT, IF APPLICABLE. THIS INCLUDES, BUT IS NOT LIMITED TO, VEHICLES AND EQUIPMENT, LIMITS OF EXCAVATION, STOCKPILED EXCAVATED AND IMPORTED MATERIAL, BACKFILL MATERIAL, STREAMBED MATERIAL, AND WEIR MATERIAL. IF THE CONTRACTOR REQUIRES ADDITIONAL CONSTRUCTION EASEMENTS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN SUCH EASEMENTS FROM INDIVIDUAL PROPERTY OWNERS AND BEAR ALL ASSOCIATED COSTS.
14. UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR SPECIFICATIONS, ALL EXISTING ITEMS INCLUDING, BUT NOT LIMITED TO, STRUCTURES, IMPROVEMENTS, GROUNDWATER WELLS, SIGNS, FENCES, GATES, CURBS, PAVEMENT, BRIDGES, UTILITIES, IRRIGATION PIPELINES AND DITCHES, ETC. SHALL BE PROTECTED BY THE CONTRACTOR. IF SUCH ITEMS ARE DAMAGED OR MUST BE REMOVED OR MODIFIED TO FACILITATE CONSTRUCTION, CONTRACTOR SHALL FIRST NOTIFY THE OWNER AND THEN REPLACE THE ITEMS TO A LIKE OR BETTER CONDITION AT CONTRACTOR'S EXPENSE TO SATISFACTION OF OWNER OF FACILITIES.
15. REQUIREMENTS RELATED TO THE PROTECTION AND/OR REMOVAL OF TREES, VEGETATION, AND STRUCTURES WITHIN THE WORK AREA ARE TO BE COORDINATED WITH CONTRACTING OFFICER.
16. CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE TRENCH LIMITS NEEDED TO COMPLETE THE WORK IN CONFORMANCE WITH LOCAL, STATE AND FEDERAL CODES GOVERNING SHORING, SHEETING, BRACING OF EXCAVATIONS AND TRENCHES, AND FOR PROTECTION AND SAFETY OF THE WORKERS AND OTHER CONSTRUCTION RELATED PERSONNEL.
17. EXCAVATION SHALL MEET THE REQUIREMENTS OF OSHA 29 CFR PART 1926, SUBPART P. EXCAVATIONS. ACTUAL SLOPES SHALL NOT EXCEED THE MAXIMUM ALLOWABLE SLOPES (SUBPART P. APPENDIX B).
18. HORIZONTAL DATUM IS NAD83/91. HORIZONTAL COORDINATES SHOWN HEREIN ARE WASHINGTON STATE PLANE COORDINATE SYSTEM, NORTH ZONE, US SURVEY FEET.
19. VERTICAL DATUM IS NAVD 88, FEET.
20. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE INDICATED.
21. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
22. THE CONTRACTOR IS RESPONSIBLE FOR PRODUCING, IMPLEMENTING, ADHERING TO, AND MAINTAINING A STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH THE REGULATIONS AND GUIDELINES SET FORTH AND SUBJECT TO APPROVAL BY THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, WATER QUALITY PROGRAM. CONTRACTOR SHALL IMPLEMENT AND DOCUMENT ANY ADDITIONAL MEASURES NECESSARY TO PREVENT ANY EROSION OR HAZARDOUS MATERIALS FROM LEAVING THE SITE, DISCHARGING, BEING ENTRAINED, ABSORBED OR OTHERWISE ENTERING SURFACE WATERS, GROUND WATER OR SOILS.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES AT ALL TIMES. MAINTENANCE OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE CONSIDERED INCIDENTAL.
24. THE CONTRACTOR SHALL BE HELD SOLELY RESPONSIBLE FOR ANY NPDES OR OTHER APPLICABLE ENVIRONMENTAL PERMIT VIOLATIONS AND FINES.

LEGEND

- 1234— EXISTING GRADE CONTOURS
- 1234— FINISH GRADE CONTOURS

ABBREVIATIONS

APPROX	APPROXIMATE
CFS	CUBIC FEET PER SECOND
CONT	CONTINUOUS
CP	CONTROL POINT
CY	CUBIC YARD
E	EAST
EBM	ENGINEERED BANK MATERIAL
EL	ELEVATION
EXST	EXISTING
ESM	ENGINEERED STREAMBED MATERIAL
G	GRADE
H	HORIZONTAL
HWY	HIGHWAY
L	LENGTH
LF	LINEAR FOOT
LS	LUMP SUM
MAX	MAXIMUM
MIN	MINIMUM
MSRF	METHOW SALMON RECOVERY FOUNDATION
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OG	ORDINARY GROUND
OHW	ORDINARY HIGH WATER
PT	POINT
Q	FLOW
RD	ROAD
S	SOUTH
SF	SQUARE FOOT
SPEC	SPECIFICATION
STA	STATION
SY	SQUARE YARD
TYP	TYPICAL
USCS	UNIFIED SOIL CLASSIFICATION SYSTEM
W	WEST
WSE	WATER SURFACE ELEVATION

DATE AND TIME PLOTTED
AUGUST 1, 2012 11:39
PLOTTED BY
JHNELSEN

CAD SYSTEM
CALPLOT 16.28
CAD FILENAME
1678-100-1547.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
FCRPS HABITAT IMPROVEMENT PROGRAM

METHOW SUBBASIN

BEAVER CREEK
FORT-THURLOW ADAPTIVE MANAGEMENT PROJECT

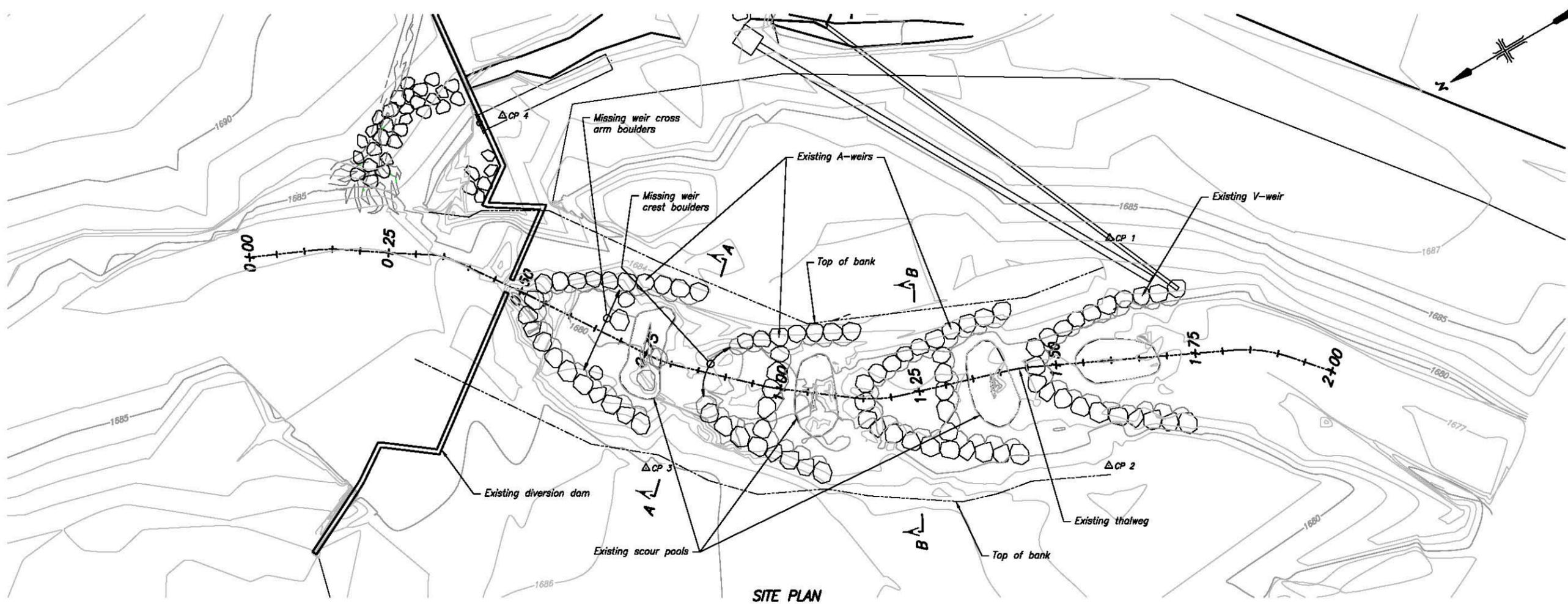
JUSTIN NIELSEN
DESIGNED
J. F. THOMAS
DRAWN
MIKE KNUTSON
CHECKED
MIKE KNUTSON P.E.
TECH. APPR.
SHARON PARKINSON P.E.
ADMIN. APPROVAL
MIKE BUNCH PROJECT MGR.
TITLE PROGRAM MANAGER

BOISE, ID 2012-09-02

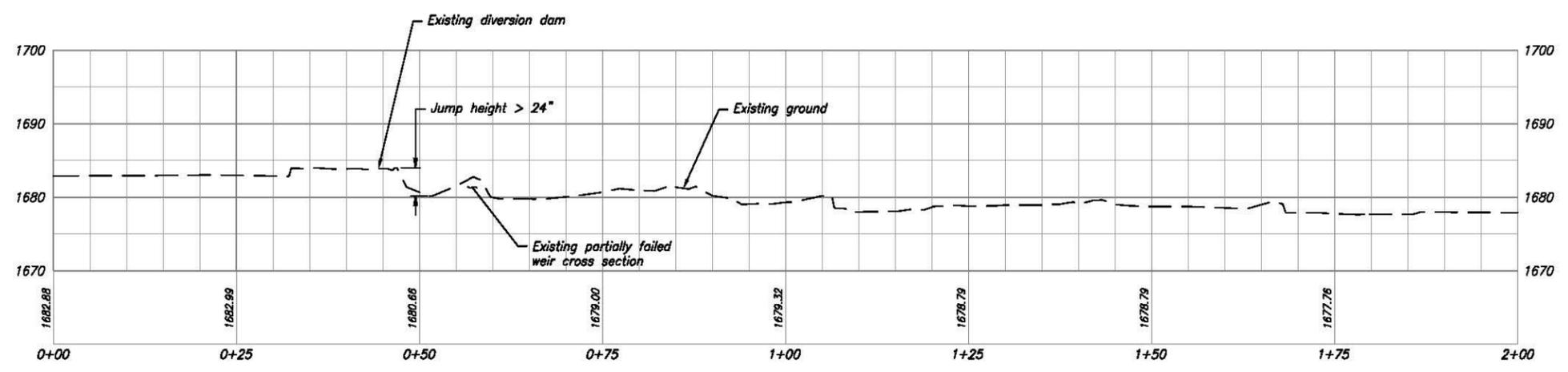
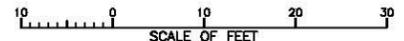
GENERAL NOTES
AND LEGEND

1678-100-1547

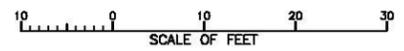
SHEET 1 OF 1



SITE PLAN



PROFILE



DATE AND TIME PLOTTED
AUGUST 1, 2012 11:33
PLOTTED BY
JANIELSEN

CAD SYSTEM
CAD FILENAME
1678-100-1548.DWG

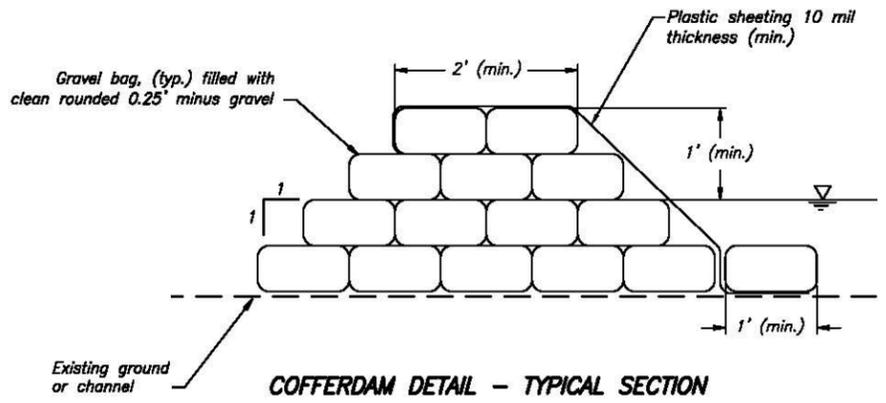
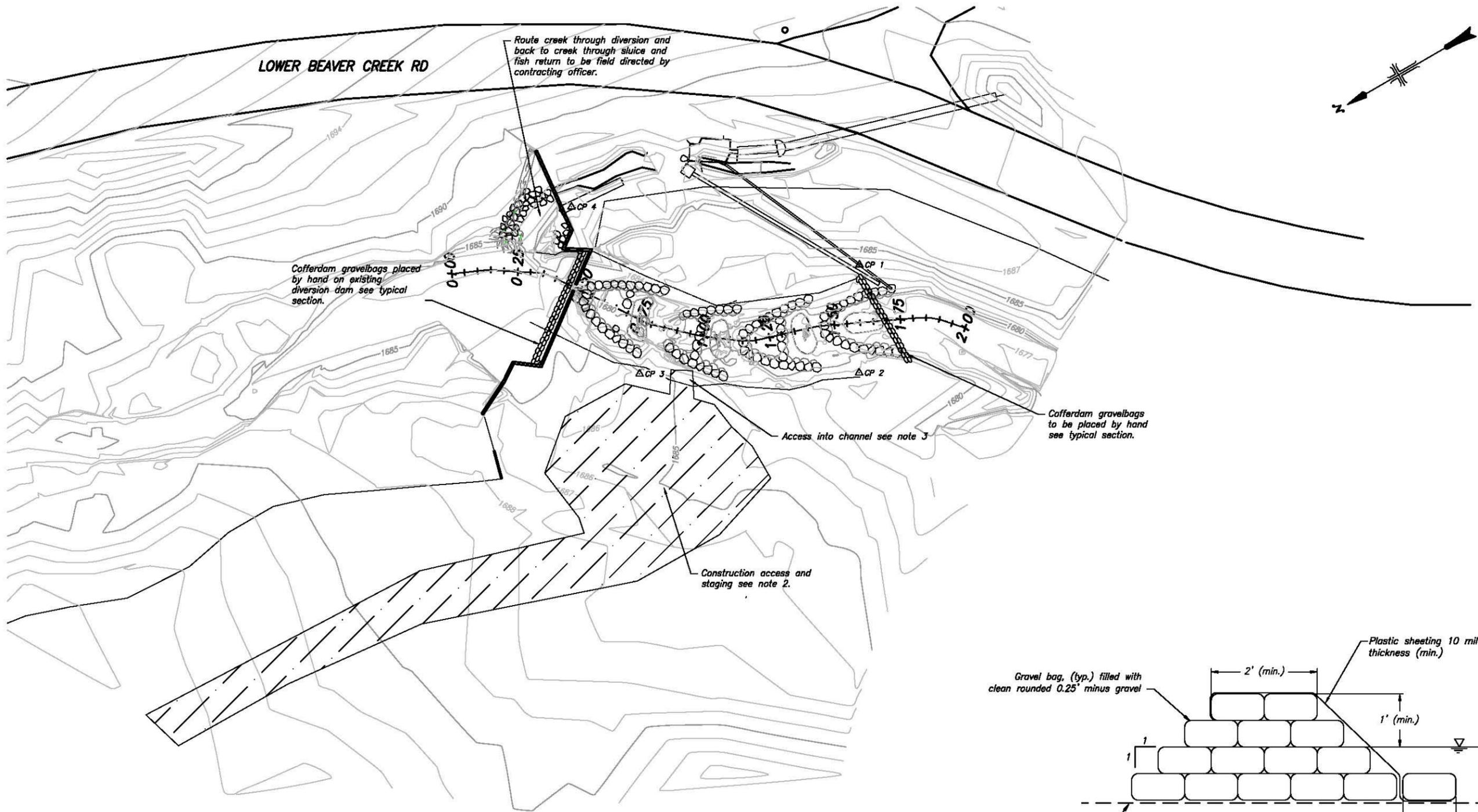
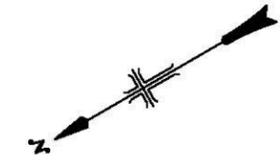
ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
FCRPS HABITAT IMPROVEMENT PROGRAM
METHOW SUBBASIN
BEAVER CREEK
FORT-THURLOW ADAPTIVE MANAGEMENT PROJECT

DESIGNED: JUSTIN NIELSEN
DRAWN: J. F. THOMAS
CHECKED: MIKE KNUTSON
TECH. APPR.: MIKE KNUTSON P.E.
NAME, PROF. ABBR.
ADMIN. APPROVAL: SHARON PARKINSON P.E.
NAME, DESIGN PROFESSION P.E.
TITLE, PROGRAM MANAGER
BOISE, ID 2012-09-02

EXISTING PLAN AND PROFILE

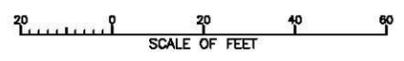
1678-100-1548
SHEET 1 OF 1



NOTES:

1. Revegetation of impacted areas to be addressed by others.
2. Access and staging to be staked by contracting officer.
3. Access into the channel to be in one location only to minimize disturbance. Location to be coordinated with contracting officer.
4. Defishing to be coordinated by contracting officer.
5. Lines and grades of grade control structures and roughened channel to be established by contracting officer under the direction of the engineer.

ACCESS, STAGING, AND DEWATERING PLAN



Control Points				
Point Number	Northing	Easting	Elevation	Description
CP 1	490666.89	1831241.42	1683.39	Yellow cap rebar
CP 2	490687.32	1831206.32	1681.84	Yellow cap rebar
CP 3	490759.26	1831247.38	1686.08	Yellow cap rebar
CP 4	490750.05	1831314.67	1689.85	Yellow cap rebar

DATE AND TIME PLOTTED
AUGUST 3, 2012 11:57
PLOTTED BY
JNIELSEN

CADD SYSTEM
CADD USER
CADD FILENAME
1678-100-1549.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
FCRPS HABITAT IMPROVEMENT PROGRAM

METHOW SUBBASIN
BEAVER CREEK

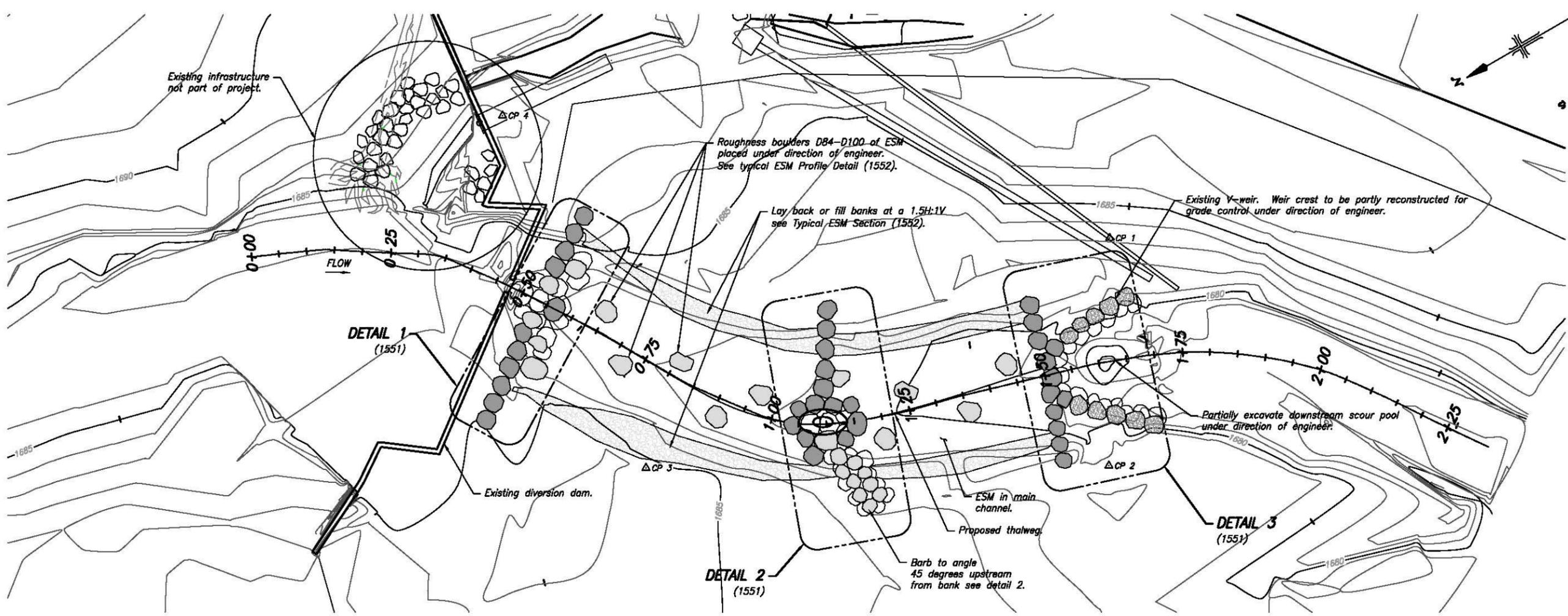
FORT-THURLOW ADAPTIVE MANAGEMENT PROJECT

DESIGNED
JUSTIN NIELSEN
DRAWN
MIKE KNUTSON
CHECKED
MIKE KNUTSON P.E.
TECH. APPR.
SHARON PARKINSON P.E.
ADMIN. APPROVAL
MIKE SWANSON PERSPECTIVE P.E.
TITLE PROGRAM MANAGER

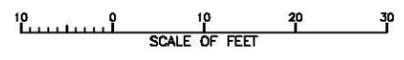
BOISE, ID 2012-08-02

ACCESS, STAGING, AND DEWATERING PLAN

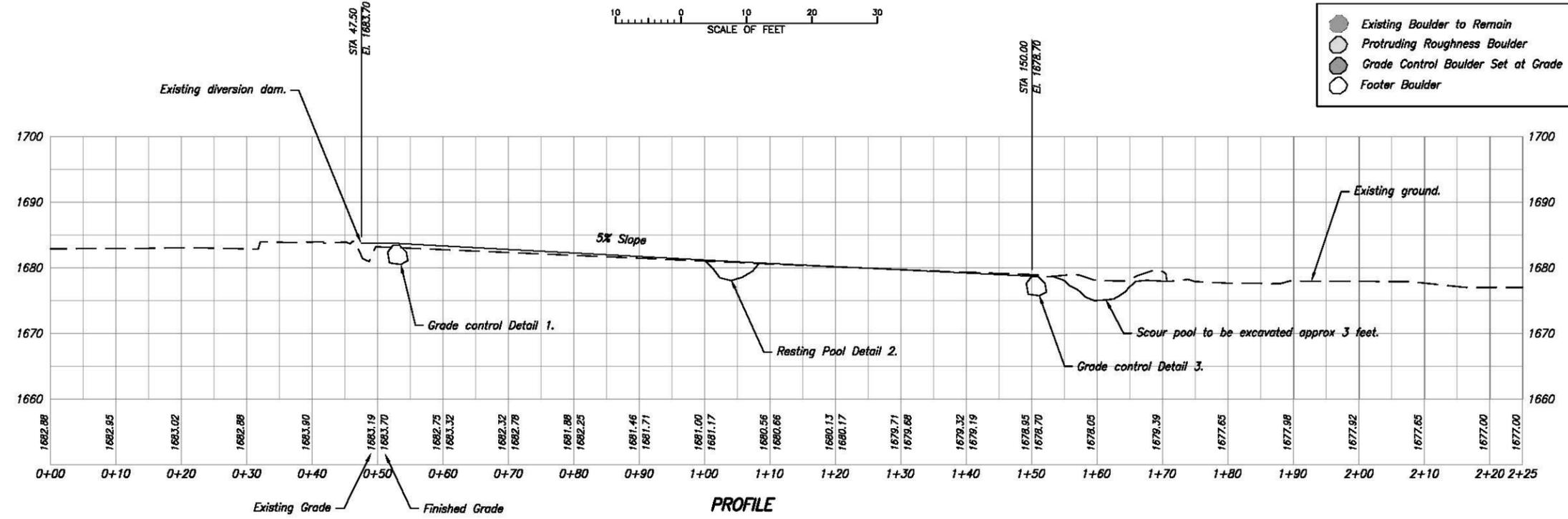
1678-100-1549
SHEET 1 OF 1



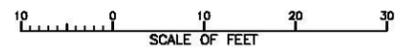
SITE PLAN



- Existing Boulder to Remain
- Protruding Roughness Boulder
- Grade Control Boulder Set at Grade
- Footer Boulder



PROFILE



DATE AND TIME PLOTTED
AUGUST 3, 2012 11:46
PLOTTED BY
JNIELSEN

CAD SYSTEM
CAD FILENAME
1678-100-1550.DWG

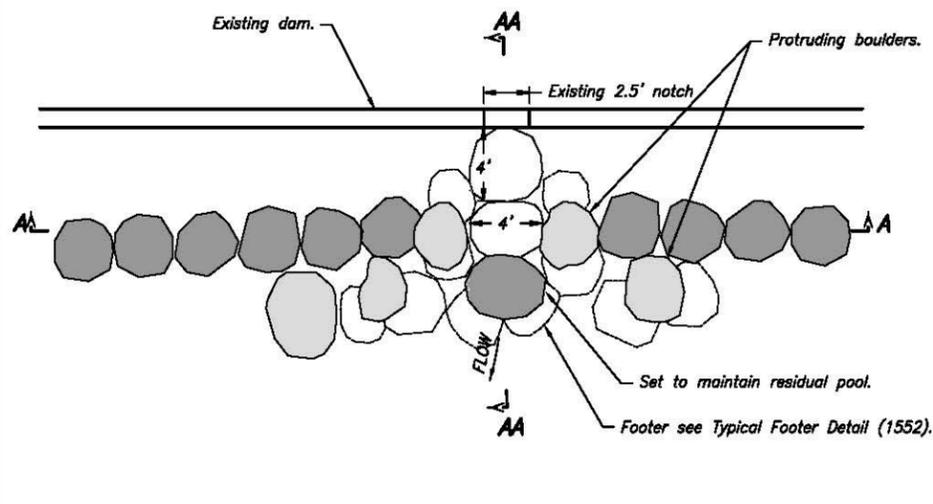
ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
FCRPS HABITAT IMPROVEMENT PROGRAM
METHOW SUBBASIN
BEAVER CREEK
FORT-THURLOW ADAPTIVE MANAGEMENT PROJECT

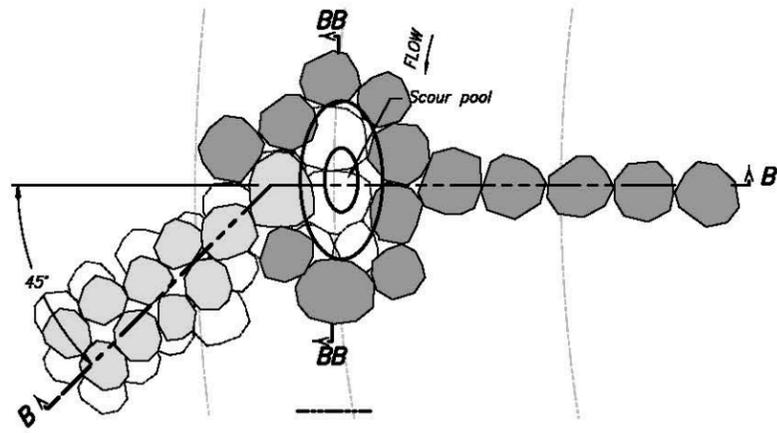
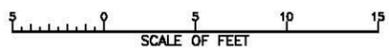
DESIGNED
JUSTIN NIELSEN
CHECKED
MIKE KNUTSON
TECH. APPR.
SHARON PARKINSON P.E.
NAME, PROF. ABBR.
MIKE KNUTSON P.E.
NAME, PROF. ABBR.
BOISE, ID 2012-08-02

ROUGHENED
CHANNEL PLAN
AND PROFILE

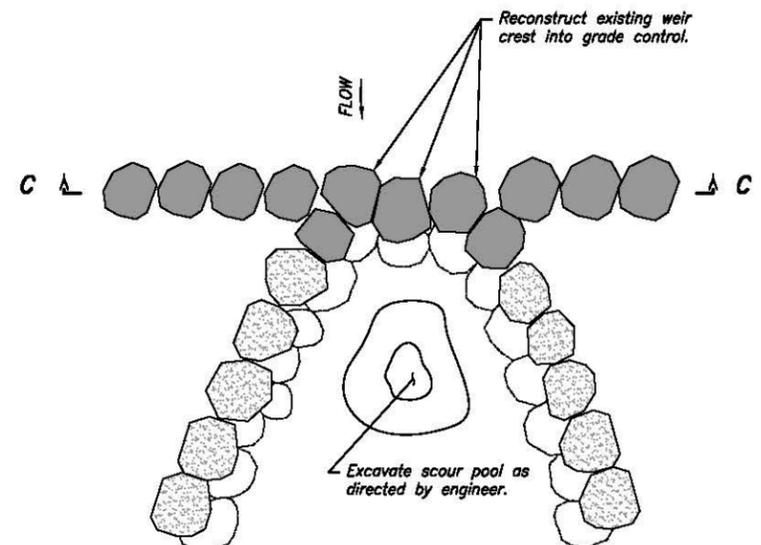
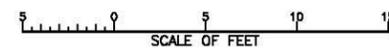
1678-100-1550
SHEET 1 OF 1



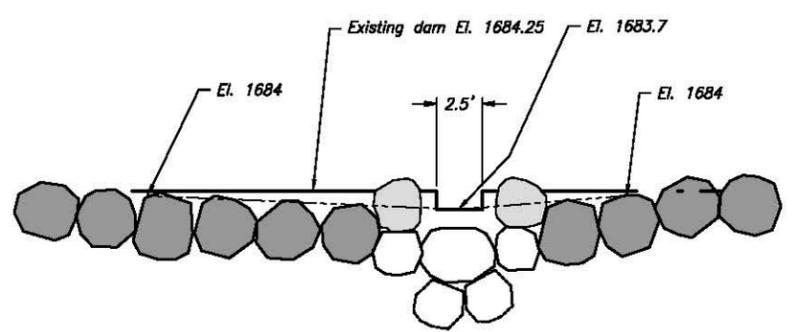
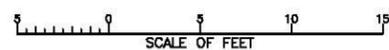
DETAIL 1 WEIR A STA. 0+53 (1550)



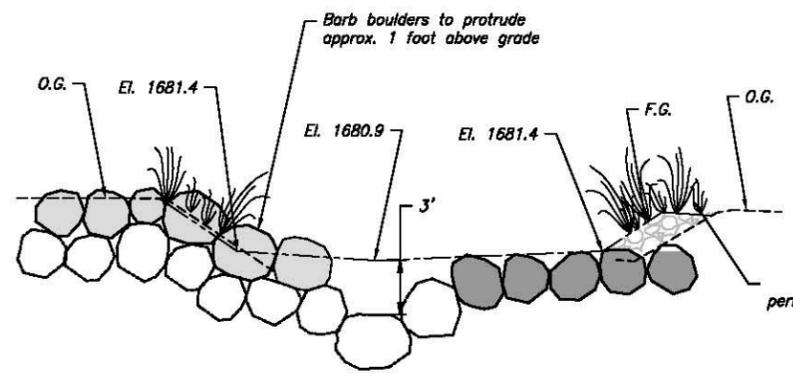
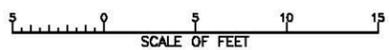
DETAIL 2 WEIR B STA. 1+10 (1550)



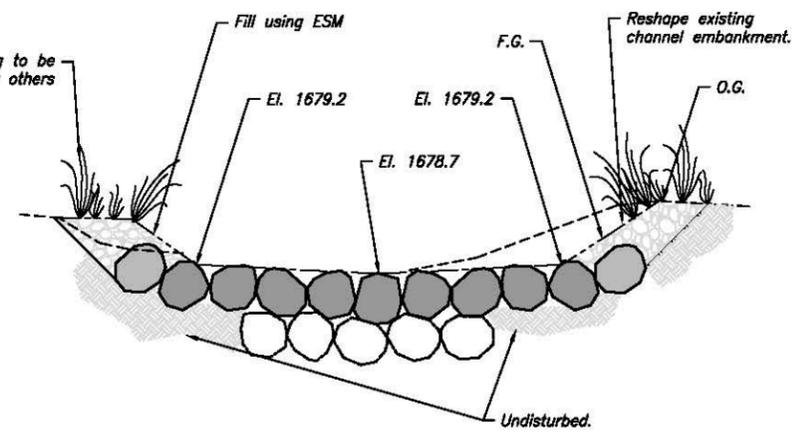
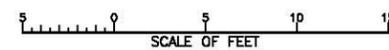
DETAIL 3 WEIR C STA. 1+50 (1550)



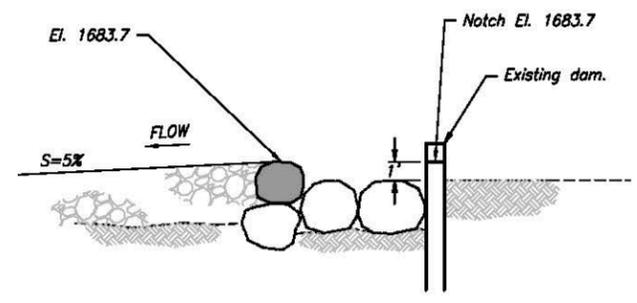
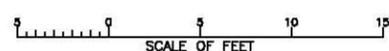
SECTION A-A



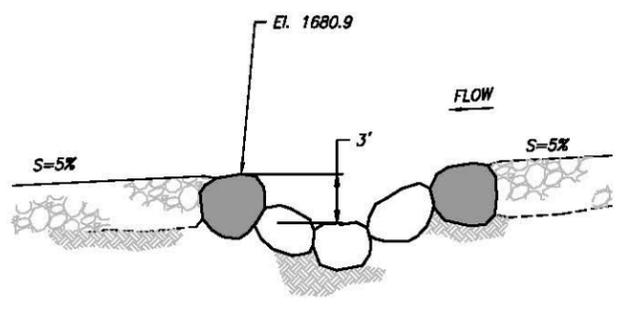
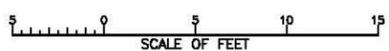
SECTION B-B



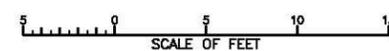
SECTION C-C



SECTION AA-AA



SECTION BB-BB



- Existing Boulder to Remain
- Protruding Roughness Boulder
- Grade Control Boulder Set at Grade
- Footer Boulder

DATE AND TIME PLOTTED: AUGUST 3, 2012 11:49 AM PLOTTED BY: JNIELSEN

CAD SYSTEM: CALDWELL 12.29 CAD FILENAME: 1678-100-1551.DWG

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
CORPS HABITAT IMPROVEMENT PROGRAM
METHOW SUBBASIN
BEAVER CREEK
FORT-THURLOW ADAPTIVE MANAGEMENT PROJECT

JUSTIN NIELSEN
DESIGNED
J.E. THOMAS, JUSTIN NIELSEN
DRAWN
MIKE KNUTSON
CHECKED
MIKE KNUTSON P.E.
TECH. APPR.
SHARON PARKINSON P.E.
NAME APPROVAL
MIKE KNUTSON P.E.
TITLE PROGRAM MANAGER

ROUGHENED CHANNEL
DETAILS AND SECTIONS

1678-100-1551
SHEET 1 OF 1

ENGINEERED STREAMBED MATERIAL (ESM)		
Gradation	% of Mix	Size
*D100	16%	4 feet
*D84	34%	2.5 feet
D50	34%	1 foot
D16	8%	2.25 inch
D8	8%	0.75 inches

FINES (USCS SILTY SAND)		
Gradation	% of Mix	US Sieve Size
D100	15% retained	No. 4
D85	55% retained	No. 200
D30	30% passing	No. 200

*Roughness and grade control boulders are considered D100-D84 of ESM.

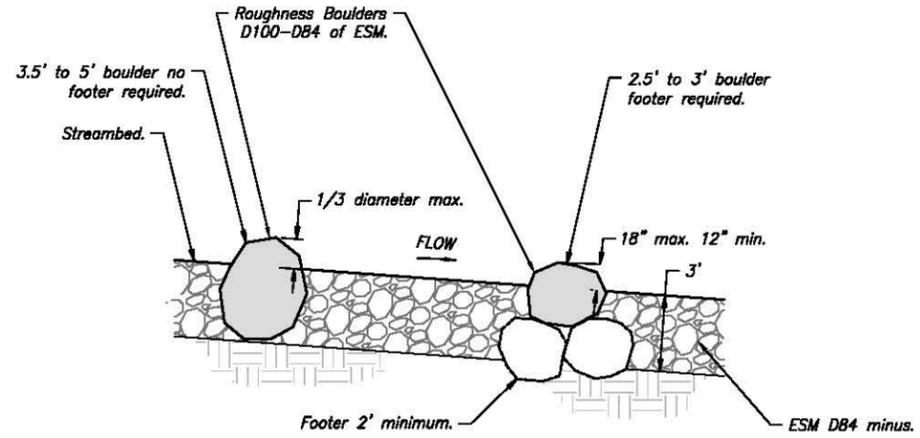
ESTIMATED QUANTITIES		
Material	Quantity	Units
Grade Control and Roughness Boulders	70	EA
ESM D84 minus	75	CY
Fines	25	CY
Approx. Area of Disturbance	0.2	acres

ESM NOTES

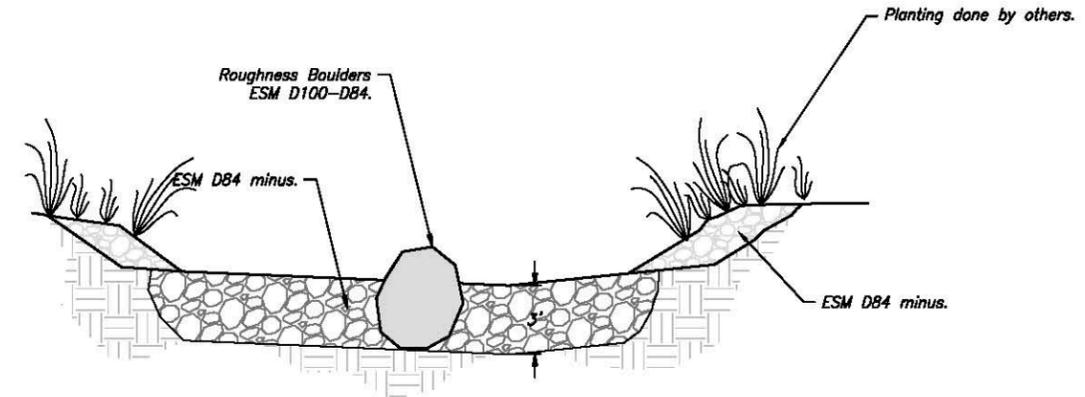
1. Obtain ESM material in three separate ranges of size, D100-D84, D84 minus, and fines. Store in separate piles onsite.
2. All material other than fines to be angular hard durable rock.
3. Use a 2" trash pump for sluicing/washing D16 minus material into voids. Nozzle may be required. Minimize turbidity by reusing water used for sluicing/washing.

CONSTRUCTION SEQUENCING

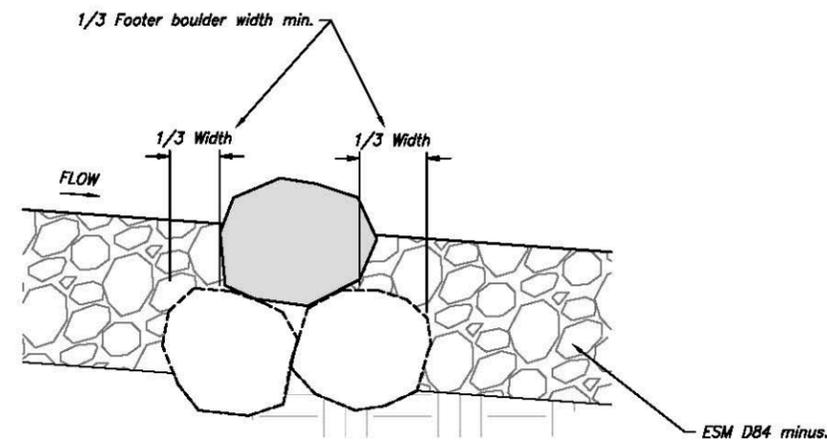
1. Remove crest rocks of existing A-weirs and sort material for reuse as ESM.
2. Excavate to bottom grade of ESM. Leave footer rocks from existing weirs in place. Sort material for reuse as ESM.
3. Excavate scour pool near Sta. 1+60 use as sump for dewatering and sluicing/washing ESM material into voids.
4. Finished grading to proceed from downstream to upstream moving stepwise a distance within swing radius of excavator constructing channel/banks then moving to next section.
5. Build grade control structures and place roughness boulders within swing radius of excavator under direction of engineer.
6. Begin placing D84 minus of ESM around grade control structures and roughness boulders. Use max. 1' lifts and bucket compact with excavator.
7. Add fines and wash/sluice material liberally and continuously into voids reusing water from sump to minimize turbidity until all voids are filled and water sheets over placed material.
8. Repeat steps 6-7 until grade of roughened channel is reached.
9. Lay back or fill slopes using ESM D84 minus or excavated material at 1.5H:1V under direction of engineer.
10. Wash fines into voids to completely seal banks.
11. Move upstream repeating steps 5-10 until roughened channel is complete.



TYPICAL ESM PROFILE DETAIL (1550)



TYPICAL ESM SECTION DETAIL (1550)



TYPICAL FOOTER DETAIL (1551)

- Existing Boulder to Remain
- Protruding Roughness Boulder
- Grade Control Boulder Set at Grade
- Footer Boulder

DATE AND TIME PLOTTED: AUGUST 3, 2012 11:52 AM
PLOTTED BY: JHWELSH

CAD SYSTEM: MICROSOFT VISIO 10.2.0
CAD FILENAME: 1678-100-1552.DWG

ALWAYS THINK SAFETY
 U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
 COLUMBIA/SNAKE RIVER SALMON RECOVERY PROGRAM
 FORPS HABITAT IMPROVEMENT PROGRAM
METHOW SUBBASIN
 BEAVER CREEK
 FORT-THURLOW ADAPTIVE MANAGEMENT PROJECT

JUSTIN NIELSEN
 DESIGNED
 JUSTIN NIELSEN
 DRAWN
 MIKE KNUTSON
 CHECKED
 MIKE KNUTSON P.E.
 TECH. APPR.
 SHARON PARKINSON P.E.
 ADMIN. APPROVAL
 MIKE KNUTSON P.E.
 TITLE PROGRAM MANAGER
 BOISE, ID 2012-08-02

ENGINEERED STREAMBED MATERIAL
1678-100-1552
 SHEET 1 OF 1

JARPA Attachment 4

Fort Thurlow Documentation of HPA Fee Exemption



OKANOGAN COUNTY WASHINGTON



TAXSIFTER

[SIMPLE SEARCH](#) [SALES SEARCH](#) [REETSIFTER](#) [COUNTY HOME PAGE](#) [CONTACT](#) [DISCLAIMER](#)

Scott D. Furman
Okanogan County Assessor 149 3rd North Avenue, Room 202 Okanogan, WA 98840

Assessor **Treasurer** **Appraisal** **MapSifter**

Parcel

Parcel#: 9100300000
Land Use Code: 83 - Resource - Agriculture Current Use
Situs:
Map Number: 33-22-22
Status:
Description: COMMON AREA TICE RANCH LLC PD 95-01
Comment: PLATTED 3322220177 3322230007 0014 3322260025 3322270282 0283 TO 9100300000 0100 0200 0300 0400 FOR PAY 2005 DUE TO OWNER REQUEST. DELETED 20.66 AC DUE TO SURVEY.

Owner Name: TICE RANCH LP
Address1:
Address2: 7326 BOWLEYN PL S
City, State: SEATTLE WA
Zip: 98118

Land

Land - Land

Land Code	Unit Type	Units	Land Shape	Width	Depth
Land1	Acres	8.48000000	Rectangular		
Land1	Acres	3.73000000	Rectangular		
Land1	Acres	125.06000000	Rectangular		
Land1	Acres	10.15000000	Rectangular		
Land5	Acres	38.00000000	Rectangular		
Land5	Acres	52.71000000	Rectangular		
Land5	Acres	40.00000000	Rectangular		
FirePatrol	Fire Acres	45.00000000	Rectangle		

JARPA Attachment A

Additional Property Owners – Fort Thurlow Diversion

**WASHINGTON STATE
Joint Aquatic Resources Permit
Application (JARPA) [\[help\]](#)**



AGENCY USE ONLY

Date received: _____

Agency reference #: _____

Tax Parcel #(s): _____

TO BE COMPLETED BY APPLICANT [\[help\]](#)

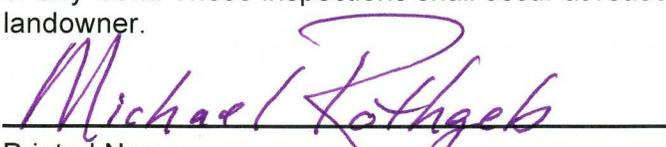
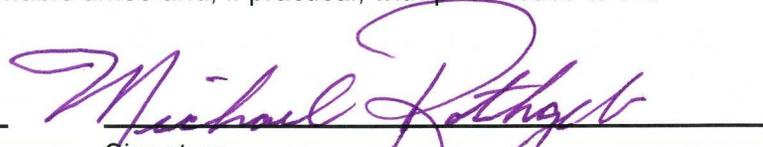
Project Name: _____

**Attachment A:
For additional property owner(s) [\[help\]](#)**

Use this attachment only if you have more than one property owner. Complete one attachment for each additional property owner impacted by the project.

Signatures of property owners are not needed for repair or maintenance activities on existing rights-of-way or easements.

Use black or blue ink to enter answers in white spaces below.

1. Name (Last, First, Middle) and Organization (if applicable)			
Rothgieb, Michael; Tice Ranch LP			
2. Mailing Address (Street or PO Box)			
7326 Bowleyn Pl S			
3. City, State, Zip			
Seattle, WA 98118			
4. Phone (1)	5. Phone (2)	6. Fax	7. E-mail
()	()	()	
Address or tax parcel number of property you own:			
9100300000			
Signature of Property Owner			
I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.			
			
Printed Name		Signature	

If you require this document in another format, contact the Governor's Office of Regulatory Assistance (ORA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORA publication number: ENV-020-09 rev. 06-12

JARPA Attachment B

Additional Property Owners – Fort Thurlow Diversion

WASHINGTON STATE
Joint Aquatic Resources Permit
Application (JARPA) [\[help\]](#)



Attachment B:
For additional project location(s) [\[help\]](#)

Use this attachment only if you have more than one project location.

Use a separate form for each additional location.

Use black or blue ink to enter answers in white spaces below.

AGENCY USE ONLY

Date received: _____

Agency reference #: _____

Tax Parcel #(s): _____

TO BE COMPLETED BY APPLICANT [\[help\]](#)

**Project Name: Beaver Creek Weirs
Renovation Project – Marracci Diversion &
Fort Thurlow Diversion**

**Location Name (if applicable): Fort
Thurlow Diversion**

1. Indicate the type of ownership of the property. (Check all that apply.) [\[help\]](#)

Private
 Federal
 Publicly owned (state, county, city, special districts like schools, ports, etc.)
 Tribal
 Department of Natural Resources (DNR) – managed aquatic lands (Complete [JARPA Attachment E](#))

2. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 16) [\[help\]](#)

West of Lower Beaver Creek Road, just South of its intersection with State Route 20.

3. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [\[help\]](#)

Twisp, WA, 98856

4. County [\[help\]](#)

Okanogan County

5. Provide the section, township, and range for the project location. [\[help\]](#)

¼ Section	Section	Township	Range
SW	23	33N	22E

6. Provide the latitude and longitude of the project location. [\[help\]](#)

- Example: 47.03922 N lat. / -122.89142 W long (Use decimal degrees - NAD 83)

48.342071 N lat/-120.048249 W long

7. List the tax parcel number(s) for the project location. [\[help\]](#)

- The local county assessor's office can provide this information.

9100300000

8. Contact information for all adjoining property owners. (If you need more space, use [JARPA Attachment C.](#)) [\[help\]](#)

Name	Mailing Address	Tax Parcel # (if known)
SHEELY, BRANDON AND SCHRAGER, LAURA	134 LOWER BEAVER CREEK RD	3322230022
	TWISP WA 98856	
STOKES & STOKES LLC	20647B HWY 20	3322230027
	TWISP, WA 98856	
SONNICHSEN, ROSALYN	4117 LAKESHORE DR	3322230019
	MOSES LAKE, WA 98837	
SEE ATTACHMENT C		

9. List all wetlands on or adjacent to the project location. [\[help\]](#)

There are no wetlands on or adjacent to the project location.

10. List all waterbodies (other than wetlands) on or adjacent to the project location. [\[help\]](#)

Beaver Creek

11. Is any part of the project area within a 100-year flood plain? [\[help\]](#)

Yes No Don't know Beaver Creek is not mapped for the 100-year floodplain in the project areas; however, all project areas are within and adjacent to the creek.

12. Briefly describe the vegetation and habitat conditions on the property. [\[help\]](#)

This project includes areas within Beaver Creek, adjacent deciduous riparian forest, and vegetated uplands. Portions of the project areas were previously disturbed during initial weir construction during and were successfully re-vegetated with a mixture of grass, forb, and shrub species. Beaver Creek is a small snowmelt-fed stream, which provides spawning, rearing, and migration habitat for steelhead, bull trout, spring Chinook salmon, and other fish species.

Fort Thurlow Diversion: The diversion is located on the left bank of Beaver Creek. Up and downstream from the project areas, bank vegetation is a narrow riparian forest. Within the project areas, the bank vegetation is mostly grasses and low shrubs. On the right bank, an agricultural field lies adjacent to the riparian area; on the left bank, the creek and narrow riparian zone are adjacent to Lower Beaver Creek Road.

13. Describe how the property is currently used. [\[help\]](#)

Fort Thurlow Diversion:

The property surrounding the immediate area where the project will occur is currently used for agricultural purposes and for livestock. There is a private residence that also serves as a group retreat. An irrigation diversion (Fort Thurlow) diverts flow from Beaver Creek to serve the properties outside of the project area for agriculture.

14. Describe how the adjacent properties are currently used. [\[help\]](#)

Land uses in the surrounding area consist of primarily of agricultural (including hay production and livestock range operations) and rural residential.

15. Describe the structures (above and below ground) on the property, including their purpose(s). [\[help\]](#)

The project is related to two irrigation diversions and associated canals that supply water for agricultural use to properties both inside and outside the project area. Additional structures on the properties include single-family residences with associated domestic ground water wells and appurtenances, and utilities to serve the wells and surrounding uses. Barns and outbuildings are used for livestock and farming operations. These structures will not be impacted by the project.

16. Provide driving directions from the closest highway to the project location, and attach a map. [\[help\]](#)

Fort Thurlow Diversion:

From Highway 20 eastbound from Twisp, turn right (south) onto Lower Beaver Creek Road and drive 0.5 miles to a pullout on right. The project site is adjacent to Lower Beaver Creek Road. See Fort-Thurlow Adaptive Management Project Drawing – Sheet 1 (1689-100-1546; Location Map) for a map.

If you require this document in another format, contact the Governor's Office of Regulatory Assistance (ORA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORA publication number ENV 021-09 rev. 06-12

JARPA Attachment C

Adjoining Property Owners – Fort Thurlow Diversion



US Army Corps
of Engineers
Seattle District

WASHINGTON STATE Joint Aquatic Resources Permit Application (JARPA) [\[help\]](#)

Attachment C: Contact information for adjoining property owners. [\[help\]](#)

Use this attachment only if you have more than four adjoining property owners.

Use black or blue ink to enter answers in white spaces below.

AGENCY USE ONLY

Date received: _____

Agency reference #: _____

Tax Parcel #(s): _____

TO BE COMPLETED BY APPLICANT [\[help\]](#)

Project Name: Beaver Creek Weirs
Renovation Project – Marracci
Diversion & Forth Thurlow Diversion

Location Name (if applicable): Fort
Thurlow Diversion

1. Contact information for all adjoining property owners. [\[help\]](#)

Name	Mailing Address	Tax Parcel # (if known)
THURLOW, SUE	52 THURLOW RD TWISP, WA 98856	3322230021
LAGSDIN, SUSAN	1521 AVON COURT NW EAST WENATCHEE, WA 98802	3322260018
JOHNSON, DONALD A & KAREN	PO BOX 95 TWISP, WA 98856	3322260010
OTT, GARY	61 LOWER BEAVER CRK RD TWISP, WA 98856	3322260022
THOMPSON, MARY ETAL	47 LOWER BEAVER CREEK RD TWISP, WA 98856	3322260021
PORT, MICHAEL	PO BOX 794 TWISP, WA 98856	3322270274
BARKER, ELDRED	PO BOX 934 TWISP, WA 98856	3322220161 3322230010
KORESKE, STEPHEN	PO BOX 95 TWISP, WA 98856	3322270289

If you require this document in another format, contact the Governor's Office of Regulatory Assistance (ORA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341.
ORA publication number: ENV-022-09 rev. 06-12

KULSRUD, ROCKY & KATHRYN	PO BOX 505	3322270318
	TWISP, WA 98856	
MARTINSON, RONALD & ANN	4480 TWIN LAKES DR	3322260027
	BELLINGHAM, WA 98226	
MONEGAN, JAMES	20423 HWY 20	3322220185
	TWISP, WA 98856	
ROGERS, EDWIN & JENNIFER	PO BOX 1297	8832400200
	TWISP, WA 98856	
ROGERS, HENRY	PO BOX 554	8832400100
	TWISP, WA 98856	
SEA-REAL CORP	PO BOX 1201	3322220162
	EVERETT, WA 98206	3322220165
SMITH, MORGAN	40 WAGNER RD	3322220004
	TWISP, WA 98856	
WAGNER, PAUL	21 WAGNER RD	3322220163
	TWISP, WA 98856	

Restoration Programmatic for the State of Washington Specific Project Information Form

U.S. Army Corps of Engineers, Seattle District, Regulatory Branch

July 29, 2008 version

Use this form to notify the U.S. Army Corps of Engineers, Seattle District (Corps) of a proposed restoration project that falls within the range of the nine restoration activities considered by National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) during its Section 7 of the Endangered Species Act (ESA) consultation (NMFS Reference No. 2008/03598; USFWS Reference No. 13410-2008-F-0209). You may also use this form if your project slightly deviates from the description and scope of the nine project categories addressed in this consultation. However, should the resulting impacts exceed those considered in the NMFS and USFWS Biological Opinion you will need to consult individually (which generally takes longer) and potentially provide additional information. The Corps is responsible, in most cases, for ensuring that a project complies with the requirements of Section 106 of the National Historic Preservation Act.

Table of Contents

I GENERAL INFORMATION	1
II EFFECT DETERMINATIONS FOR FISH SPECIES USFWS & NMFS	19
III EFFECT DETERMINATIONS FOR LISTED TERRESTRIAL SPECIES	31
IV SIGNATURE	37
APPENDIX A: DEWATERING AND FISH CAPTURE PROTOCOL	38

I GENERAL INFORMATION

A. **Date:** April 2, 2013 **Corps reference no.:** _____

B. **Applicant name** (same as in JARPA): Chris Johnson, Methow Salmon Recovery Foundation

Address PO Box 755

Twisp, WA 98856

C. **Agent Name** (same as on JARPA): N/A

Address: _____

D. **Location(s) of activity:**

Location 1: Marracci Diversion

Section: 35 Township: 34N Range: 22E

Latitude (xxx° xx' xx.x"): 48° 24' 5.9"

Longitude (xxx° xx' xx.x"): -120° 2' 29.76"

UTM: Zone 10: 5365171m N, 718954m E

Waterbody: Beaver Creek County: Okanogan

ESU or IRU: Upper Columbia

Location 2: Fort Thurlow Diversion

Section: 23 Township: 33N Range: 22E

Latitude (xxx° xx' xx.x"): 48° 20' 31.455"

Longitude (xxx° xx' xx.x"): -120° 2' 53.6958"

UTM: Zone 10: 5358514m N, 718629m E

Waterbody: Beaver Creek County: Okanogan

ESU or IRU: Upper Columbia

E. Project elements. In the table below, fill in the maximum length of each project element proposed and the number of structures where applicable. This information will be used by the Services for calculating your take exemption:

Action Category	Project Length and Width where applicable	Number of Structures
1. Fish Passage:		
a. Culvert Replacement and Relocation		
b. Retrofitting Culverts		
c. Culvert Removal		
d. Tidegate Removal		
e. Removal or Modification of Sediment Bars or Terraces		
f. Temporary Placement of Sandbags, Hay Bales and Ecology Blocks		
g. Construction of Structures to Provide Passage over Small Dams	Approximately 120 ft long by 40 ft wide; approximately 100 ft long by 40 ft wide	2 roughened channels
2. Installation of Instream Structures:		

Action Category	Project Length and Width where applicable	Number of Structures
a. Placement of Woody Debris		
b. Placement of Live Stakes		
c. Placement of Engineered Log Jams		
d. Grade Control ELJs		
e. Trapping Mobile Wood		
f. Placement of Boulders		
g. Boulder Weirs and Roughened Channels	Approximately 120 ft long by 40 ft wide; approximately 100 ft long by 40 ft wide	2 roughened channels
h. Gravel Placement Associated with Structure Placement		
3. Levee Removal and Modification		
4. Side Channel/Off Channel Habitat Restoration and Reconnection		
5. Salmonid Spawning Gravel Restoration		
6. Forage Fish Spawning Gravel Restoration		
7. Hardened Fords and Fencing for Livestock Stream Crossings		
8. Irrigation Screen Installation and Replacement		
9. Debris and Structure Removal		

F. Description of the proposed work: [Describe the work to be accomplished including purpose, number and type of structures to be installed or constructed, construction materials and machinery to be used, and anticipated construction techniques to be employed. You may attach additional pages or, if completing this form by computer, expand the space below to provide this information. Attach maps or drawings to clearly illustrate the location, nature, and extent of the proposed work.]

Project Summary

Methow Salmon Recovery Foundation (MSRF) proposes to renovate two existing rock weir irrigation diversion complexes in Beaver Creek, a tributary of the Methow River, Okanogan County, WA. The two irrigation diversions are the Marracci diversion at river mile (RM) 6.5 and the Fort Thurlow diversion at RM 1.5. Both diversions were previously modified with a goal of providing fish passage while maintaining irrigation diversions. The diversions were previously modified between 2003 and 2005 to include a series of rock vortex weirs designed to improve fish passage. These weir complexes provided a series of drops (each no more than 0.8 ft) to improve fish passage while maintaining adequate water diversion to irrigators and to reduce instream impacts of annual weir construction.

Subsequent monitoring following an unusually high flow spring runoff event in 2011 indicated that a number of the weirs had sustained damage to the point that they no longer met NOAA Fisheries' fish passage criteria for all life stages and all flows. Bureau of Reclamation (Reclamation) engineers reviewed the data and determined that although the weirs had functioned well for several years prior to flood damage, a revised structural design to maintain fish passage at all flows over a longer term was indicated. Reclamation developed revised designs for the affected diversions to address the damage and improve long-term function. These proposed renovations will: 1) restore fish passage in compliance with NOAA criteria for fish passage (0.8 ft. maximum drop) and 2) optimize intake performance for agricultural use, thereby eliminating the need for seasonal instream actions by irrigators, which could hinder fish passage.

Marracci Diversion: The existing rock weir diversion was constructed in 2005 to provide fish passage. High flows in 2006 displaced two rocks in the weir crest, scoured out and lowered the downstream pool, and eroded the right bank upstream of the diversion. This damage was repaired during low flows in 2006. To prevent head cutting and continued scour in the pool below the weir rocks in the weir crest, another line of large boulders were placed during repairs at the start of the pool tail-out riffle. Extended high flows in 2011 moved several of the large boulders composing the weir and damaged the diversion intake trash rack. As a result, fish passage is poor and water surface elevation at the diversion intake is too low. A revised design was selected by MSRF and Reclamation to reconstruct the existing weir with a more natural roughened channel structure. This proposed renovation will: 1) restore fish passage in compliance with NOAA criteria for fish passage and 2) optimize intake performance for agricultural use, thereby reducing the need for seasonal instream actions by irrigators, which could hinder fish passage.

Fort Thurlow Diversion: The existing concrete dam was modified between 2003 and 2005 to include a series of four rock vortex weirs designed to improve fish passage. This weir complex provided a series of drops (each no more than 0.8 ft) for fish passage over the original 5.5 ft-high concrete irrigation diversion dam to improve fish passage while maintaining adequate water diversion to irrigators and to reduce instream impacts of annual weir construction/modification. Subsequent monitoring following extended high flows in 2011 indicated that the new weirs had sustained damage to the point that they no longer met NOAA Fisheries fish passage criteria for all life stages and all flows. Reclamation engineers determined that although the weir complex had functioned well for several years prior to flood damage, a revised structural design to maintain fish passage at all flows over a longer term was indicated. A revised design was selected by MSRF and Reclamation to reconstruct the drop weirs with a more natural roughened channel structure. This proposed renovation will: 1) restore fish passage in compliance with NOAA's fish passage criteria and 2) optimize intake performance for agricultural use, thereby significantly reducing the need for seasonal instream actions by irrigators, which could hinder fish passage.

Project Purpose

The purpose of the project is to restore fish passage at two irrigation diversions on Beaver Creek. Unusually high and sustained spring peak flows in Beaver Creek in 2011 resulted in failure of several of the constructed weirs. Estimates place the flow above a 20-year event (approximately 850 cfs, with the creek above bank full for 6 weeks). The damage sustained by the weir complexes compromised their function and impeded fish passage through increased drops.

Marracci Diversion: A Reclamation site visit on July 12, 2011 and subsequent topographic survey of the area on July 13, 2011 noted that several boulders from the weir tipped into the scour pool, a large log was located on the river left arm of the weir, and the trash rack was severely damaged. The movement of the weir rocks lowered the water surface elevation at the diversion intake substantially. Failure to address these problems will likely result in further degradation, resulting in increased drop height and decreased diversion for irrigation.

Fort Thurlow Diversion: A Reclamation topographic survey of the area on Aug. 16, 2011 noted that several boulders from the upstream weirs had moved downstream, compromising the structures. The two upper weirs were undermined, resulting in a combined 2 ft. drop between the damaged weirs, which is well outside of fish passage criteria. Also, the displaced boulders compromise the integrity of the structures, increasing the potential of additional boulders mobilizing downstream. Failure to address these problems will likely result in further degradation, resulting in increased drop heights between structures and decreased diversion for irrigation.

Project Description

Beaver Creek is not mapped for the 100-year floodplain in the project areas. The proposed Beaver Creek Weir Renovation Project is located within both the active channel and the estimated 100-year floodplain of Beaver Creek. Project construction on the Marracci diversion will likely occur in early- to late-October, outside of the irrigation season & during minimal flow conditions to minimize impact to the aquatic environment and surrounding riparian. Project

construction on the Fort Thurlow diversion will likely occur in September during minimal flow conditions to minimize impact to the aquatic environment and surrounding riparian.

Construction will take place during the irrigation season to allow diverted water to be routed down the irrigation canal until it is below the project area, where it will be routed back to the creek channel through the existing fish bypass. Actual start dates at both sites will be dependent on irrigation schedules and creek flows. The areas at both Marracci and Fort Thurlow were previously disturbed during initial construction of the projects in 2003 and 2005. Construction at each diversion will take a total of approximately 2-3 weeks to complete.

Marracci Diversion:

Site Access:

Project access will be provided via an existing gravel driveway off of Upper Beaver Creek Road, as shown on Marracci Diversion Drawings - Sheet 6 of 7 (1678-100-1558; Access Staging and Dewatering Plan).

Construction Elements:

NOTE: This section includes brief descriptions of the recommended work area isolation and water control procedures for the project. A recommended dewatering plan is shown on Marracci Diversion Drawings - Sheet 6 of 7 (1678-100-1558; Access Staging and Dewatering Plan). However, the contractor will be responsible for developing the final water control and work area isolation plan. In the event that the contractor's plan deviates significantly from the recommended dewatering plan, the contractor will be required to seek approval from the permitting agencies prior to construction.

Cofferdam Construction:

Two cofferdams will be required to isolate the work area from the active flow of the creek. The upstream cofferdam will be located immediately upstream of the existing intake structure. The lower cofferdam will be constructed immediately downstream of the work site. Marracci Diversion Drawings - Sheet 6 of 7 (1678-100-1558; Access Staging and Dewatering Plan) shows the conceptual plan for cofferdam placement. It is anticipated that the placement of the cofferdam materials would be conducted by hand. The cofferdam structures will likely be formed by clean washed gravel-filled bags (gravel bags) with a synthetic membrane such as PVC or HDPE (plastic sheeting) placed on the outside of the gravel bags, then folded over the top of the gravel bags and secured on both inside and outside of the cofferdam to reduce seepage into the work area. The footprint of the cofferdams would be as small as possible to accommodate proposed work while minimizing impact to river substrate. The flows at the time of project construction in early fall are expected to be near base flow levels of approximately 7 cfs. All flow will be routed through a 30" HDPE bypass pipe, around the project site, and back into the stream immediately below the project site. As such, the site will be fully dewatered of surface flows.

Dewatering, Fish Handling and Salvage:

Gravel bags will be placed on the existing dam structure and left overnight to gradually reduce stream flow to the project site and to encourage fish to leave the area on their own prior to

defishing activities. When this cofferdam is placed, a bypass pipe will be placed to divert upstream water around the project site. A fish salvage crew will be on hand in case flow shuts down more quickly than expected. Fish handling and salvage will be conducted by professionally qualified and experienced fisheries biologists and technicians. To reduce impacts to ESA-listed salmonid species, fish removal will be completed for the entire length of the project site prior to any construction activities. Once the project site is isolated at the upstream end and flows have been reduced, the fish salvage crew will make one downstream pass with the electro-fisher. The downstream end of the site will then be netted off to prevent fish from reentering the area. . Once the project site is isolated, qualified fish biologists will begin to remove any remaining fish using approved methods according to the terms of the Dewatering and Fish Capture Protocol given in Appendix A of the 2008 U.S. Army Corps of Engineers' Restoration Programmatic for the State of Washington. The project site is not conducive to using seines to salvage fish because of the large rocks in the channel. De-fishing may be coordinated with the USGS so the captured fish can be measured and tagged as part of their on-going monitoring effort in the Methow watershed; de-fishing will not increase the number of fish they handle under their permit. If the de-fishing is coordinated with the USGS, tagging would be done under their existing research permits. Once the de-fishing is largely complete, the upstream and downstream cofferdams will be completed. It is anticipated that dewatering will occur over a period of 2 days; the site will remain dewatered for approximately 2-3 weeks. About 100 feet of channel will be dewatered.

Isolation of Work Area and Sediment Control:

Water will be removed from between the cofferdams using trash pumps to prevent sediment-laden water from entering Beaver Creek. The dewatering system will discharge into a remnant channel on the left bank. Any sediment release into Beaver Creek from the dewatered construction area is anticipated to be minimal. The contractor shall divert runoff water to prevent erosion at all sites affected by the work operations. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. The sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment will be stored along the access and staging area more than 150 ft away from Beaver Creek.

Following completion of renovations, all construction materials within the cofferdams will be removed to the extent practical prior to cofferdam removal. Individual gravel bags comprising the cofferdam will be pulled incrementally to prevent a large pulse of sediment during removal.

Downstream turbidity is expected to be visible on two different days—one at the beginning of the construction during cofferdam installation, and one at the end of construction during cofferdam removal, while flows are first allowed through the roughened channel. These turbidity events are expected to be light to moderate turbidity visible for less than 500 feet downstream for a short period (less than an hour) when cofferdams are placed and removed, and flows are reintroduced in the new roughened channel. The contractor will be required to monitor downstream turbidity every 20 minutes during these periods and any other time that downstream turbidity may be generated. All areas of construction that do not extend down to

the creek surface ordinary high water level will have silt fencing between the construction area and the river.

Adjustment of trash rack and intake location

The existing trash rack and intake will be moved into the bank approximately 8 feet to bring it flush with the bank in order to reduce the possibility that it will be impacted by debris flowing down stream. In addition, the structure will be rotated so that it will be facing perpendicular to the flow. Relocation of the intake structure will require 2 cy of excavation and 1-2 cf of footing prep/bedding material. See Sheet 1678-100-1559 for more details of the intake structure.

Installation of downstream sill

A grade control sill will be installed at the downstream extent of the project. The intent of this feature is to mitigate any downcutting of the rock ramp or headcutting of the channel from below the rock ramp. The sill will be composed of two stacked rows of ~3' angular rock installed at grade. The sill will be keyed into the bank a minimum of 3'. Construction of the sill will require 12 cy of excavation and an equal volume of rocks. See sheet 1678-100-1557 for more details of the sill.

Replacement of weir

The failed weir crest will be replaced with a perpendicular sill in order to maintain the water surface elevation required for the irrigation diversion. This will consist of placing angular rocks to recreate the original crest elevation. Reconstruction of the weir crest will require approximately 10 cy of excavation and an equivalent volume of 3' rocks.

Construction of rock ramp

A rock ramp will be constructed between the grade control sills. This will add stability to the weir structure while still maintaining fish passage. The existing scour hole will be filled in order to spread out the flow of water to more accurately mimic the natural geometry of Beaver Creek. As this will increase the tractive forces on the toes of the bank through the project site, a combination of rock and bioengineering techniques will be applied to the toes. The scour holes will be filled with an engineered streambed material. The engineered streambed material will consist of 40 cubic yards of material. The engineered streambed material will be placed by an excavator, bucket compacted, and then to ensure that the flow stays on the surface, will be jetted in using a small trash pump that recycles water from a sump dug within the dewatered area. In addition to the engineered streambed material, larger boulders around 2-3' in diameter will be placed and countersunk to add roughness and pockets of slower water to aid in fish passage. See sheet 1678-100-1557 for typical detail.

Site Restoration and Revegetation:

Rehabilitation goals for the projects include minimizing soil disturbance, replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds. Protection of aquatic habitat will be accomplished if these goals are met. The negative effects of project construction on local plant, fish, and wildlife habitat are expected to be temporary. Ground disturbance activities will be limited to the staging areas, access routes, and construction sites.

Staging, Fueling, Stockpiling, and Demobilization:

Landowner agreements will be in place prior to construction. Following construction, the contractor will remove all equipment and material from the staging area and restore the area to pre-project conditions. If revegetation is required, the contractor will leave the site in a condition suitable for replanting.

Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located a minimum of 150 feet from Beaver Creek or other flowing stream or water body. Fueling and overnight parking for vehicles will be available on Upper Beaver Creek Road. See Marracci Diversion Drawings - Sheet 6 of 7 (1678-100-1558; Access Staging and Dewatering Plan), for more details. Fueling, other than occasional hand fueling of small tools, will be allowed only on Upper Beaver Creek road, which is more than 150 feet from live flows. The Contracting Officer will inspect and approve the fueling area by prior to its use. No fuel will be stored onsite for use by heavy equipment. Trucks will haul fuel to the approved site as needed for fueling heavy equipment. Five to 10 gallons of fuel in approved containers may be kept at the fueling area in an approved containment vessel for use with hand-held power tools and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. No other fueling sites will be allowed.

Equipment to be used or stored onsite may include an excavator, backhoe, dozer, 10-cy dump trucks, and small tools. Additional equipment may be required as determined by the contractor. This equipment, of an adequate size to move and place the materials necessary for construction, will minimally affect the existing terrain while moving around the site. Equipment operating with hydraulic fluid and used for this project will use only those fluids certified as nontoxic to aquatic organisms while working in or around the stream. Equipment used for this project shall be free of external petroleum-based products. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of the Beaver Creek or any adjacent water body. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities.

All stationary power equipment such as generators operated within 150 feet of any water body shall be diapered to prevent leaks unless suitable containment is provided to prevent potential spills from entering the water. Materials to be stored onsite will include engineered streambed material, large rock, and 30" HDPE pipe sections. All excess materials not used on the job will be removed within 10 days of completion of the project. Non-native waste materials not reused in construction or reclaimed by the Project Sponsor will be removed by the contractor to a disposal site in accordance with State regulations.

Area Disturbed:

The footprint of the proposed construction work would extend from the existing intake to the proposed grade control sill. The construction total area that would be disturbed is approximated to be 0.4 acres. The staging area location has not been confirmed yet, but we anticipate that the staging area will be approximately 120 ft by 40 ft. An area near the site, adjacent to the road, is a possible location.

Fort Thurlow Diversion:

Site Access:

Project access will be provided along an existing road from the Tice Ranch. The area along Lower Beaver Creek Road may be used for parking passenger vehicles.

Construction Elements:

NOTE: This section includes brief descriptions of the recommended work area isolation and water control procedures for the project. A recommended dewatering plan is shown on Fort-Thurlow Adaptive Management Project Drawings – Sheet 4 (1678-100-1549, Access, Staging, and Dewatering Plan). However, the contractor will be responsible for developing the final water control and work area isolation plan. In the event that the contractor’s plan deviates significantly from the recommended dewatering plan, the contractor will be required to seek approval from the permitting agencies prior to construction.

Cofferdam Construction:

Two cofferdams will be required to isolate the work area from the active flow of the creek. The upstream cofferdam will be located directly on the existing dam structure. The lower cofferdam will be constructed immediately upstream of the fish return and sluice (Figure 4). It is anticipated that each of these cofferdams will be formed by clean washed gravel-filled bags (gravel bags) with plastic sheeting placed on the outside of the gravel bags, folded over the top, then secured on both sides of the cofferdam to reduce seepage into the work area. Placement of cofferdam materials could be constructed by hand or with the assistance of a machine working from the bank; the footprint of the cofferdams will be as small as possible to accommodate proposed work while minimizing impact to river substrate. The flows at the time of project construction in late fall are expected to be near base flow levels of approximately 5-10 cfs at Fort-Thurlow. All surface flow will be routed through the existing irrigation diversion, around the project site through the existing fish bypass, which will return flows back into the stream immediately below the project site. As such, the site will be fully dewatered of surface flows.

Dewatering, Fish Handling and Salvage:

NOTE: Throughout dewatering, de-fishing, and construction, flows will be routed through the existing irrigation fish bypass. Downstream fish passage will be available through the bypass; upstream passage at the diversion is not available under current low-flow conditions and will not be restored until construction is complete.

Gravel bags will be placed on the existing dam structure and left overnight to gradually reduce stream flow to the project site and to encourage fish to leave the area on their own prior to de-fishing activities. A fish salvage crew will be on hand in case flow shuts down more quickly than expected. Fish handling and salvage will be conducted by professionally qualified and experienced fisheries biologists and technicians. To reduce impacts to ESA-listed species, fish removal will be completed for the entire length of the project site prior to any construction activities. Once the project site is isolated at the upstream end and flows have been reduced,

the fish salvage crew will make one downstream pass with the electro-fisher. The downstream end of the project site will then be netted off to prevent fish from re-entering the project site. Once the project site is isolated, qualified fish biologists will begin to remove any remaining fish using approved methods according to the terms of the Dewatering and Fish Capture Protocol given in Appendix A of the 2008 U.S. Army Corps of Engineers' Restoration Programmatic for the State of Washington. The project site is not conducive to using seines to salvage fish because of the large rocks in the channel. De-fishing may be coordinated with the USGS so the captured fish can be measured and tagged as part of their on-going monitoring effort in the Methow watershed; de-fishing will not increase the number of fish they handle under their permit. If the de-fishing is coordinated with the USGS, tagging would be done under their existing research permits. Once the de-fishing is largely complete, the upstream and downstream cofferdams will be completed. It is anticipated that dewatering will occur over a period of 2 days; the site will remain dewatered for approximately 2-3 weeks. About 120 feet of channel will be dewatered.

Isolation of Work Area and Sediment Control:

Water will be removed from between the cofferdams using trash pumps to prevent sediment-laden water from entering Beaver Creek. Use of the existing concrete dam as the coffer base will ensure that very little water will re-enter the project site. The dewatering system will discharge into a settling area and/or filtering system on the adjacent bank. Any sediment release into Beaver Creek from the dewatered construction area is anticipated to be minimal. The contractor shall divert runoff water to prevent erosion at the site. Diversion of runoff waters will be controlled and contained by use of straw bales or sediment fencing. Sediment fencing will be utilized along the shoreline in the work areas to control sediment releases into the water as needed. The sediment fencing will be installed prior to excavation operations and will remain in place until construction is completed. Equipment will be stored along the access and staging area more than 150 ft away from Beaver Creek. Materials will be staged in the upland staging area adjacent to the work site.

Following completion of renovations, all construction materials within the cofferdams will be removed to the extent practical prior to cofferdam removal. Individual gravel bags comprising the cofferdam will be pulled incrementally to prevent a large pulse of sediment during removal. Any release of fines washed from the new rock ramp will be minimized by this incremental, gradual reintroduction of water to the dewatered site, and will be of short duration.

Downstream turbidity is expected to be visible on two different days—one at the beginning of the construction during cofferdam installation, and one at the end of construction during cofferdam removal, while flows are first allowed through the roughened channel. These turbidity events are expected to be light to moderate turbidity visible for less than 500 feet downstream for a short period (less than an hour) when cofferdams are placed and removed, and flows are reintroduced in the new roughened channel. The contractor will be required to monitor downstream turbidity every 20 minutes during these periods and any others that might generate downstream turbidity.

Partially deconstruct rock weirs

The three existing A-weirs will be partially deconstructed, with only their footer boulders remaining. Approximately 60-70 cy of excavated material will be generated, which will be reused for construction of the rock ramp and channel roughening. Large boulders exceeding 2 ft diameter will be used to construct the rock sills and provide stability to the toes of the bank. Smaller material will be used if it meets the gradation requirements of Engineered Streambed Material (ESM) for filling scour holes and roughening of the channel.

Construction of rock ramp and roughening

A rock ramp will be constructed between the existing concrete dam and the downstream-most weir crest. This will add stability to the project reach while maintaining fish passage. Three rock sills will be constructed as shown in Drawings 5-7. The uppermost sill is intended to backwater the existing concrete dam crest, facilitating fish passage at low flow. The middle and lower sills are intended to provide structural stability to the rock ramp. The middle sill has a rock barb built into the sill on the left bank to dissipate energy. The lower sill will be incorporated into the lower-most weir and will act as grade control while providing for a resting scour pool at the bottom of the ramp. The scour holes corresponding to the partially deconstructed A-weirs will be filled in order to spread out the flow of water to more accurately mimic the natural geometry of Beaver Creek. The scour holes will be filled and the rock ramp constructed of approximately 60 cy of engineered streambed material (including material excavated during weir dismantling) mixed from gradations of round and angular rock. No grout or other synthetic materials will be used. The engineered streambed material will be placed by an excavator bucket and compacted. A small trash pump that recycles water from a sump dug within the dewatered area will be employed to drive sediment into the bed to create a seal. This installation procedure will ensure that stream flow stays on the surface of the rock ramp. In addition to the engineered streambed material, approximately 60 angular boulders of ~2-4 ft. diameter will be placed and countersunk to add roughness and pockets of slower water to aid in fish passage. Total area expected to be impacted during repairs will be approximately 0.2 acres.

Site Restoration and Revegetation:

Rehabilitation goals for the projects include minimizing soil disturbance, replacing vegetative cover to pre-disturbance levels, preventing the propagation of new weeds, and preventing the spread of existing noxious weeds. Protection of aquatic habitat will be accomplished if these goals are met. The negative effects of project construction on local plant, fish, and wildlife habitat are expected to be temporary. Ground disturbance activities will be limited to the staging areas, access routes, and construction sites.

Staging, Fueling, Stockpiling, and Demobilization:

Landowner agreements for use of staging and stockpiling areas will be in place prior to construction. Following construction, the contractor will remove all equipment and material from the staging area and restore the area to pre-project conditions. Where re-vegetation is required, the contractor will leave the site in a condition suitable for replanting. Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located a minimum of 150 feet from Beaver Creek or other flowing stream or water body. The Contracting Officer will inspect and approve the fueling area prior to use. No fuel will be stored onsite for use by heavy equipment; trucks will haul fuel to the approved site when required. Five to 10 gallons of fuel in approved containers may be kept at the fueling area in an approved containment vessel for

use with hand-held power tools and other small engines. A fuel spill kit will be maintained onsite in case of a broken hydraulic hose or other small spill of petroleum products. No other fueling sites will be allowed.

Area Disturbed:

The approximate footprint of the proposed construction work will extend from the existing dam structure to the downstream grade control sill. Total disturbed area (including staging area) will be approximately 0.2 acres.

All Project Locations

Equipment and Materials:

Equipment to be used or stored onsite may include an excavator, backhoe, dozer, 10-cy dump trucks, and small tools. Additional equipment may be required as determined by the contractor. All hydraulic fluid used by equipment operating in or near the stream will be certified as nontoxic to aquatic organisms; equipment shall be free of external petroleum-based products. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of Beaver Creek or any adjacent water body. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities. All stationary power equipment such as generators operated within 150 feet of any water body shall be diapered to prevent leaks, unless suitable containment is provided to prevent potential spills from entering the water. Materials to be stored onsite will include engineered streambed material, large rock, sediment fencing, straw bales, and native plants for vegetation treatments. All excess materials not used on the job will be removed within 10 days of completion of the project. Non-native waste materials not reused in construction or reclaimed by the Project Sponsor will be removed by the contractor to a disposal site in accordance with State regulations.

In the Event of High Flow Conditions:

If a high-water-level event occurs during construction that threatens to overtop the project site, work in the area will be suspended until the high water recedes. The contractor will remove all motorized equipment and most tools before leaving the site so that any inundation in the contractor's absence will not pollute the stream. The contractor will be required by Contract to monitor weather and river forecasts and evacuate the site in a timely manner if flows are predicted to affect the project area. If a high water event occurs that leads to site inundation, the project sponsor will again arrange for qualified biologists to remove fish from the work area behind the cofferdams after high water recedes. The area will then be dewatered as needed to resume construction.

Adaptive Management and Effectiveness Monitoring:

Adaptive management is proposed to include annual implementation monitoring for three subsequent years to check conditions at each site and to confirm re-vegetation success. Survey cross sections of the creek will continue at least once per year during this period to track changes over time. Adaptive work in the creek may be required if problems develop or if

conditions change to reduce the operational performance of the structures. Contact with resource agencies would be made prior to any in-water adaptive management efforts.

G. Project timing:

Marracci Diversion:

Start date: September 1, 2013	Start Date In-water Work: September 1, 2013
End date: November 30, 2013	End Date In-water Work: November 30, 2013

Fort Thurlow Diversion:

Start date: September 1, 2013	Start Date In-water Work: September 1, 2013
End date: November 30, 2013	End Date In-water Work: November 30, 2013

H. Anticipated cubic feet per second (CFS) of stream at time of construction:

5-10 cfs

I. How much area do you propose to clear for temporary access?

N/A; access for both Marracci and Fort Thurlow will be on existing roads.

J. How many trees and what sizes will be felled for temporary access?

N/A; no trees will be felled

K. Will your temporary access traverse across slopes steeper than 30%?

N/A; no temporary access

L. How many temporary stream crossings do you propose? List all best management practices (BMPs) proposed to avoid and minimize impacts from stream crossings.

If the contractor is able to place and remove the two cofferdams at each work area by hand or with assistance from a machine working from the bank, then no temporary stream crossings will be required. If at either work area the cofferdam installation or removal requires assistance from a machine working in the stream, then up to four temporary stream crossings are proposed at each work area: two for installation of the upstream and downstream cofferdams and two for cofferdam removal. All other work in the channel will occur in the dry after the cofferdams and pump(s) are in place.

Best management practices proposed are:

1. Stream crossing will be avoided when possible
2. Stream crossings will not be located in potential spawning habitat
3. Stream crossing for large rock removal will remain on cobble or larger substrate
4. Stream crossings will not leave any permanent structure
5. Stream crossings will be located perpendicular to flow

M. Culvert replacements:

N/A; no culverts will be replaced.

N. Rock grade control structures:

Marracci Diversion:

Approximately 1-2 cy of footing prep/bedding material will be used in the relocation of the intake structure and the trash rack. Approximately 12 cy of rocks will be used in the installation of the downstream sill, which will serve as a grade control structure to mitigate any downcutting of the rock ramp or headcutting of the channel from below the rock ramp. The downstream sill will be composed of 2 stacked rows of approximately 3' angular rock installed at a grade, which will be keyed into the bank a minimum of 3'. Approximately 10 cy of 3' rocks will be used to replace the upstream failed weir crest with a perpendicular sill to recreate the original crest elevation required for irrigation diversion. The rock ramp will be composed of approximately 140 cy of material – approximately 60 cy of engineered streambed material, approximately 60 cy of angular boulders, and approximately 20 cy of fines. The 60 cy of engineered streambed material used to construct the rock ramp will be composed of the following gradation:

- D100 4'
- D84 2.5'
- D50 1'
- D16 2.25"
- D8 0.75"

In addition to the engineered streambed material in the rock ramp, approximately 60 angular boulders of 2.5-4' diameter (approximately 60 cy) will be placed and countersunk to add roughness and pockets of slower water to aid in fish passage, and 20 cy of fines will be used to fill in the interstitial spaces between the rocks to reduce the impact of the tractive forces on the cobble bed. No grout or other synthetic materials will be used. The material will be placed by an excavator, bucket compacted, and then to ensure that the flow stays on the surface, the fines will be jetted in using a small trash pump that recycles water from a sump dug within the dewatered area.

An estimated 24 cy of material will be excavated during the above work at the project site. Dependent on the gradation and suitability of the excavated material, it will be reused on site to meet the design specifications for construction. Additional material will be imported by the contractor from an approved local source as needed to meet design specifications. Two temporary cofferdams constructed of gravel bags will be placed by hand to isolate the work area. The bags will be filled with clean washed gravel or native material, and will equal approximately 30 cy of material.

Fort Thurlow Diversion:

The rock ramp will be composed of approximately 170 cy of material – approximately 75 cy of engineered streambed material, approximately 70 cy of angular boulders, and approximately 25 cy of fines. Approximately 75 cy of engineered streambed material will be used in the construction of the rock ramp and roughening of the channel, composed of the following gradation:

- D84 2.5'
- D50 1'
- D16 2.25"

D8 0.75"

In addition to the engineered streambed material, 70 angular boulders of 2.5-4 ft. diameter (approximately 70 cy) will be used to add roughness and pockets of slower water to aid in fish passage, and 25 cy of fines will be used to fill in the interstitial spaces between the rocks to reduce the impact of the tractive forces on the cobble bed. No grout or other synthetic materials will be used. The material will be placed by an excavator, bucket compacted, and then to ensure that the flow stays on the surface, the fines will be jetted in using a small trash pump that recycles water from a sump dug within the dewatered area.

An estimated 60-70 cy of material will be excavated during the above work at the project site. Dependent on the gradation and suitability of the excavated material, it will be reused on site to meet the design specifications for construction. Additional material will be imported by the contractor from an approved local source as needed to meet design specifications. Two temporary cofferdams constructed of gravel bags will be placed by hand or by a machine working from the bank to isolate the work area. The bags will be filled with clean washed gravel or native material, and will equal approximately 30 cy of material.

O. Removal or modification of sediment bars or terraces: Has there been previous removal of sediment at this location? If yes when and how much?

No sediment bar or terrace removal is proposed.
There has been no previous removal of sediment at this location.

P. Side Channel/Off Channel Habitat Creation:

N/A; no side channel or off channel habitat creation is proposed.

Q. Will you be isolating the work area? [Explain how your decision on working in the wet or dry, or partially isolation the area, will minimize impacts to salmonids.]

Construction at each diversion location will require isolation of the work area from surface flows.
Marracci Diversion: At the upstream end of the work area, Beaver Creek flows (expected to be 5-10 cfs at the time of construction) will be routed through a 30" HDPE bypass pipe, around the project site, and back into the stream immediately below the project site. This will allow downstream passage throughout construction. Upstream passage is currently not available over the diversion dam at low flows, and the site isolation is not likely to change this condition.
Fort Thurlow Diversion: At the upstream end of the work area, Beaver Creek flows (expected to be 5-10 cfs at the time of construction) will be routed through the irrigation intake and back to the creek downstream of the work area through the existing fish return. This will allow downstream passage throughout construction. Upstream passage is currently not available over the diversion dam at low flows, and the site isolation is not likely to change this condition. The purpose of these projects is to restore upstream fish passage at the diversions. Please refer to the *Cofferdam Construction, Dewatering, Fish Handling and Salvage, and Isolation of Work Area and Sediment Control* in Section F, above, for additional details.

- R. Give a maximum estimate for the duration and length of downstream turbidity impacts. The Services will use this estimate for giving you your take exemption. (During construction you will be monitoring downstream sedimentation every 20 min to verify/refine your given estimate.)**

Each diversion project will generate turbidity at several points in construction. Turbidity is expected to be generated during cofferdam installation and removal, and when initially allowing flows through the roughened channel. At both Marracci and Fort Thurlow, downstream turbidity is expected to be visible on two different days—one at the beginning of the construction and one at the end. These turbidity events are expected to be light to moderate turbidity visible for less than 500 feet downstream for a short period (less than an hour) when cofferdams are placed, removed, and flows are reintroduced in the new roughened channel.

- S. Explain what equipment will generate noise above ambient levels and for what period during the day and for how many days.**

Short-term noise associated with power tools and construction machinery will occur during construction. Construction of the project will require heavy equipment, including an excavator, dump truck, and possibly a loader or similar equipment. Short-term noise impacts from heavy machinery may exceed noise levels typically associated with surrounding land uses. Elevated noise levels will occur during project construction, which is anticipated to last about 1-2 weeks for both Marracci and Fort Thurlow. Construction will occur during normal weekday work hours. It is possible that noise associated with generators or pumps required for water control may occur outside of these hours. If pumps are necessary, contractors would be required to locate and shield such necessary equipment to ensure that off-site impacts are kept to the minimum amount necessary for project success.

- T. Please attach HPA or explain why you do not need one.**

We are submitting the JARPA concurrently with the SPIF; therefore, environmental permits, including the HPA, have not yet been received.

- U. If your project does not meet all of the criteria outlined in the PBA, but is a restoration action of similar scope and impacts, contact the Services with the project's description, conservation measures and reason(s) it may not currently fit under the PBA. Provide below any supporting conversations with NMFS and/or USFWS staff, including a list of the PBA criteria your project won't meet.** This is a living document. We are continuously working on refining the proposed/covered actions and conservation measures.

For all action categories selected at section I.E. of this SPIF, the project will comply with all elements of the project description and the conservation measures.

This project will comply with all general conservation measures of the PBA, and all of the specific conservation measures for all of the project elements.

The 2010 version of the WDFW in-water work windows identifies Beaver Creek as a stream that requires a project specific work window. We are requesting a work window of September

1st through November 30th. This work area is during the incubation period for Chinook salmon, and the spawning period for bull trout, but neither species is known to spawn near the project areas. Chinook may spawn in lower Beaver Creek, but the low flows around the Fort-Thurlow diversion do not offer suitable habitat. Redd surveys of the project area and at least 1500' downstream will be conducted before beginning construction. If any redds are found in this area, we will not begin construction and will reinitiate consultation with WDFW, USFWS, and NOAA.

The project will comply with all of the PBA's conservation measures frequently associated with restoration actions.

This project is not proposing any activities that are excluded under the PBA.

II EFFECT DETERMINATIONS FOR FISH SPECIES USFWS & NMFS

Each project should have the appropriate effect determination. The PBA allows for No Effect (NE), Not Likely to Adversely Affect (NLAA), or Likely to Adversely Affect (LAA) determinations for listed species. Each determination must be adequately documented in this form. If you need assistance in determining the appropriate effect determination, consult the Corps, USFWS, and NMFS staff.

Check all currently listed evolutionarily significant units (ESUs) or Interim Recovery Units (IRUs) that may occur in the fifth field watershed where the project is located.

Endangered

- Upper Columbia River Spring-run Chinook (*Oncorhynchus tshawytscha*)
- Snake River Sockeye (*Oncorhynchus nerka*)

Threatened

- Upper Columbia River Steelhead (*Oncorhynchus mykiss*)
- Bull trout, Coastal/Puget Sound IRU (*Salvelinus confluentus*)
- Bull trout, Columbia River IRU (*Salvelinus confluentus*)
- Coho salmon, Lower Columbia River ESU (*O. kisutch*)
- Chinook salmon, Lower Columbia River ESU (*Oncorhynchus tshawytscha*)
- Chinook salmon, Puget Sound ESU (*Oncorhynchus tshawytscha*)
- Chinook salmon, Snake River Spring/Summer-run ESU (*Oncorhynchus tshawytscha*)
- Chinook salmon, Snake River Fall-run ESU (*Oncorhynchus tshawytscha*)
- Chum salmon, Columbia River ESU (*Oncorhynchus keta*)
- Chum salmon, Hood Canal summer ESU (*Oncorhynchus keta*)
- Steelhead trout, Lower Columbia River ESU (*Oncorhynchus mykiss*)
- Steelhead trout, Middle Columbia River ESU (*Oncorhynchus mykiss*)
- Steelhead trout, Coastal/Puget Sound DPS (*Oncorhynchus mykiss*)
- Steelhead trout, Snake River ESU (*Oncorhynchus mykiss*)

Designated

- Critical habitat for Coastal/Puget Sound bull trout IRU
- Critical habitat for Columbia River bull trout IRU
- Critical habitat for Columbia River chum salmon ESU
- Critical habitat for Hood Canal summer chum salmon ESU
- Critical habitat for Lower Columbia River Chinook salmon ESU
- Critical habitat for Upper Columbia River Spring-run Chinook salmon ESU
- Critical habitat for Snake River Spring/Summer-run Chinook salmon ESU
- Critical habitat for Snake River Fall-run Chinook salmon ESU
- Critical habitat for Puget Sound Chinook salmon ESU
- Critical habitat for Lower Columbia River steelhead trout ESU
- Critical habitat for Upper Columbia River steelhead trout ESU
- Critical habitat for Middle Columbia River steelhead trout ESU
- Critical habitat for Snake River steelhead trout ESU

Lake Ozette Sockeye salmon are not covered by this programmatic at this time.

Directions: Use the Notes section under each question to document your rational and decision making process for presence or absence of the fish, and the effect determination.

FILL OUT THIS SECTION FOR EACH INDIVIDUAL ESU THAT OCCURS IN THE FIFTH FIELD WATERSHED

**Effect Determination by Species:
ESU and critical habitat:**

Upper Columbia River Spring-run Chinook

1) Is the project in a fifth - field watershed that contains or has the potential to contain Upper Columbia River Spring-run Chinook?

YES If yes, list fifth field watershed, and go to question 2.
Fifth-field watershed: Middle Methow River 1702000811

NO If no, the project will have “No Effect” on (insert species). Go to question 5. Notes:

2) Do the stream(s) in which impacts may occur contain suitable habitat for Upper Columbia River Spring-run Chinook?

For bull trout use Tables 1 & 2 of Appendix A and/or the draft recovery plans (available at: <http://www.fws.gov/pacific/bulltrout/recovery.html>) and a distribution map the USFWS posted at <http://www.fws.gov/westwafwo/index.html> to determine if your project is within critical habitat for bull trout.

For other salmon you may use the NMFS critical habitat web page at <http://www.nwr.noaa.gov/Salmon-Habitat/Critical-Habitat/CH-Maps.cfm> determine if your project is within critical habitat.

YES If yes, what type of habitat is present? Spawning Rearing Migratory Corridor Not known Go to Question 3.

NO If no, the project will have “No Effect” on (insert species). Go to question 5.

Notes: _____

3) Approximately how far is the project from the nearest suitable habitat (in river miles, upstream or downstream) for Upper Columbia River Spring-run Chinook?

This project is within suitable habitat for UCR Spring-run Chinook.

Go to question 4.

Notes: Beaver Creek is listed as essential fish habitat (EFH) for Chinook. UCR spring Chinook are present in the lower reaches of Beaver Creek, from the mouth up past the Fort-Thurlow project area (RM 1.5). Juvenile spring Chinook have been documented as far as 3.9 miles upstream (USGS provisional data: W. Tibbits pers. comm.). Populations in the upper portion of this range are believed to be very low, with a single detection above RM 3.1 during extensive sampling from 2004 through 2012. An adult spring Chinook salmon was observed immediately below the Marracci project site by WDFW screen shop personnel in 2007; this sighting is considered a rarity as no juveniles have been detected in the area by the USGS sampling effort.

4) Does the proposed activity have the potential to alter or affect the following indicators: temperature, sediment, chemical contamination/nutrients, physical barriers, substrate embeddedness, large woody debris, pool frequency, pool quality, off-channel habitat, refugia, wetted width/depth ratio, streambank condition, floodplain connectivity, peak/base flows, drainage network, disturbance history, function of riparian reserves, or disturbance regime?

YES If yes, briefly explain which habitat elements will be affected and indicate if the effects will be short term or long-term. For example, many activities will have increased levels of turbidity during project implementation, but are expected to result in long-term improvements to the target indicators.

The proposed activities will have short-term negative impacts to stream sediment, streambank condition, and pool quality. The project will have beneficial effects on physical barriers. The project will not affect chemical contamination or nutrients, water temperature, substrate embeddedness, large wood, off-channel habitat, refugia, wetted width/depth ratio, floodplain connectivity, function of riparian reserves, peak/base flows, drainage network, disturbance history, or disturbance regime.

NO If no, the project will have “No Effect” on (insert species). Go to question 4.

Notes: _____

5) Provide rationale for effect determination.

This project may cause both direct and indirect effects to Spring Chinook. The project has been designed and planned to minimize negative effects while providing long term passage over the existing irrigation dam.

Direct effects:

- Timing of the weir renovation projects should occur between early-September and mid-November, during the tail end of spring Chinook spawning (mid-August to mid-September) and while flows are still low. Because any redds present could be impacted, redd surveys will be conducted in the project areas and 1500 ft.

downstream prior to construction activities. If redds are present, construction will be rescheduled to avoid impacts to spring Chinook.

- Passage during construction The Fort-Thurlow diversion is currently an upstream fish passage barrier during low flows. During construction, the creek will be routed through the fish return facilities of the diversion, which will not allow upstream passage. Upstream fish passage will not be restored until the project is complete.
- Dewatering/Defishing may affect spring Chinook in the project area, where plans call for dewatering about 120 linear feet of stream at Fort Thurlow and 100 linear feet of stream at Marracci. This could temporarily displace about 0-1 spring Chinook at each area, based on the USGS population estimates (# fish/ft) from Beaver Creek. However, because juvenile Chinook tend to have a clumped distribution, it is possible that several could be found in one scour pool. If any Chinook are present, many are expected to leave on their own or by herding as flows are reduced during construction of the upstream cofferdam. Remaining fish will be captured by electrofishing and released downstream of the project area; a few fish could be harmed by this process or from being stranded.
- Sediment disturbance: Streambed construction will be confined between the cofferdams. These activities are not expected to release appreciable sediment into Beaver Creek due to control measures that will isolate and capture sediment away from the creek. Upon removal of the cofferdams, some fines from the construction site will be washed downstream. These fines could be irritable to fish gills. Cofferdam removals will be done slowly, to minimize sediment releases. Low flows will limit the downstream distribution of turbidity. Turbidity is expected to extend no more than 500 feet downstream and will last less than 4 hours at each site. In addition, if any redds are found during pre-construction surveys, the project would be rescheduled to avoid impacts to spring Chinook (see under Timing, above).

Indirect effects:

- Bank vegetation will be negatively impacted by construction equipment in the short term. All areas disturbed during the course of this project are previously disturbed. The project will require approximately 0.6 acres of disturbance in the riparian area at the two sites combined; most of this area currently supports grasses and herbaceous species. Disturbed areas will be replanted to help re-establish riparian vegetation, resulting in neutral to beneficial long-term effects.
- Existing scour pools below the weirs will be filled in to construct the roughened channel. There will be some negative impact to fish from the loss of these pools for resting areas, but this will be offset by reliable long-term passage over the irrigation diversion.
- Sediment mobilized during construction is expected to return to pre-project levels during the first annual high flow. Any fines released will be temporary and will be dispersed from the streambed before the next season of spawning. The project will have a minor, short-term negative effect on sediment, with a neutral long-term effect.
- None of the project activities will affect the hydrology or the ground-water interactions of Beaver Creek.

Long-term effects:

- Renovations at the project site will result in long-term, sustainable fish passage. Monitoring of the initial barrier removals and weir constructions in 2004-2005 demonstrated their success through the expanded presence of Chinook farther up Beaver Creek, where they had not been previously found. It is anticipated that these new renovations will restore this passage, and possibly allow the further expansion of Chinook into Beaver Creek. The roughened channel is designed to be passable by all species and life stages at all flows by mimicking a natural riffle. At low flows, it will concentrate water to sufficient depths for adults to pass, while at high flows, juvenile fish will be helped by slower water regimes at the edges.
- The long term stability of the roughened channel promises to reduce the need for in-water work to maintain passage or irrigation flows. Weir designs have failed to provide adequate fish passage over the long term in Beaver Creek.

Effect Determination: May Affect, Likely to Adversely Affect Upper Columbia River Spring-run Chinook

Note: If you are dewatering an area, electroshocking in an area, or are doing major in-water work where listed salmonids are likely to be present during the work window, you will probably have a LAA effect determination.

Upper Columbia River Steelhead

1) Is the project in a fifth - field watershed that contains or has the potential to contain Upper Columbia River Steelhead?

YES If yes, list fifth field watershed, and go to question 2.

Fifth-field watershed: Middle Methow River 1702000811

NO If no, the project will have "No Effect" on (insert species). Go to question 5. Notes:

2) Do the stream(s) in which impacts may occur contain suitable habitat for Upper Columbia River Steelhead?

For bull trout use Tables 1 & 2 of Appendix A and/or the draft recovery plans (available at: <http://www.fws.gov/pacific/bulltrout/recovery.html>) and a distribution map the USFWS posted at <http://www.fws.gov/westwafwo/index.html> to determine if your project is within critical habitat for bull trout.

For other salmon you may use the NMFS critical habitat web page at <http://www.nwr.noaa.gov/Salmon-Habitat/Critical-Habitat/CH-Maps.cfm> determine if your project is within critical habitat.

YES If yes, what type of habitat is present? Spawning Rearing Migratory Corridor Not known Go to Question 3.

NO If no, the project will have "No Effect" on (insert species). Go to question 5.

Notes: Beaver creek is occupied designated critical habitat for UCR steelhead. O. mykiss is the most abundant fish species in Beaver Creek, and USGS research has documented anadromous fish as 6 miles up Beaver Creek. Population estimates by the USGS for juvenile O. mykiss below river mile 8 are between 0.04 and 0.58 fish per linear foot of stream (USGS provisional data: K. Martens and W. Tibbits pers comm; Martens and Connolly 2008).

3) Approximately how far is the project from the nearest suitable habitat (in river miles, upstream or downstream) for Upper Columbia River Steelhead?

This project is within suitable habitat for UCR Steelhead.

Go to question 4.

Notes: Beaver Creek is occupied designated critical habitat and essential fish habitat for UCR Steelhead.

4) Does the proposed activity have the potential to alter or affect the following indicators: temperature, sediment, chemical contamination/nutrients, physical barriers, substrate embeddedness, large woody debris, pool frequency, pool quality, off-channel habitat, refugia, wetted width/depth

ratio, streambank condition, floodplain connectivity, peak/base flows, drainage network, disturbance history, function of riparian reserves, or disturbance regime?

YES If yes, briefly explain which habitat elements will be affected and indicate if the effects will be short term or long-term. For example, many activities will have increased levels of turbidity during project implementation, but are expected to result in long-term improvements to the target indicators.

The proposed activities will have short-term negative impacts to stream sediment, streambank condition, and pool quality. The project will have beneficial effects on physical barriers. The project will not affect chemical contamination or nutrients, water temperature, substrate embeddedness, large wood, off-channel habitat, refugia, wetted width/depth ratio, floodplain connectivity, function of riparian reserves, peak/base flows, drainage network, disturbance history, or disturbance regime.

NO If no, the project will have “No Effect” on (insert species). Go to question 4.

Notes: _____

5) Provide rationale for effect determination.

This project may cause both direct and indirect effects to UCR steelhead. The project has been designed and planned to minimize negative effects while providing long term passage over the existing irrigation dam.

Direct effects:

- Timing of the weir renovation projects should occur between early-September and mid-November, after fry have emerged from redds in late June, so only free swimming stages should be present.
- Dewatering/Defishing may affect UCR steelhead in the project area, where plans call for dewatering about 120 linear feet of stream at Fort Thurlow and 100 linear feet of stream at Marracci. This is expected to temporarily displace about 40 juvenile fish at each area, based on the USGS population estimates (# fish/ft) from Beaver Creek. Many of the fish in the work area are expected to leave on their own as flows are reduced during construction of the upstream cofferdam. Remaining fish will be captured by electrofishing and released downstream of the project area; a few fish could be harmed by this process or from being stranded.
- Sediment disturbance: Streambed construction will be confined between the cofferdams. These activities are not expected to release appreciable sediment into Beaver Creek due to control measures that will isolate and capture sediment away from the creek. Upon removal of the cofferdams, some fines from the construction site will be washed downstream. These fines could be irritable to fish gills. Cofferdam removals will be done slowly, to minimize sediment releases. Low flows will limit the downstream distribution of turbidity. Turbidity is expected to extend no more than 500 feet downstream and will last less than 4 hours at each site.

Indirect effects:

- Bank vegetation will be negatively impacted by construction equipment in the short term. All areas disturbed during the course of this project are previously disturbed.

The project will require approximately 0.6 acres of disturbance in the riparian area at the two sites combined; most of this area currently supports grasses and herbaceous species. Disturbed areas will be replanted to help re-establish riparian vegetation, resulting in neutral to beneficial long-term effects.

- Existing scour pools below the weirs will be filled in to construct the roughened channel. There will be some negative impact to fish from the loss of these pools for resting areas, but this will be offset by reliable long-term passage over the irrigation diversion.
- Sediment mobilized during construction is expected to return to pre-project levels during the first annual high flow. Any fines released will be temporary and will be dispersed from the streambed before the next season of spawning. The project will have a minor, short-term negative effect on sediment, with a neutral long-term effect.
- None of the project activities will affect the hydrology or the ground-water interactions of Beaver Creek.

Long-term effects:

- Renovations at the project site will result in long-term, sustainable fish passage. Monitoring of the initial barrier removals and weir constructions in 2004-2005 demonstrated their success through the expanded presence of Chinook farther up Beaver Creek, where they had not been previously found, and movement of individual PIT tagged juvenile steelhead move up and downstream at all times of year. It is anticipated that these new renovations will restore this passage. The roughened channel is designed to be passable by all species and life stages at all flows by mimicking a natural riffle. At low flows, it will concentrate water to sufficient depths for adults to pass, while at high flows, juvenile fish will be helped by slower water regimes at the edges.
- The long term stability of the roughened channel promises to reduce the need for in-water work to maintain passage or irrigation flows. Weir designs have failed to provide adequate fish passage over the long term in Beaver Creek.

Effect Determination: Likely to Adversely Affect Upper Columbia River Steelhead

Note: If you are dewatering an area, electroshocking in an area, or are doing major in-water work where listed salmonids are likely to be present during the work window, you will probably have a LAA effect determination.

Columbia River Bull Trout

1) Is the project in a fifth - field watershed that contains or has the potential to contain Columbia River Bull Trout?

YES If yes, list fifth field watershed, and go to question 2.

Fifth-field watershed: Middle Methow River 1702000811

NO If no, the project will have “No Effect” on (insert species). Go to question 5. Notes:

2) Do the stream(s) in which impacts may occur contain suitable habitat for Columbia River Bull Trout?

For bull trout use Tables 1 & 2 of Appendix A and/or the draft recovery plans (available at: <http://www.fws.gov/pacific/bulltrout/recovery.html>) and a distribution map the USFWS posted at <http://www.fws.gov/westwafwo/index.html> to determine if your project is within critical habitat for bull trout.

For other salmon you may use the NMFS critical habitat web page at <http://www.nwr.noaa.gov/Salmon-Habitat/Critical-Habitat/CH-Maps.cfm> determine if your project is within critical habitat.

YES If yes, what type of habitat is present? Spawning Rearing Migratory Corridor Not known Go to Question 3.

NO If no, the project will have “No Effect” on (insert species). Go to question 5.

Notes: _____

3) Approximately how far is the project from the nearest suitable habitat (in river miles, upstream or downstream) for Columbia River Bull Trout?

This project is within suitable habitat for CR Bull Trout.

Go to question 4.

Notes:

Bull trout inhabit streams and rivers in the Methow Watershed and these populations are considered crucial in the recovery of the Upper Columbia DPS (US FWS Draft Recovery Plan). The Methow is listed as a “core area” in the bull trout recovery plan, but the Beaver Creek drainage is not considered part of the Methow core area of the Upper Columbia Recovery Unit. The project area is within designated essential feeding, migration, and overwintering critical habitat for CR bull trout. In the Beaver Creek drainage, bull trout are primarily found in Blue Buck Creek, a headwater tributary approximately 10 miles upstream from the project area, and in lower Beaver Creek near the confluence with the Methow River. Extensive fish sampling efforts conducted by the USGS from 2004 through 2011 found only occasional bull trout (USGS provisional data: K.

Martens and W. Tibbits pers. comm.; Martens and Connolly 2008). This suggests that bull trout are present at very low density through the project areas in Beaver Creek.

4) Does the proposed activity have the potential to alter or affect the following indicators: temperature, sediment, chemical contamination/nutrients, physical barriers, substrate embeddedness, large woody debris, pool frequency, pool quality, off-channel habitat, refugia, wetted width/depth ratio, streambank condition, floodplain connectivity, peak/base flows, drainage network, disturbance history, function of riparian reserves, or disturbance regime?

YES X If yes, briefly explain which habitat elements will be affected and indicate if the effects will be short term or long-term. For example, many activities will have increased levels of turbidity during project implementation, but are expected to result in long-term improvements to the target indicators.

The proposed activities will have short-term negative impacts to stream temperature, sediment, and pool quality. The project will have beneficial effects on physical barriers. The project will not affect chemical contamination or nutrients, substrate embeddedness, large wood, off-channel habitat, refugia, wetted width/depth ratio, floodplain connectivity, function of riparian reserves, streambank condition, peak/base flows, drainage network, disturbance history, or disturbance regime.

Direct effects:

- Timing: Construction is scheduled between early-September and mid-November, to take advantage of low flows. Bull trout generally migrate to their spawning areas with the descending limb of the spring freshet, and return downstream after spawning in late September or October. Construction timing corresponds with a time of year when bull trout may be present in low numbers at the project area.
- Location: The project areas are not known to be bull trout spawning habitat and are likely too warm to be considered good rearing habitat. A culvert and several irrigation diversions blocked fish passage up Beaver Creek until a series of fish passage restoration actions were completed between 2004 and in 2007. Monitoring associated with these passage improvements has not documented any bull trout migrating up to the headwater spawning areas since passage was restored. Several of the irrigation diversion structures failed in 2011, again blocking upstream passage. Any migratory bull trout in Beaver Creek are likely to be isolated by an irrigation diversion downstream, or up on the headwater spawning grounds.
- Dewatering/Defishing:
 - Marracci: Annual sampling surveys conducted by the USGS since 2004 have found a total of 1 bull trout in the reach from RM 5.6 – 8.1 (Marracci project site is at ~ RM 6.5). Dewatering this project site would include handling or displacing any bull trout that were in the area. The low population density, as indicated by only 1 bull trout detected in this area in 7 years of sampling, means the likelihood of an encounter is low. However, if bull trout were present, there is the potential for harm from electrofishing or stranding.
 - Fort-Thurlow: Sampling conducted by the USGS since 2004 detected only a few more bull trout in the lowest 2.5 miles of Beaver Creek than upstream near the Marracci site (7 fish caught in a weir trap at RM 0.8 over 4 years of

sampling; none seen in other population surveys). These data suggest bull trout populations are very low through this reach; bull trout would most likely be in the Fort-Thurlow project area during spring and fall freshets. Because of the demonstrated low population density, and the timing of construction in mid-autumn, the likelihood of an encounter is low. However, if bull trout were present, there is the potential for harm from electrofishing or stranding.

Indirect effects:

- Bank vegetation will be negatively impacted by construction equipment in the short term. All areas disturbed during the course of this project are previously disturbed. The project will require approximately 0.6 acres of disturbance in the riparian area at the two sites combined; most of this area currently supports grasses and herbaceous species. Disturbed areas will be replanted to help re-establish riparian vegetation, resulting in neutral to beneficial long-term effects.
- Existing scour pools below the weirs will be filled in to construct the roughened channel. There will be some negative impact to fish from the loss of these pools for resting areas, but this will be offset by reliable long-term passage over the irrigation diversion.
- Sediment mobilized during construction is expected to return to pre-project levels during the first annual high flow. Any fines released will be temporary and will be dispersed from the streambed before the next season of spawning. The project will have a minor, short-term negative effect on sediment, with a neutral long-term effect.
- None of the project activities will affect the hydrology or the ground-water interactions of Beaver Creek.

Long-term effects:

- Renovations at the project site will result in long-term, sustainable fish passage. Monitoring of the initial barrier removals and weir constructions in 2004-2005 demonstrated their success through the expanded presence of Chinook farther up Beaver Creek, where they had not been previously found. It is anticipated that these new renovations will restore this passage, and possibly allow the further expansion of Chinook into Beaver Creek. The roughened channel is designed to be passable by all species and life stages at all flows by mimicking a natural riffle. At low flows, it will concentrate water to sufficient depths for adults to pass, while at high flows, juvenile fish will be helped by slower water regimes at the edges.
- The long term stability of the roughened channel promises to reduce the need for in-water work to maintain passage or irrigation flows. Weir designs have failed to provide adequate fish passage over the long term in Beaver Creek.

NO ____ If no, the project will have “No Effect” on (insert species). Go to question 4.

Notes: _____

5) Provide rationale for effect determination.

Because of the low population densities of bull trout near Fort-Thurlow and Marracci, the likelihood of encountering bull trout during construction between September and November is low.

However, because dewatering activities would disturb any individuals that happened to be present, the construction actions are **Likely to Adversely Affect** bull trout. Long-term benefits of these renovations are expected to be positive by maintaining passage past these diversions and reducing the need for annual maintenance by irrigators.

Effect Determination: Likely to Adversely Affect Columbia River Bull Trout

Note: If you are dewatering an area, electroshocking in an area, or are doing major in-water work where listed salmonids are likely to be present during the work window, you will probably have a LAA effect determination.

III EFFECT DETERMINATIONS FOR LISTED TERRESTRIAL SPECIES

1. To determine which listed species may occur in the project area follow the steps below:
 - a. Obtain a county species list from the USFWS web page.
http://www.fws.gov/westwafwo/se/SE_List/Endangered_Species.asp
<http://www.fws.gov/easternwashington/county%20species%20lists.htm>
 - b. Site-specific information of listed species occurrences in Washington State may be obtained from the Washington Department of Fish and Wildlife Priority Habitat and Species Program <http://www.wdfw.wa.gov/hab/phspage.htm> and from the Washington Department of Natural Resources Natural Heritage Program at <http://www.dnr.wa.gov/nhp/>.
 - c. Remove species from the species list when habitat is not available for the species in the project area or “vicinity of activity” (generally 1 mile radius around the project site. The area that may be affected by any project impacts including noise and turbidity.)

2. When filling out the information below consider:

Each project should have the appropriate effect determination. The PBA allows for NE or NLTAA determinations for terrestrial species, and NE, NLTAA or LTAA for aquatic species. Each determination must be adequately documented in this form. If you need assistance in determining the appropriate effect determination, request help from a Corps ESA Coordinator or the USFWS. The USFWS contact is Tom McDowell at 360-753-9426.

 - a. For information on species biology, range and critical habitat use the USFWS web site: <http://www.fws.gov/westwafwo/index.html>
 - b. Conservation Measures are listed in Appendix B
 - c. If you do not implement all conservation measures related to the species present please explain.

LISTED TERRESTRIAL SPECIES

Please refer to the PBA for actions that may affect these species and conservation measures to protect terrestrial species. For information on the listed terrestrial and aquatic species that occur in Washington, visit the following website: ecos.fws.gov or contact the following FWS field offices:

Western Washington Office in Lacey:	(360) 753-6044	John Grettenberger
Central Washington Office in Wenatchee:	(509) 665-3508	Jessica Gonzales
Eastern Washington office in Spokane:	(509) 891-6839	Suzanne Audet

COASTAL ECOSYSTEMS

Listed Species: Brown Pelican (*Pelecanus occidentalis*), Oregon silverspot butterfly (*Speyeria zerene hippolyta*), and Snowy Plover (*Charadrius alexandrinus nivosus*):

a) Will the activity occur in Grays Harbor, Wahkiakum, Pacific, Jefferson or Clallam Counties?

No X Put NE under “Effect Determination” for these three coastal species.

Yes If yes go to b)

b) Will the activity alter sand islands or coastal dunes and meadows in Grays Harbor or Pacific County?

No Yes

If yes, contact the FWS office in Lacey for coordination.

c) Conservation Measures to be applied:

d) Effect Determination for coastal species and rationale:

This project will have **no effect** on coastal species because it is not located in the specified counties.

LOWER COLUMBIA

Listed species: Columbian white-tailed deer (*Odocoileus virginianus leucurus*)

a) Will the activity occur on islands or in the floodplain of the lower Columbia River (Wahkiakum and Cowlitz Counties) and include installing fence?

No Yes

If yes, apply conservation measures for the Columbian white-tailed deer

b) Effect Determination and rationale:

The project will have **no effect** on Columbian white-tailed deer because it is in far northern Washington outside the range of the subspecies.

CARNIVORES and CARIBOU

1. Gray Wolf (*Canis lupus*) – The range of the grey wolf includes the Blue Mountains, northeast Washington (Rocky Mountains) and the Cascade Mountains. There are no confirmed records of wolves west of the Cascade Crest and no documented den sites in the state.

2. Grizzly Bear (*Ursus arctus horribillis*) – The grizzly bear recovery plan identifies high alpine areas in the North Cascades (north of Interstate 90 to the Canadian border) as important for recovery of this species in Washington.

3. Canada lynx (*Lynx Canadensis*) - This species occurs in high elevation forests (generally above 4,000 feet) in the North Cascades and northeast Washington.

4. The woodland caribou (*Rangifer tarandus caribou*) occurs in high elevation forests (generally above 4,000 feet) in northeast Washington (Pend Oreille County).

a) Will the activity be conducted in or near mountain meadows or forest openings, high elevation forests, or ungulate wintering or calving sites in the geographic areas where these listed species may occur?

No Yes

If yes, apply the appropriate seasonal restrictions identified in the PBA to minimize disturbance

If you do not know whether your project will affect suitable habitat or feeding areas for these species, please contact the USFWS office in Spokane.

a) Effect Determination for these species and rationale. Document any supporting conversations with USFWS staff:

The project is outside of suitable habitat for Canada lynx. The project area is within the North Cascades Grizzly Bear Recovery Zone. Alpine areas, avalanche chutes and areas away from human development are important habitats for grizzly bears. The Project area is moderately developed lowland habitat, and does not offer seclusion for grizzly bears. If any grizzly bears are present in the Methow Valley, it is highly unlikely that they are utilizing habitat at or near the project area. Therefore, the proposed project will have **no effect** on grizzly bear, Canada lynx, or their habitats.

Gray wolves are present in the Methow Valley, with recent sightings throughout the valley. Summer and fall locations have been in the Sawtooth Mountains in the Lake Chelan Sawtooth Wilderness where they appear to be using montane habitat. Wolves are a wide ranging species, and occasional sightings in lowland areas indicate they will move through areas of human habitation. The proposed project is generally an area of moderate human activity, and project actions will be a short-term minor increase in the level of activity. There is a chance that people working on the project may incidentally encounter a wolf, but this chance is discountable. Since this project represents a minor increase in the general level of human activity, wolves are not likely to avoid the project area any more than they already do.

Gray wolves depend on an ungulate prey base. In the Methow Valley, this is mostly mule deer supplemented by white-tailed deer and other prey items. Mule and white-tailed deer are common in the project area and may be temporarily disturbed by the project activities. Deer in the project area are generally accustomed to moderate levels of human disturbance. Consequently, the short-term disturbance from project activities is not likely to result in permanent or long-term changes in their activity patterns or abundance. This project is not likely to change prey distribution or abundance.

Though there will be a noticeable increase in disturbance at the project sites during construction, the possibility of a chance encounter is discountable, the proposed project is not expected to result in avoidance of habitat, or significantly affect their prey base. Therefore, we expect that the project **may affect but is not likely to adversely affect** gray wolves in the Methow Valley.

Pygmy rabbit (*Brachylagus idahoensis*)

1. The pygmy rabbit historically was found in dense, tall sagebrush areas east of the Columbia River (Douglas, Adams, Lincoln, Grant and Benton Counties).

a) Will the activity occur in native sagebrush areas of the central Columbia Plateau?

No **X** Put NE under “Effect Determination” and proceed to next species.

Yes If yes, contact the USFWS.

d) Effect Determination and rationale:

The project will have **no effect** on pygmy rabbit because it is not within the native sagebrush areas of the central Columbia Plateau.

MATURE FORESTS in the CASCADE and OLYMPIC MOUNTAINS:

Marbled Murrelet (*Brachyramphus marmoratus*)

For information on the marbled murrelet, see <http://www.fws.gov/pacific/marbledmurrelet/index.html>

a) Are you within 50 miles of marine water?

No X Put NE under “Effect Determination” and proceed to next species Yes

b) Is there suitable habitat (mature conifer-dominated forests over 80 years old) within 200 feet of the project vicinity?

No Yes Not known

c) Will the activity generate noise above ambient levels within 200 feet (1.0 mile if blasting, low-elevation aircraft operations, or pile driving) of potential suitable nesting habitat?

No Yes If yes, apply conservation measures to minimize disturbance.

d) Does the activity include low elevation operation of aircraft, pile driving, or blasting within 1 mile of suitable or occupied nesting or foraging habitat?

No Yes If yes, apply seasonal restrictions to minimize disturbance.

Activities in the marine environment that include pile driving or blasting may need to go through individual consultation. Contact the USFWS office in Lacey for specific restrictions related to underwater sound in marine areas.

e) Will the project affect suitable nesting habitat or designated critical for marbled murrelets?

Activities that remove or kill trees with suitable platforms, remove suitable platforms, or reduce the suitability of the stand as nesting habitat are not covered under this PBA.

f) Notes:

g) Conservation Measures to be applied:

h) Effect Determination and rationale:

The project will have **no effect** on marbled murrelet because it is inland and not near any suitable habitat.

Northern spotted owl (*Strix occidentalis caurina*)

For information, including critical habitat designation see

<http://ecos.fws.gov/speciesProfile/SpeciesReport.do?spcode=B08B>

a) Is there suitable habitat (mature conifer forests over 80 years old) within 200 feet of the project vicinity?

No X Put NE under “Effect Determination” and proceed to next species

Yes Not known

b) What type of forest habitat is present in the vicinity of the activity?

nesting or foraging habitat dispersal habitat designated critical habitat
none

d) Will the activity occur in nesting or foraging habitat?

No Yes If yes, apply seasonal operating restrictions to minimize disturbance.

e) Will the activity generate above ambient noise within 200 feet (1.0 mile if blasting, pile driving or aircraft operations) of suitable nesting habitat?

No Yes If yes, apply seasonal restrictions.

f) Will the activity occur in or remove trees from spotted owl designated critical habitat?

No Yes If yes, explain how/if this will affect the function of the stand.

g) Notes:

h) Conservation Measures to be applied:

i) Effect Determination for northern spotted owls:

The project will have **no effect** on northern spotted owl because it is not within or adjacent to suitable habitat.

Effect Determination for designated critical habitat for the northern spotted owl:

The project will have **no effect** on northern spotted owl because it is not within or adjacent to any designated critical habitat.

Listed Plants:

No herbicide use, mechanical vegetation management, or construction activities are permitted in areas that could support listed plants under this programmatic.

Information on these species can be found at: <http://ecos.fws.gov>, the Washington Department of Fish and Wildlife Priority Habitat and Species Program at (360)-902-2543 or their website at www.wdfw.wa.gov/hab/phspage.htm, or the Washington Department of Natural Resources Natural Heritage Program at (360) 902-1667 or their website at www.dnr.wa.gov/nhp/.

1. *Hackelia venusta* (**showy stickseed**) this species occurs in Chelan County, between 984 and 1,600 feet in elevation, in the Ponderosa Pine zone

2. *Lomatium bradshawii* (**Bradshaw's desert-parsley**) – this species occurs in wetlands, prairies and grasslands in Clark County

3. *Sidalcea oregana* var. *calva* (**Wenatchee Mountains checker-mallow**) - this species is found in the Peshastin Creek watersheds in Chelan County. Information on critical habitat for this species can be found at: http://ecos.fws.gov/docs/federal_register/fr3793.pdf

4. *Castilleja levisecta* (**golden paintbrush**) - this plant occurs in Island, San Juan, and Thurston Counties and is found in open grasslands, prairies, and grass dominated coastal bluffs.
5. *Howellia aquatilis* (**water howellia**) – this aquatic plant is found in and around seasonal wetlands in Mason, Pierce, Thurston, Clark, and Spokane Counties.
6. *Lupinus sulphureus ssp. kincaidii* (**Kincaids lupine**) - this plant occurs near Boistfort, Lewis County in native upland prairie habitat.
7. *Sidalcea nelsoniana* (**Nelson's checkermallow**)- this plant is found in wetlands, stream corridors, or wet prairies in Lewis or Cowlitz Counties.
8. *Silene spaldingii* (**Spalding's silene/catchfly**)– this plant is also associated with native prairies and occurs in Asotin, Lincoln, Spokane, and Whitman Counties.
9. *Spiranthes diluvialis* (**Ute ladies'-tresses**) – this plant grows on the margins of springs, wet meadows, floodplains, and riparian areas in Okanagon and Grant County

Please document conversations with USFWS staff and provide adequate information on botanical surveys and/or habitat analysis to support your effect determination.

Effect determination for listed plants:

The project area is within the known range of Ute's ladies' tresses (*Spiranthes diluvialis*). Habitat within the project site does not fit the general description of suitable habitat for Ute ladies tresses, and does not resemble the habitat of the known populations in or near Okanogan County. The nearest known populations are along the Columbia River in alkaline soils. There are no known populations of Ute's ladies tresses in the Methow watershed.

The project is outside of the known range of other listed terrestrial plants.

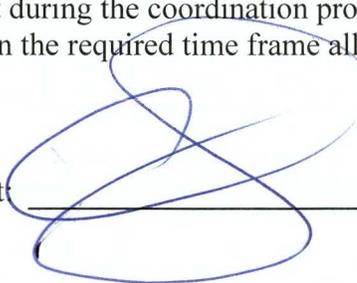
The project will have **no effect** on Ute's ladies tresses or other terrestrial plants because it is not within suitable habitat or known ranges of these species.

IV SIGNATURE

I hereby verify that this work will comply with all applicable requirements of the above-referenced Biological Opinion should a Department of the Army authorization be issued for this work.

Certain categories of activities require the permittee to submit post construction reports to the Corps and/or the Services. These reports are identified in the PBA. For projects deviating from PBA criteria, the Services may require additional post-construction reporting. These additional reports will be clearly identified and agreed upon by the Services and applicant during the coordination process. By signing this form, the applicant agrees to submit within the required time frame all applicable post-construction reports.

Signature of Applicant



Date:

4/2/2013

Signature of Agent:

Date:

APPENDIX A: DEWATERING AND FISH CAPTURE PROTOCOL

Work to facilitate habitat restoration may occur in isolation from flowing waters or in flowing water depending on site conditions to minimize impacts to salmonids.

If bull trout or other listed salmonids could be present in the vicinity of the project use the following dichotomous key to determine which dewatering protocol and timing window you need to implement for your project. This key references information within the *Draft Recovery Plan for the Coastal-Puget Sound Distinct Population Segment of Bull Trout Volumes I and II* (USFWS 2004a; USFWS 2004b), and the *Draft Recovery Plan for the Columbia River Distinct Population Segment of Bull Trout* (USFWS 2002). <http://www.fws.gov/pacific/bulltrout/recovery.html>. If you have questions, contact the USFWS.

1. Is the project located within a documented or potential bull trout Local Population Area that is excluded from coverage under this programmatic consultation (see Table 1)?
 - a. Yes – Dewatering in a documented or potential bull trout Local Population Area in eastern Washington is not covered under this programmatic consultation. Complete an individual section 7 consultation for the project. Please contact the USFWS office in Spokane or Wenatchee for assistance.
 - b. No – go to 2
2. Is the project located within a water body where any listed salmonids are likely to be present? For specific bull trout areas where projects are permitted see Table 2.
 - a. Yes – go to 3
 - b. No - use “Protocol for Dewatering Outside High Likelihood Listed Fish Areas”;
3. Is the stream flow at the time of project construction anticipated to be greater than or equal to 5 cubic feet per second **and** is the dewatered stream length (not including the culvert and plunge pool length, if present) greater than or equal to 33 ft?
 - a. No - use “Protocol for Dewatering Outside High Likelihood Listed Fish Areas”;
 - b. Yes - use “Protocol I Dewatering Within High Likelihood Listed Fish Areas”;and consult with a USFWS bull trout biologist staff on appropriate timing window.

Table 1: Bull Trout Spawning and Rearing Areas that are Excluded from the Programmatic¹
(Listed in order of WRIA number)

Management or Recovery Unit	Core Area	Spawning and Rearing Areas Excluded (no in-water work is permitted in these areas)
Umatilla-Walla Walla River Basin	Walla Walla Core Area WRIA 32	Mill Creek and tributaries Wolf Fork above Coates Creek N Fk Touchet and tributaries upstream of Wolf Fk confluence S Fk Touchet River and tributaries above Griffin Creek
Snake River Basin	Asotin Creek Tucannon River WRIA 35	N Fk Asotin Creek including Charley and Cougar Creeks – above confluence with Charley Cr Tucannon River from confluence with Little Tucannon Upper Tucannon River and tributaries above confluence with Hixon Creek Cummings Creek
Middle Columbia River Basin	Yakima River Core Area	WRIA 37 N and MFk Ahtanum Creek - above the confluence of S Fk S Fk Ahtanum Creek – above confluence with N Fk Ahtanum WRIA 38 Rattlesnake Creek – upstream of confluence with Naches River WRIA 39 Taneum Creek – upstream of Taneum Campground Upper Yakima – upstream of Lake Easton Dam Cle Elum River – upstream of confluence with Yakima River N Fk Teanaway – upstream of confluence with Yakima River
Upper Columbia River Basin	Wenatchee River Core Area WRIA 45	Upper Wenatchee and tributaries above confluence with the Chiwawa, including Nason Cr, Little Wenatchee, White and the Chiwawa Rivers

¹ Spawning and rearing areas on lands administered by the U.S. Forest Service or Bureau of Land Management are not listed because these lands are not included in this Programmatic

Management or Recovery Unit	Core Area	Spawning and Rearing Areas Excluded (no in-water work is permitted in these areas)
		Chiwaukum Creek and Icicle Creek– upstream from confluence with the Wenatchee River Ingalls Creek- upstream of confluence with Peshastin Creek
	Entiat River Core Area WRIA 46	Entiat River – above confluence with the Mad River Mad River – above confluence with Entiat River
	Methow River Core Area WRIA 48	Upper Methow tributaries - Lost River, Early Winters Cr, W Fk Methow, Goat Cr, and Wolf Cr Chewack River – upstream of Twentymile Cr
		Twisp River and tributaries above confluence of, and including, Little Bridge Creek
		Gold Cr – upstream of confluence with Methow River
Northeast Washington	Pend Oreille River WRIA 62	Le Clerc Creek – upstream of mouth

Table 2 List of streams and marine areas that important for bull trout recovery where in-water work is permitted

Management Unit	Bull Trout Areas
Olympic Peninsula - Marine	Hood Canal and independent tributaries Strait of Juan de Fuca and independent tributaries (includes Bell, Morse, Ennis, Siebert Creeks) Pacific Ocean and independent coastal tributaries (includes Goodman, Mosquito, Cedar, Steamboat, Kalaloch and Joe Creeks, Raft, Moclips and Copalis Rivers) Lower Chehalis River/Grays Harbor and independent Tributaries (includes Humptulips, Wishkah, Wynoochee and Satsop Rivers)
Olympic Peninsula - Freshwater	Dungeness River – mouth to RM 10 Skokomish River – mouth to head of Cushman Reservoir Hoh River – mouth to headwaters Queets River – mouth to headwaters Quinault River - mouth to headwaters

Management Unit	Bull Trout Areas
Puget Sound - Marine	All marine shorelines including North Puget Sound, Main Basin, Whidbey Basin, and South Puget Sound
Puget Sound - Freshwater	<p>Samish River, Whatcom Creek, Squalicum Creek, Duwamish and lower Green River, and Lower Nisqually River including the Nisqually River estuary and McAllister Creek (FMO areas outside of core areas)</p> <p>Lake Washington including the following: lower Cedar River; Sammamish River; Lakes Washington, Sammamish, and Union; and Ship Canal</p> <p>Nooksack River – mouth to National Forest boundary (North and South Forks)</p> <p>Skagit River – mouth to National Forest boundary</p> <p>Stillaguamish River – mouth to headwaters of N Fork; Deer Creek – mouth to National Forest boundary; S Fork and Canyon Cr – mouth to National Forest boundary</p> <p>Snohomish/Skykomish – mouth to confluence of Skykomish and Snoqualmie Rivers; Pilchuck River; Snoqualmie River to falls; Tolt River; Skykomish River – mouth to National Forest boundary, including Sultan River, Woods Creek and Wallace River; S Fk Skykomish to National Forest boundary</p> <p>Puyallup River – mouth, including Mowich River, to National Park boundary; Carbon River – mouth to National Forest boundary;</p> <p>White River – mouth to National Forest boundary</p>
Lower Columbia	<p>Lewis River – mouth to RM 75 (Upper Falls), including Swift, Yale, and Mervin Reservoirs</p> <p>Klickitat River – mouth to confluence of W FK Klickitat</p> <p>Mainstems of the Columbia, Snake, Walla Walla, Pend Oreille, and Grande Ronde Rivers</p>
Middle Columbia River Basin	<p>Ahtanum Creek – mouth to confluence of N and S Forks</p> <p>Naches River – mouth to confluence of Little Naches and Bumping River</p> <p>Tieton River – mouth to Rimrock Lake</p> <p>Yakima River – mouth to Easton (RM 203) and Teanaway River</p>

Management Unit	Bull Trout Areas
Upper Columbia River Basin	<p>Wenatchee River – mouth to confluence of the Chiwawa; Peshastin Cr – mouth to confluence of Ingalls Cr; Chewack River – confluence with Wenatchee to RM 20; Beaver Cr – mouth to Blue Buck Cr</p> <p>Entiat River – mouth to confluence with Mad River</p> <p>Methow River – mouth to confluence of Lost River</p>
Northeast Washington Pend Oreille River	<p>Pend Oreille River; Tacoma Cr - mouth to Little Tacoma; Small Creek – mouth to forks; Sullivan Creek to and including Sullivan Lake</p>
Walla Walla River Basin	<p>Touchet River – mouth to forks; S Fk Touchet River – to confluence of Griffin Cr N Fk Touchet to Wolf Fork; Wolf Fork to confluence of Coates Cr Mill Creek and tributaries</p>
Snake River Basin	<p>Mainstem Snake and Grande Ronde Rivers; Asotin Creek – mouth to confluence of N Fk Asotin and Charley Cr; Tucannon River – mouth to confluence of Hixon Cr</p>

Protocol I Dewatering Within High Likelihood Listed Fish Areas

A. Fish Capture – General Guidelines

1. Fish Capture Methods
 - a. Minnow traps. Optional. Traps may be left in place prior to dewatering and may be used in conjunction with seining. Once dewatering starts, minnow traps should only be used if there is someone present to check the traps every few hours, and remove the traps once the water level becomes too low.
 - b. Seining. Required. Use seine with mesh of a size to ensure entrapment of the residing ESA-listed fish and age classes.
 - c. Sanctuary dip nets. Required. Use in conjunction with other methods as area is dewatered.
 - d. Electrofishing. Optional. Use electrofishing only after other means of fish capture have been exhausted or where other means of fish capture are not be feasible. Applicants shall adhere to NMFS Backpack Electrofishing Guidelines (NMFS 2000).
2. Fish capture operations will be conducted by or under the supervision of a fishery biologist experienced in such efforts and all staff working with the capture operation must have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.
3. The applicant must obtain any other Federal, State and local permits and authorizations necessary for the conduct of fish capture activities.
4. A description of any capture and release effort will be included in a post-project report, including the name and address of the supervisory fish biologist, methods used to isolate the work area and minimize disturbances to ESA-listed species, stream conditions before and following placement and removal of barriers; the means of fish removal; the number and size of fish removed by species and age class; condition upon release of all fish handled; and any incidence of observed injury or mortality.
5. Storage and Release. ESA-listed fish must be handled with extreme care and kept in water at all times during transfer procedures. The transfer of ESA-listed fish must be conducted using a sanctuary net that holds water during transfer, whenever necessary to prevent the added stress of an out-of-water transfer. A healthy environment for non-ESA listed fish shall be provided by large buckets (five gallon minimum to prevent overcrowding) and minimal handling of fish. The water temperature in the transfer buckets shall not exceed the temperature of cold pool water in the subject stream. Retain fish the minimum time possible to ensure that stress is minimized, temperatures do not rise, and dissolved oxygen remains suitable. Release fish as near as possible to the isolated reach in a pool or area that provides cover and flow refuge.

B. Dewater Instream Work Area and Fish Capture

Fish screen. Except for gravity diversions that have gradual and small outfall drops directly into water, all water intake structures must have a fish screen installed, operated, and maintained in accordance with NMFS Guidelines (NMFS 1997; Chapter 11 in NMFS 2008).

The sequence for stream flow diversion will be:

Note: this sequence will take one 24-hour period prior to construction to complete (of which 12 hours are for staged dewatering with 6 hours overnight). We suggest you start in the morning the day before project construction is scheduled and leave the reach dewatered overnight according to instruction below.

1. Install flow conveyance devices (pumps, discharge lines, gravity drain lines, conduits, and channels), but do not divert flow.
2. Install upstream barrier. Allow water to flow over upstream barrier.
3. Install block net at upstream end of work area. Block nets will be checked every 4 hours, 24 hours a day. If any fish are impinged or killed on the nets they will be checked hourly.
4. Reduce flow over upstream barrier by one-third for a minimum of 6 hours.
5. Inspect as discharge is diminishing and in dewatered areas for stranded and trapped fish and remove them with sanctuary dip nets.
6. Reduce flow over upstream barrier by an additional one-third for a minimum of 6 hours.
7. Again, inspect dewatered areas for stranded and trapped fish and remove them with sanctuary dip nets.
8. Leave the project area in a stable, low flow (one third of flow) condition, overnight, allowing fish to leave the area volitionally.
9. In the morning, remove any remaining fish from the area to be dewatered using seines and/or hand held sanctuary dip-nets.
10. Divert upstream flow completely.
11. Install downstream barrier if necessary (only in low gradient, backwatered reaches).
12. If water remains within the work area; seine, dip net, and lastly electrofish (if using this technique), the project area until catch rates have reached no fish for 3 consecutive passes. Move rocks as needed to flush fish and effectively electrofish the work area.
13. If needed, pump water out of isolated pools within the project area to a temporary storage and treatment site or into upland areas and filter through vegetation prior to reentering the stream channel. Continue to seine, dip net and electrofish while pumping.
14. If fish continue to be captured, shut pump off before average water depths reach one foot. Continue to seine, dip net and electrofish until no fish are caught for 3 consecutive passes.
15. Pump dry and check substrate for remaining fish.
16. Continue to pump water from the project area as needed for the duration of the project.

The diversion structure is typically a temporary dam built just upstream of the project site with sand bags that are filled with clean gravel or stream/floodplain rock and covered with plastic sheeting. A portable bladder dam or other non-erosive diversion technologies may be used to contain stream flow. Mining of stream or floodplain rock can be used for diversion dam construction if it does not result in significant additional floodplain or stream disturbance. Often gravel has to be moved to key in logs in which case it makes sense to use this gravel for the diversion structure.

The temporary bypass system must consist of non-erosive techniques, such as a pipe or a plastic-lined channel, both of which must be sized large enough to accommodate the predicted peak flow rate during construction. In cases of channel rerouting, water can be diverted to one side of the existing channel.

Dissipate flow at the outfall of the bypass system to diffuse erosive energy of the flow. Place the outflow in an area that minimizes or prevents damage to riparian vegetation. If the diversion inlet is a gravity diversion and is not screened to allow for downstream passage of fish, place diversion outlet in a location that facilitates gradual and safe reentry of fish into the stream channel.

C. Rewater Instream Work Area

Remove stream diversion and restore stream flow. Heavy machinery operating from the bank may be used to aid in removal of diversion structures. Slowly re-water the construction site to prevent loss of surface water downstream as the construction site streambed absorbs water and to prevent a sudden increase in stream turbidity. Look downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

All stream diversion devices, equipment, pipe, and conduits will be removed and disturbed soil and vegetation will be restored after the diversion is no longer needed.

Protocol II Dewatering Outside High Likelihood Listed Fish Areas

If bull trout or other listed salmonids are captured at any time during the dewatering process, immediately notify a USFWS bull trout biologist or NMFS biologist and obtain guidance to either continue to dewater and remove fish or stop activities and re-water the project site.

Normal guidance:

1. If you encounter listed fish at or prior to step 3 switch to Protocol I
2. If you encounter listed fish after step 3, continue to dewater and remove fish, paying close attention to presence of additional listed salmonids.

A. Fish Capture – General Guidelines

1. Fish Capture Methods
 - a. Minnow traps. Optional. Traps may be left in place prior to dewatering and may be used in conjunction with seining. Once dewatering starts, minnow traps should only be used if there is someone present to check the traps every few hours, and remove the traps once the water level becomes too low.
 - b. Seining. Required. Use seine with mesh of such a size to ensure entrapment of the residing ESA-listed fish and age classes.
 - c. Sanctuary dip nets. Required. Use in conjunction with other methods as area is dewatered.
 - d. Electrofishing. Optional. Use electrofishing only after other means of fish capture have been exhausted or where other means of fish capture are not be feasible. Applicants shall adhere to NMFS Backpack Electrofishing Guidelines.
2. Fish capture operations will be conducted by or under the supervision of a fishery biologist experienced in such efforts and all staff working with the seining operation must have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.
3. The applicant must obtain any other Federal, State and local permits and authorizations necessary for the conduct of fish capture activities.
4. A description of any seine and release effort will be included in a post-project report, including the name and address of the supervisory fish biologist, methods used to isolate the work area and minimize disturbances to ESA-listed species, stream conditions before and following placement and removal of barriers; the means of fish removal; the number and size of fish removed by species; conditions upon release of all fish handled; and any incidence of observed injury or mortality.
5. Storage and Release. Fish must be handled with extreme care and kept in water to the maximum extent possible during transfer procedures. A healthy environment for the stressed fish shall be provided by large buckets (five gallon minimum to prevent overcrowding) and minimal handling of fish. The temperature of the water shall not exceed the temperature in large deep holding pools of the subject system. The transfer of any ESA-listed fish must be conducted using a sanctuary net that holds water during transfer, to prevent the added stress of

an out-of-water transfer. Retain fish the minimum time possible to ensure that stress is minimized, temperatures do not rise, and dissolved oxygen remains suitable. Release fish as near as possible to the isolated reach in a pool or area that provides cover and flow refuge.

B. Dewater Instream Work Area and Fish Capture

Fish screen. Except for gravity diversions that have gradual and small outfall drops directly into water, all water intake structures must have a fish screen installed, operated, and maintained in accordance with the NMFS Guidelines (NMFS 1997; Chapter 11 in NMFS 2008).

The sequence for stream flow diversion would be as follows:

1. Install flow conveyance devices (pumps, discharge lines, gravity drain lines, conduits, and channels), but do not divert flow.
2. Install block net at upstream end of work area.
3. Seine and dip net through the entire project area in a downstream direction, starting at the upstream end; thereby moving fish out of the project area. Then, if necessary electrofish.
4. Install upstream barrier and divert upstream flow completely.
5. Capture any remaining fish using hand held dip-nets.
6. Install downstream barrier if necessary (only in low gradient backwatered reaches).
7. If water remains within the work area; seine and dip net, if necessary electrofish the project area until catch rates have reached no fish for 3 consecutive passes.
8. Pump water out of isolated pools within the project area to a temporary storage and treatment site or into upland areas and filter through vegetation prior to re-entering the stream channel. Continue to seine, dip net, or electrofish while pumping.
9. If fish continue to be captured, shut pump off before average water depths reach one foot. Continue to seine, dip net, or electrofish until no fish are caught for 3 consecutive passes.
10. Pump dry and check substrate for remaining fish and remove them.
11. Continue to pump water from the project area as needed for the duration of the project.

The diversion structure is typically a temporary dam built just upstream of the project site with sand bags that are filled with clean gravel or stream/floodplain rock and covered with plastic sheeting. A portable bladder dam or other non-erosive diversion technologies may be used to contain stream flow. Mining of stream or floodplain rock can be used for diversion dam construction if it does not result in significant additional floodplain or stream disturbance. Often gravel has to be moved to key in logs in which case it makes sense to use this gravel for the diversion structure.

The temporary bypass system must consist of non-erosive techniques, such as a pipe or a plastic-lined channel, both of which must be sized large enough to accommodate the predicted peak flow rate during construction. In cases of channel rerouting, water can be diverted to one side of the existing channel.

Dissipate flow at the outfall of the bypass system to diffuse erosive energy of the flow. Place the outflow in an area that minimizes or prevents damage to riparian vegetation. If the diversion inlet is a gravity diversion and is not screened to allow for downstream passage of fish, place diversion outlet in a location that facilitates gradual and safe reentry of fish into the stream channel.

C. Rewater Instream Work Area

Remove stream diversion and restore stream flow. Heavy machinery operating from the bank may be used to aid in removal of diversion structures. Slowly re-water the construction site to prevent loss of surface water downstream as the construction site streambed absorbs water and to prevent a sudden increase in stream turbidity. Look downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

All stream diversion devices, equipment, pipe, and conduits will be removed and disturbed soil and vegetation will be restored after the diversion is no longer needed.

Literature Cited

- NMFS (National Marine Fisheries Service). 1997. Fish Screening Criteria for Anadromous Salmonids. NMFS Southwest Region, (January 1997). 12 p.
<http://swr.nmfs.noaa.gov/hcd/fishscrn.pdf>
- NMFS (National Marine Fisheries Service). 2000. Guidelines for Electrofishing Waters Containing Salmonids Listed Under the ESA. <http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf>
- NMFS (National Marine Fisheries Service). February 2008. ANADROMOUS SALMONID PASSAGE FACILITY DESIGN. http://www.nwr.noaa.gov/Salmon-Hydropower/FERC/upload/Fish_Passage_Design.pdf
- USFWS (USFWS). 2002. Bull trout (*Salvelinus confluentus*) draft recovery plan. Chapter One. Fish and Wildlife Service, Portland, Oregon. 137 pp.
- USFWS (USFWS). 2004a. Draft Recovery Plan for the Coastal-Puget Sound Distinct Population Segment of Bull Trout (*Salvelinus confluentus*). Volume I (of II): Puget Sound Management Unit. Portland, Oregon. 389 + xvii pp.
- USFWS (USFWS). 2004b. Draft Recovery Plan for the Coastal-Puget Sound Distinct Population Segment of Bull Trout (*Salvelinus confluentus*). Volume II (of II): Olympic Peninsula Management Unit. Portland, Oregon. 277 + xvi pp.

LITERATURE CITED

Bates, K., B. Bernard, B. Heiner, J.P. Klavas, and P.D. Powers. 2003. Design of Road Culverts for Fish Passage. Washington Department of Fish and Wildlife, Olympia, WA.

http://wdfw.wa.gov/hab/engineer/cm/culvert_manual_final.pdf

NMFS (National Marine Fisheries Service). 2000. Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act.

APPENDIX C

CONSULTATION AND COORDINATION



United States
Department of the Interior
Bureau of Reclamation

Upper Columbia Area Office
1917 Marsh Road
Yakima, WA 98907-1749

UCA-1613

October 6, 2005

MEMORANDUM

To: Project files – Methow SubBasin Program
From: Mark DeLeon, Area Archeologist
Subject: Results of historic properties field reconnaissance, Marracci Diversion

On July 11, 2005, I examined a location on private land on Beaver Creek approximately 5 miles upstream from the creek's junction with the Methow River that is proposed for a fisheries habitat enhancement project partially funded with federal money. Bureau of Reclamation provided technical assistance for engineering specifications.

Project Description: the project is replacing a diversion dam constructed of locally available cobbles and small boulders with an engineered rock v-weir diversion, and the installation of pipe in the prism of the existing ditch. This is a fisheries enhancement project.

Location: the project lies in the SW ¼ SE ¼ Section 35, T34N, R22E, Okanogan County, Washington (Blue Buck Mountain 7 ½ minute USGS quadrangle).

Area of Potential Effect: project effects are primarily instream; the project will not effect undisturbed ground. Access and staging areas for the proposed action will use an existing maintenance corridor, and is estimated to involve an area of less than ¼ acre. The existing diversion and ditch has been in use since the late 1890's. As can be seen in the attached photograph, the diversion is a "low budget" construction where expediency is the only design consideration. It is essentially a temporary structure, rebuilt as needed.

Field Reconnaissance: the APE was visually examined for the presence or absence of historic properties. The area adjacent to the diversion is a seasonal hunting camp, probably of long-standing. Low impact, short term use is evident. The APE is also adjacent to a county road.

Literature Review: a review of records housed in the Bureau of Reclamation, Upper Columbia Area Office cultural resource files, revealed no known historic properties or previous surveys in the APE. The Okanogan National Forest has a somewhat dated *Cultural Resources Overview* that provides a modicum of historic context for the Beaver Creek drainage. And a predictive model of the area done

for the Forest Service by Cathy Fulkerson in 1988 identifies American Indian sites in the far upper Beaver Creek drainage.

A review of the Washington on-line National Register listings as well as the recent GIS data update is silent regarding listed properties.

Results: A small instream irrigation diversion in use for perhaps 100 years will be replaced by an engineered structure. The existing structure is essentially a low rock wall that has been rebuilt and realigned over the years as needed to direct water into a shallow ditch. Although there is a permanent right to take water at the location, there are no permanent facilities. The above described project meets the criteria of 36 CFR § 800.3(a)(1), Subpart B, *No Potential to cause effects*, and, no further Section 106 review is necessary on this undertaking.

Bureau of Reclamation
Upper Columbia Area Office
Methow Sub-Basin Program



Marracci Diversion -- in-stream modification
view to west, downstream is to viewer's left

T34N, R22E, Section 35
Okanogan County, Washington
Blue Buck Mtn 7 1/2 minute quadrangle





IN REPLY REFER TO:

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region Office
1150 N. Curtis Road, Suite 100
Boise, Idaho 83706-1234



ENV 3.00

March 23, 2012

MEMORANDUM

TO: Vincent J. Kozakiewicz, Deputy Program Manager (PN-1720)
Columbia-Snake Recovery Office (CSRO)

FROM: Sean Hess, Regional Archeologist (PN-3914)
Pacific Northwest Region Office (PNRO)

RE: Marracci Diversion Project (BiOp ID#4026)
Request for Determination of No Potential to Cause Effects to Historic Properties
(Tracking No. PNRO U12-004:12.008)

On March 2, 2012, Jennifer Molesworth provided a description of the Marracci Diversion Project, which is proposed for Beaver Creek, a tributary to the Methow River in Okanogan County, Washington (Section 26, Township 34N, Range 22E, W.M.). The project lies within the footprint of a 2005 project designed to provide fish passage. Mark DeLeon, the Upper Columbia Area Office Archaeologist, conducted a cultural resources reconnaissance of the previous project in October 2005, and he found no historic properties.

Because this project involves work within a previously constructed feature within Beaver Creek and the earlier cultural resources reconnaissance found no historic properties, it qualifies for a Determination of No Potential to Cause Effects.

Therefore, I request that you exercise your authority as the Agency Official as defined in 36 CFR 800.2(a) and that you authorize a Determination of No Potential to Cause Effects.

Please sign below if you wish to authorize this determination. Thank you.

Authorization

I find that this project has no potential to cause effects to historic properties.

Vincent J. Kozakiewicz, Deputy Program Manager

Date

cc: Molesworth (PN-1770); Nielsen (PN-3411); PNRO Central Files



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

April 10, 2012

Mr. Vincent Kozakiewicz
Pacific Northwest Regional Office
Bureau of Reclamation
1150 North Curtis Road, Suite 100
Boise, Idaho 83706-1234

Re: Fort-Thurlow Diversion Project
Tracking: PNRO U12-002:12.009
Log No.: 041012-35-BOR

Dear Mr. Kozakiewicz:

Thank you for contacting our department. We have reviewed the materials you provided for the Area of Potential Effect (APE) and level of effort for the proposed Fort-Thurlow Diversion Project in Okanogan County, Washington.

We concur with your determination of the Area of Potential Effect (APE) as described and presented in your figures and text. We look forward to receiving the results of your consultations, professional archaeological survey, and the Determination of Effect.

We would also appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in compliance with the Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations 36CFR800.4.). Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: rob.whitlam@dahp.wa.gov



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

July 16, 2012

Ms. Lori Lee
Bureau of Reclamation
1150 north Curtis Road, Suite 100
Boise, Idaho 83706-1234

Re: Fort Thurlow Diversion Dam Fish Passage Project
Log No.: 041012-35-BOR

Dear Ms. Lee:

Thank you for contacting our department. We have reviewed the professional archaeological survey report you provided for the proposed Fort Thurlow Diversion Dam Fish Passage Project, Okanogan County, Washington.

We concur with your determination of No Historic Properties Affected.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity must stop, the area secured, and this office notified.

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: rob.whitlam@dahp.wa.gov



United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Regional Office
1150 North Curtis Road, Suite 100
Boise, ID 83706-1234

IN REPLY REFER TO:

PN-1777
ENV. 7.00

AUG 22 2012

Dale Bambrick
Eastern Washington Branch
National Oceanic and Atmospheric Administration, National Marine Fisheries Service
Eastern Washington Habitat Branch
304 S Water Street, Suite 201
Ellensburg, WA 98926

Subject: Endangered Species Act- Section 7 Consultation – Request for Concurrence-
Fort-Thurlow and Marracci weir renovations, Beaver Creek Project, Okanogan County,
Twisp, WA

Dear Mr. Bambrick:

The Bureau of Reclamation (Reclamation) is requesting formal consultation under section 7 of the Endangered Species Act (50CFS 402.14) and also consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery and Conservation Management Act (MSA).

Reclamation has prepared and enclosed the Biological Assessment (BA) for the Fort-Thurlow and Marracci weir renovations, Beaver Creek Project. The proposed action is to reconstruct an existing habitat restoration project designed to address key limiting factors affecting ESA listed steelhead, salmon and bull trout fish passage and habitat productivity in Beaver Creek. In the past, local NMFS biologists have participated in field visits to the diversions and have been briefed on the these projects.

The BA describes and evaluates the potential effects of the proposed action on Upper Columbia River spring Chinook salmon and Upper Columbia River steelhead, EFH for Coho, species under the jurisdiction of the National Marine Fisheries Service that are known to occur in the action area. Columbia River bull trout also occur in the Beaver Creek watershed and are addressed in a BA to USFWS.

In summary, the construction of the Fort-Thurlow and Marracci weir renovations is likely to result in adverse effects on the above listed species, from increased turbidity or construction related disturbance. Over the long-term, the proposed action will maintain habitat access and functional habitat area in this localized portion of the Beaver Creek drainage. On this basis, we request concurrence on a “likely to adversely affect” determination but with mitigation suggestions to reduce adverse affects of the action on these species.

It is our intention to construct this project in August/September 2012 using funding and in-kind contributions from Reclamation. The project was developed in cooperation with the Methow Salmon Recovery Foundation (MSRF), Yakima Nation, Methow Conservancy, Washington Water Project of Trout Unlimited, USGS, USFWS and multiple landowners.

We request NOAA fisheries concurrence on Reclamation's findings as soon as practicable in order to support the completion of this beneficial habitat restoration effort.

If you have any questions on this request please call Gretchen Fitzgerald-Natural Resource Specialist Middle Snake River Area Office, Boise, ID @ 208-383-2231 or Jennifer Molesworth Methow Subbasin Liaison, Twisp, WA @ 509-997-0028.

Thank you for your assistance with this project.

Sincerely,



Vincent J. Kozakiewicz
Deputy Program Manager
Columbia/Snake Salmon Recovery Office

Enclosure



United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Regional Office
1150 North Curtis Road, Suite 100
Boise, ID 83706-1234

IN REPLY REFER TO:

PN-1777
ENV. 7.00

AUG 22 2012

Karl Halupka
United States Fish and Wildlife Service
215 Melody Lane
Wenatchee, Washington 98801

Subject: Endangered Species Act- Section 7 Consultation – Request for Concurrence-
Fort-Thurlow and Marracci weir renovations, Beaver Creek Project, Okanogan County,
Twisp, WA

Dear Mr. Kalupka:

The Bureau of Reclamation (Reclamation) is requesting formal consultation under section 7 of the Endangered Species Act (50CFS 402.14) and also consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery and Conservation Management Act (MSA).

Reclamation has prepared and enclosed the Biological Assessment (BA) for the Fort-Thurlow and Marracci weir renovations, Beaver Creek Project. The proposed action is to reconstruct an existing habitat restoration project designed to address key limiting factors affecting Columbia River Basin ESA listed steelhead, salmon and bull trout fish passage and habitat productivity in Beaver Creek. In the past USFWS biologist, have participated in field visits and have been briefed on the project.

The BA describes and evaluates the potential effects of the proposed action on Columbia River bull trout, Upper Columbia River spring Chinook and UCR steelhead and wildlife species under the jurisdiction of the US Fish and Wildlife Service that are known to occur in the action area.

In summary, the construction of the Fort-Thurlow and Marracci weir renovations is likely to result in adverse effects on the ESA listed fish species and will have minimal short-term impacts from increased turbidity, construction related disturbance. Over the long-term, the proposed action will increase functional habitat area and significantly improve habitat conditions for these species in the Beaver Creek drainage. On this basis, we request concurrence on a "likely to adversely affect" determination but with mitigation suggestions to reduce the adverse affects of the action on these species.

With the assistance of US Forest Service Wildlife Biologist Kent Woodruff, we reached "No Effect" determination for the gray wolf, grizzly bear, northern spotted owl, Canada Lynx, and Ute ladies' tresses.

It is our intention to construct this project in October/November 2012 (Fort Thurlow) and October/November 2013 (Marrachi) using funding from Reclamation. The project was developed in cooperation with the Methow Salmon Recovery Foundation (MSRF), Yakima Nation, Methow Conservancy, Washington Water Project of Trout Unlimited, USGS, USFWS and multiple landowners.

We request USFWS concurrence on Reclamation's findings as soon as practicable in order to support the completion of this beneficial habitat restoration effort.

If you have any questions on this request please call Gretchen Fitzgerald-Natural Resource Specialist Middle Snake River Area Office, Boise, ID @ 208-383-2231 or Jennifer Molesworth Methow Subbasin Liaison, Twisp, WA @ 509-997-0028.

Thank you for your assistance with this project.

Sincerely,



Vincent J. Kozakiewicz
Deputy Program Manager
Columbia/Snake Salmon Recovery Office

Enclosure



METHOW SALMON RECOVERY FOUNDATION

SOLUTIONS WITH LASTING VALUE

April 2, 2013

Maryann Baird
Endangered Species Act Coordinator
Regulatory Branch, Seattle District
US Army Corps of Engineers
Post Office Box 3755
Seattle, Washington 98124-3755

REF: Beaver Creek Weirs Renovation Project – Marracci Diversion and Fort Thurlow Diversion

Dear Maryann,

Attached are the JARPA and SPIF for the **Beaver Creek Weirs Renovation Project – Marracci Diversion and Fort Thurlow Diversion**. Methow Salmon Recovery Foundation (MSRF), the project applicant, is acting as the project sponsor for the Bureau of Reclamation (Reclamation) to implement projects in support of the Upper Columbia Salmon Recovery Plan.

As Jennifer Molesworth and Jessica Goldberg discussed with you last fall, MSRF and Reclamation are planning to repair two existing irrigation diversions at two locations on Beaver Creek. Work will take place instream and in riparian areas along Beaver Creek. The project will result in improved fish passage and reduced need for irrigators to conduct instream maintenance work, benefitting ESA-listed Upper Columbia River (UCR) spring Chinook salmon, UCR steelhead, and bull trout. We have obtained permission from the primary landowners; survey is still on-going and we will add signatures if others are identified.

The project is funded with Reclamation Construction Authority funds. Reclamation is completing Section 106 consultation and NEPA for project, but NOAA Fisheries requested that we use the Corps of Engineers' Restoration Programmatic for the State of Washington to complete the ESA consultation. Reclamation will need a copy of the resulting documentation to complete their NEPA process. Please forward any concurrences received to Reclamation:

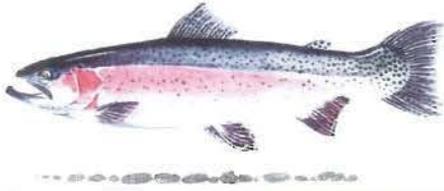
Gretchen Fitzgerald
Natural Resource Specialist
Bureau of Reclamation
230 Collins Road
Boise, ID 83702-4520
(208) 383-2231, FAX (208) 383-2237, GFitzgerald@usbr.gov

We are available to answer questions regarding the project and schedule site visits if needed. Please contact me at (509) 429-1232, Katy Williams (509) 433-8880, or Jessica Goldberg at (509) 997-0028 ext. 263.

Sincerely,

Chris Johnson
Board President
Methow Salmon Recovery Foundation

PO Box 755 Twisp, WA 98856 - Phone (509) 996-2787 - Cell (509) 429-1232
Fax (509) 422-1766 - e-mail msrf@methowsalmon.org - website www.methowsalmon.org



METHOW SALMON RECOVERY FOUNDATION

SOLUTIONS WITH LASTING VALUE

April 2, 2013

Jess Jordan
US Army Corps of Engineers
Regulatory Branch
PO Box 3755
Seattle, WA 98124-3755

REF: *Beaver Creek Weirs Renovation Project – Marracci Diversion and Fort Thurlow Diversion*

Dear Jess,

Attached is the JARPA for the **Beaver Creek Weirs Renovation Project – Marracci Diversion and Fort Thurlow Diversion**. Methow Salmon Recovery Foundation (MSRF), the project applicant, is acting as the project sponsor for the Bureau of Reclamation to implement projects in support of the Upper Columbia Salmon Recovery Plan.

As we discussed last fall with you and Maryann Baird, MSRF is planning to repair two existing irrigation diversions at two locations on Beaver Creek. Work will take place instream and in riparian areas along Beaver Creek. The project will result in improved fish passage and reduced need for irrigators to conduct instream maintenance work, benefitting ESA-listed Upper Columbia River (UCR) spring Chinook salmon, UCR steelhead, and bull trout. We have obtained permission from the primary landowners; survey is still on-going and we will add signatures if others are identified.

Work on the project is scheduled to begin September 1, 2013. In-water construction for the project is limited to the area immediately adjacent to the diversion intake structures at both Marracci and Fort Thurlow Diversions and is scheduled for September 1, 2013 – November 30, 2013. This work window will allow construction to take place when weather, water levels, and irrigation diversions are most appropriate for the work. In-water work is expected to take approximately two to three weeks per site. Work in Beaver Creek will be completed when the creek is between 5 and 10 cfs.

We are segregating this application from the normal JARPA process and sending it to you directly in order to get the completed application to you for review as soon as possible. We understand that this leaves little time for processing, but uncertainties surrounding final project design material quantities and landowner permissions prevented completing the application earlier. Please let us know if we can provide any additional information to assist you as you review this project.

We are available to answer questions regarding the project and schedule site visits if needed. Please contact me at (509) 429-1232, Katy Williams (509) 433-8880, or Jessica Goldberg at (509) 997-0028 ext. 263.

Sincerely,

Chris Johnson
Board President
Methow Salmon Recovery Foundation

PO Box 755 Twisp, WA 98856 - Phone (509) 996-2787 - Cell (509) 429-1232
Fax (509) 422-1766 - e-mail msrf@methowsalmon.org - website www.methowsalmon.org



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

APR 24 2013

Regulatory Branch

National Marine Fisheries Service
Mr. Steve Landino
Washington State Director for Habitat Conservation
Washington State Habitat Office
510 Desmond Drive Southeast, Suite 103
Lacey, Washington 98503-1263

Ken S. Berg, Manager
U.S. Fish and Wildlife Service
Washington Fish and Wildlife Office
510 Desmond Drive Southeast, Suite 102
Lacey, Washington 98503-1263

U.S. Fish and Wildlife Service
Jessica L. Gonzales, Assistant Project Leader
Central Washington Field Office
215 Melody Lane, Suite 119
Wenatchee, Washington 98801-5933

Reference: 2008 Fish Passage and
Restoration Programmatic
2008/03598 (NMFS)
13410-2008-FWS # F-0209

Dear Messrs. Landino and Berg and Ms. Gonzales:

We have enclosed the following Specific Project Information Forms for your review. We concluded that the effects of these proposed projects are within the range of effects addressed in the biological opinion referenced above. Each project includes a Memorandum for the Services that identifies any project deviations from the biological opinion and provides our determinations of effect for species and critical habitat under your jurisdiction. We request your approval for use of the 2008 Fish Passage and Restoration programmatic consultation to meet our requirements for these projects pursuant to Section 7 Endangered Species Act and the essential fish habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Please provide your electronic approval within 30 days from the date of this letter. We request that you send your electronic approval to the project manger (PM) responsible for the action and our staff

responsible for managing the programmatic consultation. The email addresses to which you should transmit your electronic approval are provided in the Memorandum for the Services.

NWS-2011-954, Yakama Nation, (Jordan, PM), Okanogan County

NWS-2012-855-DOT, WSDOT, (Manning, PM), Pierce County

NWS-2013-399, Wild Fish Conservancy, (White, PM), King County – **FWS only**

NWS-2013-439, Methow Salmon Recovery Foundation, (Jordan, PM), Okanogan County

NWS-2013-495, Kittitas Conservation District, (Urelius, PM), Kittitas County

If you find that a proposed project does not qualify for use of the programmatic consultation, please notify us of the reason for your finding and provide an estimate of the amount of time necessary for you to complete the consultation. For a non-qualifying project, this letter will serve to initiate Section 7 Endangered Species Act consultation and consultation for essential fish habitat pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.

A copy of this letter and the MFS will be furnished to the authorized agent for the above-listed projects. More information on the Endangered Species Act consultation process can be found on our webpage at www.nws.usace.army.mil click on Regulatory – Regulatory/Permits. If you have any questions or comments concerning the project, please contact the assigned project manager directly.

Sincerely,



Michelle Walker
Chief, Regulatory Branch

Enclosures

Re: 2008 Fish Passage and Restoration Programmatic ESA/EFH Consultation

NMFS Reference: 2008/03598

FWS Reference: 13410-2008-FWS# F-0209

Corps Reference Number: NWS-2013-439

Applicant's Name: Methow Salmon Recover Foundation

Corps Project Manager: Jess Jordan

Project Manager Telephone:

Project Manager Email: see section XIII of this memorandum

Date: 11 April 2013

This memorandum conveys to the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) a summary of the effects to species and critical habitat protected under the Endangered Species Act (ESA) that the U.S. Army Corps of Engineers, Seattle District (Corps) has determined are likely to result from the proposed project. The purpose of this memorandum is to facilitate required Section 7 ESA review with FWS and/or NMFS regarding the proposed project. This document is not a Department of the Army permit and it does not authorize the applicant to commence work on the proposed project.

- I. **Project Location.** The proposed projects are located in Beaver Creek near Twisp, Okanogan County, Washington
- A. Site 1 (Marracci Diversion): RM 6.5
SE ¼ Section 35, Township 34N, Range 22E
48.40164 N latitude, -120.04160 W longitude
 - B. Site 2 (Fort Thurlow Diversion): RM 1.5
SW ¼ Section 23, Township 33N, Range 22E
48.34207 N latitude, -120.04828 W longitude
- II. **Fifth Field Hydraulic Unit Code.** 1702000811 (Middle Methow River)
- III. **Project Description.** The applicant proposes to renovate 2 existing rock weir irrigation diversion structures that were damaged during high flow events in 2011. The proposed work will restore fish passage (as established by NMFS criteria) and optimize intake performance (to reduce the need for seasonal instream actions by irrigators that could hinder fish passage). The project sites will be isolated from flow by coffer dam. Fish removal will comply with criteria established in the 2008 Fish Passage and Restoration programmatic consultation (PC).
- A. Site 1 (Marracci Diversion). Construction will entail relocating the existing trash rack and intake to along the bankline, installing a downstream grade control sill, replacing the failed weir structure with a perpendicular sill, constructing a rock ramp between the grade control sills to add stability to the sills, and enhancing the channel with streambed material and habitat boulders.
 - B. Site 2 (Fort Thurlow Diversion): Construction will entail partially deconstructing the existing rock weirs, constructing a rock ramp between the existing concrete dam and downstream-most weir, constructing 3 sills, and enhancing the channel with streambed material and habitat boulders.
- IV. **Excluded Actions and Conservation Measures (CMs).** Certain types of activities are identified in the Corps' programmatic biological assessment as "excluded" from coverage under the PC. The list below identifies components of the project that are proposed by the applicant but are excluded activities under the PC or CMs with which the project will not comply.
- The project will comply with all PC CMs and will not incorporate excluded activities.
- V. **Corps Regulatory Jurisdiction.**
- Clean Water Act, Section 404
 - Rivers and Harbors Act, Section 10

- VI. Biologists at Services Familiar with Action.** The applicant coordinated with the Services as follows:
- A. *FWS*. Karl Halupka, September 2012
 B. *NMFS*. Dale Bambrick and Sean Gross, September 2012
- VII. Service from Which Electronic Approval or Consultation is Requested.** The Corps requests electronic approval or consultation for this project from:
- U.S. Fish and Wildlife Service National Marine Fisheries Service
- VIII. Determinations of Effect.** Based on the information provided in attached Specific Project Information Form, the Corps has determined that the proposed project will have the following effects on ESA protected species and critical habitat.

<i>ESA SPECIES & CRITICAL HABITAT</i>	<i>DETERMINATION OF EFFECT</i>		
<i>NMFS Species & Critical Habitat (CH)</i>			
Chinook, Upper Columbia River (UCR) spring	<input type="checkbox"/> NE ¹	<input type="checkbox"/> NLAA ²	<input checked="" type="checkbox"/> LAA ³
Chinook, UCR spring CH	<input type="checkbox"/> NE	<input checked="" type="checkbox"/> NLAA	<input type="checkbox"/> LAA
Steelhead, UCR	<input type="checkbox"/> NE	<input type="checkbox"/> NLAA	<input checked="" type="checkbox"/> LAA
Steelhead, UCR critical habitat	<input type="checkbox"/> NE	<input checked="" type="checkbox"/> NLAA	<input type="checkbox"/> LAA
<i>FWS Species & Critical Habitat (CH)</i>			
Bull trout, Columbia River (CR)	<input type="checkbox"/> NE	<input type="checkbox"/> NLAA	<input checked="" type="checkbox"/> LAA
Bull trout, CR critical habitat	<input type="checkbox"/> NE	<input checked="" type="checkbox"/> NLAA	<input type="checkbox"/> LAA
Gray wolf	<input type="checkbox"/> NE	<input checked="" type="checkbox"/> NLAA	<input type="checkbox"/> LAA

- IX. Essential Fish Habitat (EFH).** EFH is designated for the following groups in the project area:
- None in project area Pacific salmon Coastal pelagic Groundfish
- The Corps has determined that the proposed project would have the following effect on EFH.
- No EFH in project area Not likely to adversely affect Likely to adversely affect
- X. Allowable Work Window:** According to page 14 of the Specific Project Information Form, the applicant proposed an inwater work window as follows:
- 1 September through 30 November*
- XI. Attached Documents.** The following documents are included with this MFS.
- A. Specific Project Information Form, dated 2 April 2013
 B. Seven (7) project drawings (Marracci Diversion), dated 11 February 2013
 C. Seven (7) project drawings (Fort Thurlow Diversion), dated 3 August 2012
- XII. Special Conditions (SCs).** To ensure the effects of the project will be as determined, the following SCs will be conditions of the Corps permit:
- A. *The Corps will add this SC if a Service approves the project for use of the PC:*
 In order to meet the requirements of the Endangered Species Act (ESA) 2008 Fish Passage and Restoration Programmatic Consultation (National Marine Fisheries Reference No. 2008/03598; U.S. Fish and Wildlife Service Reference No. 1341-2008-FWS- #F-0209), you must comply with the conditions included in the Specific Project Information Form dated [DATE], and the enclosed electronic approval from National Marine Fisheries Service dated [DATE], and the U.S. Fish and Wildlife Service dated [DATE]. If you cannot comply with the terms and conditions of this programmatic consultation, you must, prior to commencing construction, contact the U.S. Army

¹ NE is 'no effect'

² NLAA is 'not likely to adversely affect'

³ LAA is 'likely to adversely affect'

Corps of Engineers (Corps), Seattle District, Regulatory Branch for an individual consultation in accordance with the requirements of the ESA and/of the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996.

- B. *The Corps will add this SC if a Service completes individual informal ESA consultation for the project:* You must implement and abide by the Endangered Species Act (ESA) requirements and/or agreements set forth in the [BE TITLE or RBE SPIF TITLE], dated [DATE], and the addendum dated [DATE], in their entirety. The National Marine Fisheries Service (NMFS) concurred with a finding of "may affect, not likely to adversely affect" based on this document on [DATE] (NMFS Reference Number ###). The U.S. Fish and Wildlife Service (USFWS) concurred with a finding of "may affect, not likely to adversely affect" based on this document on [DATE] (USFWS Reference Number ###). Both agencies will be informed of this permit issuance. Failure to comply with the commitments made in this document constitutes non-compliance with the ESA and your Corps permit. The USFWS/NMFS is the appropriate authority to determine compliance with ESA.
- C. *The Corps will add this SC if a Service completes individual formal ESA consultation for the project:* This U.S. Army Corps of Engineers (Corps) permit does not authorize you to take a threatened or endangered species, in particular the [LIST SPECIES OF CONCERN]. In order to legally take a listed species, you must have a separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permits, or ESA Section 7 consultation Biological Opinion with non-discretionary "incidental take" provisions with which you must comply). The enclosed BO(s) prepared by the National Marine Fisheries Service (NMFS) dated [DATE] and the U.S. Fish and Wildlife Service (USFWS) dated [DATE] contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with the specified "incidental take" in the BO (NMFS Reference Number ###, USFWS Reference Number ###). Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the enclosed BO(s). These terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO(s), where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your Corps permit. The USFWS/NMFS is the appropriate authority to determine compliance with the terms and conditions of its BO and with the ESA.
- D. In order to meet the requirements of the Endangered Species Act and protect Upper Columbia River Spring Chinook, Upper Columbia River steelhead, Columbia River bull trout, the permittee may conduct the authorized activities from 1 September through 30 November in any year this permit is valid. The permittee shall not conduct work authorized by this permit from 1 December through 31 August in any year this permit is valid.

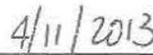
XIII. Transmit Electronic Approval To. The Corps requests that the Services transmit their electronic approval for this action under the 2008 Fish Passage and Restoration programmatic consultation to the following Corps staff:

- A. Maryann.Baird@usace.army.mil
- B. Dale.J.Jordan@usace.army.mil
- C. Karen.M.Urelius@usace.army.mil

XIV. Signature.



Maryann Baird, Endangered Species Act Coordinator



Date

Subject: FW: Electronic approval for use of restoration programmatic for NWS 2013-439
(UNCLASSIFIED)
From: "Jordan, Jess NWS" <Dale.J.Jordan@usace.army.mil>
Date: 5/30/2013 3:19 PM
To: Brian Fisher <brian@methowsalmon.org>

Classification: UNCLASSIFIED
Caveats: NONE

LOC from NMFS

-----Original Message-----

From: Dale Bambrick - NOAA Federal [<mailto:dale.bambrick@noaa.gov>]
Sent: Thursday, May 16, 2013 11:27 AM
To: Baird, Maryann NWS; Urelius, Karen M NWS; , "Stephanie Ehinger; Jordan, Jess NWS
Subject: Electronic approval for use of restoration programmatic for NWS 2013-439

Electronic Approval for Use of the 2008 Fish Passage and Restoration
Programmatic - Formal PCTS # 2013-10035

Essential Fish Habitat (EFH) for Chinook and coho salmon has been designated in the action area, and NMFS agrees with the determination that this project will not adversely affect EFH for these species.

The COE have met their obligations under Section 7 of the Endangered Species Act and EFH and no further consultation on this action is required.

--

"Whose woods these are I think I know." - Frost

Dale Bambrick, Branch Chief
304 South Water Street # 200
Ellensburg, WA 98926

(509) 962-8911, xt 221 <tel:%28509%29%20962-8911%2C%20xt%20221%20>
cell - (360) 481-5742 <tel:%28360%29%20481-5742%20>

Classification: UNCLASSIFIED
Caveats: NONE

Attachments:

NWS#2013-439 Beaver Creek Marrachi and Thurlow.doc

26.5 KB

Electronic Approval for Use of the 2008 Fish Passage and Restoration Programmatic

The applicant, Methow Salmon Recovery Foundation, proposes a restoration project that includes elements of the *Installation of Instream Structures, Sub-element g, and Fish Passage Sub-element g* categories of the Washington State Fish Passage and Habitat Enhancement/Restoration Programmatic. As per approval criteria set forth in this programmatic consultation, NMFS Tracking No.: 2008-03598(formal), NMFS is responding via this electronic format to give approval to use the programmatic consultation document for the “Marracci and Fort Thurlow Diversion Repair” Project in Beaver Creek, Methow Subbasin (COE #NWS – 2013-439, NMFS project-specific PCTS # 2013-10035; 5th field HUC 1702000811 – Middle Methow River).

NMFS considers this project to be Likely to Adversely Affect Upper Columbia River (UCR) steelhead with an associated extent of take of juveniles from crushing, electrofishing-related injury, and stress-related injury caused by stranding or salvage. This extent of take will occur as a result of the disturbance or de-watering of up to 9,000 square feet of the bed of Beaver Creek associated with the placement of coffer and salvage of fish within the isolated areas.

NMFS estimates that 110 juvenile steelhead will be present in the areas slated for disturbance prior to commencement of operations. NMFS derives this estimate of the number of juveniles likely to occupy the construction footprint based on reported values of juveniles in average habitat in the tributaries of the upper Columbia River. NMFS expects that at least one half of the individuals present will flee in response to project activity and thus avoid harm. NMFS further estimates that electrofishing and salvage in the areas isolated behind coffer will be at least 75% effective and that not more than 10% of salvaged fish will be killed or injured. It is likely that all fish remaining in the work area will be killed or injured. Thus NMFS estimates that not more than 15 steelhead will be killed or injured by isolation and salvage operations. The loss of 15 steelhead, all of which will be in pre-smolt life stages at which the rate of natural mortality is very high, is statistically unlikely to affect the number of adult returns of this species. NMFS expects that this temporary loss of a few individuals will be more than offset by increased survival rates for the brood years that will benefit from this restoration action. NMFS expects that the COE will report to NMFS the actual number of fish handled so as to allow for a continual refinement of the estimates of take from such actions.

The action also includes an extent of take resulting from anticipated turbidity levels exceeding 50 NTU within 100 feet downstream of each coffer dam as it is removed. The extent of this take will be turbidity levels exceeding 50 NTU for not more than 8 hours for not more than 100 feet downstream of any project site within a cumulative footprint of not more than 10,000 square feet.

Subject: FW: Marracci and Ft. Thurlow Diversion Repairs Consultation (FWS ref: 01EWF00-I-2013-0281) (UNCLASSIFIED)
From: "Jordan, Jess NWS" <Dale.J.Jordan@usace.army.mil>
Date: 5/30/2013 3:20 PM
To: Brian Fisher <brian@methowsalmon.org>

Classification: UNCLASSIFIED
Caveats: NONE

LOC from USFWS.

-----Original Message-----

From: Heather McPherron [<mailto:heather.mcpherron@fws.gov>]
Sent: Thursday, May 09, 2013 5:13 PM
To: Baird, Maryann NWS; Jordan, Jess NWS; Urelus, Karen M NWS
Cc: Jeff Krupka
Subject: Marracci and Ft. Thurlow Diversion Repairs Consultation (FWS ref: 01EWF00-I-2013-0281)

This responds to your April 25, 2013, request for initiation of consultation on the Salmon Recovery Foundation's Renovation of Marracci and Fort Thurlow Irrigation Diversions (Project; NWS-2013-439) located in Beaver Creek near the town of Twisp in Okanogan County, Washington. Please refer to the following U.S. Fish and Wildlife Service (Service) reference number in future correspondence about this project (FWS ref: 01EWF00-I-2013-0281).

In your Specific Project Information Form (SPIF), you described the anticipated effects to listed species and how the proposed Project is consistent with the categories of restoration actions described in the Washington State Fish Passage and Habitat Enhancement Programmatic (Programmatic). The Project will repair two existing rock weir irrigation diversion structures (Sites) damaged during high flow events in 2011. The work will restore fish passage (in accordance with National Marine Fisheries Service [NMFS] criteria) and optimize intake performance to reduce the need for future seasonal in-stream actions. Project work will be isolated from flow by installation of temporary coffer dams constructed using gravel bags, followed by fish removal that will comply with criteria established in Appendix D of the Programmatic. Specific actions on the Marracci Diversion Site include relocating the existing trash rack and intake to the bankline, installing a downstream grade control sill, replacing the failed weir structure with a perpendicular sill, and constructing a rock ramp between the grade control sills to add stability. Specific actions on the Fort Thurlow Diversion Site include partially deconstructing the existing rock weir, constructing a rock ramp between the existing concrete dam and downstream-most weir, and constructing three sills. Enhancement of the channel with streambed material and habitat boulders will occur at both Sites.

For NWS-2013-429, the Service concurs with your "may affect, likely to adversely affect" determination for the bull trout (*Salvelinus confluentus*), as well as your "not likely to adversely affect" determinations for gray wolf (*Canis lupus*) and the designated critical habitat of bull trout. The Service does not anticipate effects to other listed species and their habitats.

We anticipate the Project will result in adverse effects to 1 adult bull trout from the Beaver Creek local population from both repairs. These adverse effects should be sub-lethal. This estimate of the likely amount of take is based on results of relatively intensive monitoring of bull trout in Beaver Creek by the U.S. Geological Survey and others. The mechanisms causing these adverse effects are associated with worksite isolation and handling of fish, substrate compaction, and exposure to elevated turbidity resulting from coffer dam placement and removal events. Short term adverse effects to PCEs 2 and 8 of critical habitat will likely occur. Over the long term, the Service expects the project to have benefits on both bull trout population performance and the functionality of critical habitat. The Service reminds the Army Corps of Engineers that all applicable Terms and Conditions in the Programmatic BO must be implemented, as well as the conservation measures described in your Programmatic BA.

In summary, based on the information provided in the SPIF, the Service agrees that this Project is consistent with the restoration actions and conservation measures described in the Programmatic, and therefore may be tiered to the Service's July 8, 2008, Biological Opinion and June 30, 2008, Letter of Concurrence with the Programmatic (USFWS Reference 13410-2008-F-0209). In approving use of the Programmatic, we fully considered that the Project contains a timing deviation from Programmatic criteria. Project implementation calls for a work window from September 1 through November 30, to avoid the irrigation season, but still capture seasonal timing when bull trout are unlikely to be present in the Project area. Despite this deviation, we believe that the additional conservation measures included in the construction of this Project will result in Project effects to bull trout that are consistent with effects anticipated in the Programmatic consultation.

This concludes consultation pursuant to the implementing regulations of the Endangered Species Act, 50 C.F.R. § 402.13. This Project should be reanalyzed if new information reveals effects of the action that may affect listed or proposed species or designated or proposed critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to a listed or proposed species or designated or proposed critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this Project.

Please contact me if you have any questions. Thanks.

Heather McPherron, Fish and Wildlife Biologist

USFWS - Central Washington Field Office

215 Melody Lane, Suite 103

Wenatchee, WA 98801-8122

509.665.3508 x2011 (office)

509.665.3509 (fax)

509.393.5882 (mobile)

www.fws.gov/wafwo/

Classification: UNCLASSIFIED
Caveats: NONE

From: "Andonaegui, Carmen (DFW)" <Carmen.Andonaegui@dfw.wa.gov>
Date: June 14, 2013, 4:47:35 PM PDT
To: "chrisj@methowsalmon.org" <chrisj@methowsalmon.org>
Cc: "Mccoy, Gina O (DFW)" <Gina.McCoy@dfw.wa.gov>, "Hofmann, Lynda A (DFW)" <Lynda.Hofmann@dfw.wa.gov>, "Heiner, Bruce A (DFW)" <Bruce.Heiner@dfw.wa.gov>
Subject: FW: Fort-Thurlow fish passage recommendations

WDFW Environmental Engineering Recommendations for the Fort Thurlow Diversion Fish Passage Improvements

Our primary concerns about the design as submitted are:

- 1) The configuration of the upstream end will not provide good fish passage conditions, and
- 2) We have seen this design approach rapidly fail before, due to scour. The grade controls may impede fish passage if they are exposed by scour of the smaller materials. Additionally, failure of the uppermost grade control will reestablish the diversion dam as a fish passage barrier.

We strongly prefer that a conventional roughened channel approach be adopted, as they are doing at the Maracci diversion upstream of this site. Intermediate grade controls are not necessary in an appropriate roughened channel design, as evidenced by other USBR designs (Chewuch diversion, Fulton diversion, Marrachi). A thalweg can be maintained in a roughened channel without intermediate grade control weirs. We have seen multiple examples of intermediate weirs in roughened channels or constructed riffles causing either passage barriers or de-stabilizing the channel. If the channel material is adequately sized, as this appears to be, the weirs are not necessary. If the channel mix is not adequate the weirs are likely to become a barrier. A roughened channel design approach could be adopted with little change to the materials and quantities shown in the proposal. If the roughened channel design approach is not adopted, the following restrictions should be applied:

If grade controls are retained, they should be short rock ramps that will be passable if exposed by scour. The spacing of any grade control structures should be such that the drop between crests does not exceed 0.8 ft. Rock ramps can provide grade control, cross-sectional complexity and structural redundancy that allows some adjustment to occur without resulting in structural failure. Weirs (buried or not) with footer rocks protruding downstream from the header rocks should not be permitted.

We strongly recommend that the crest of the dam be backwatered by the roughened channel. We would rather see a slightly steeper channel that backwaters the concrete dam than a 5% channel that does not. The design has no margin of error if all the boulders in the weir do not remain in place. If the uppermost grade control is installed so that a drop exists over the crest of the dam, the volume of the intervening pool must provide adequate energy dissipation (i.e., an energy dissipation factor no greater than 4 ft-lb/sec/ft³) at high fish passage design flow. If it is entirely unacceptable to backwater the dam crest, an

alternative is to remove the top of the dam to allow construction of a roughened channel with an invert equivalent to the elevation of the existing dam crest.

The entire structure, including the streambed material and all large rock structures should be shaped to provide diverse flow conditions, with shallow margins and a well-defined low-flow pathway. The surface of the structure should be constructed to maximize roughness.

The structure should be keyed into the bed at the downstream end and constructed to remain passable if downstream channel incision exposes the below-grade portion of the structure.

The ESM note 2 on page 43 of the JARPA (Sheet 1678-100-1552) calls for all material other than fines to be hard angular rock. This should be modified so that all material up to the D50 is rounded.

Gina McCoy, P.E.

350 Bear Creek Rd
Winthrop, WA 98862
509) 996-8248 (office)
509) 969-9557 (cell)

WDFW,

Thank you for your concerns regarding the Fort Thurlow project. As you can see, this is a challenging project to adaptively manage due to the existing conditions including the large head difference from upstream to downstream (5-feet) along with the channel bend downstream of the dam. Your comments have given us the opportunity to re-evaluate our design such that we can balance the need to provide fish passage and to perform structurally. We agree that a re-design to a “conventional” roughened channel may be appropriate and may be completed with currently specified materials. Therefore, we feel that we may be able to provide a re-design in the interim of contracting to construct this project such that we can maintain our schedule for completion this fall. In addressing your concerns, we offer two conceptual re-configurations, both with differing pros and cons to structural stability and potential fish passage. In your evaluation of each, we must provide the caveat that we have not had the time to analyze each hydraulically nor compute potential additional material expenses. We therefore, appreciate your prompt feedback in terms of preference such that we could further one design to provide additional details and maintain our schedule for this critical fish passage on Beaver Creek.

Each option similarly addresses your specific concerns as follows:

1. **Grade controls within Roughened Channel** - We will remove the intermediate and upstream grade control features and replace them with Engineered Stream Bed (ESM) and Engineered Stream Bank (ESB) material as detailed in conventional roughened channel design guidance.
2. **Dam crest backwatered** – We have addressed this for higher flow conditions by raising our cross-sectional side slopes to approximately 5% such that each arm of the roughened channel is 6 to 8 inches above the dam crest. However, the low flow channel matches this existing low flow notch in the existing dam and therefore performs similarly to existing conditions during low water periods.
3. **Diverse flow conditions and roughness within Roughened Channel sections** – It is our intent to provide hydraulic diversity and roughness for both fish passage and energy dissipation in roughened channel features. Details of roughness placement will be forthcoming pending option choice in the final plans. Further, we believe that this critical design component needs to be field-fit to materials and plan to have our design team to work with MSRF and the Contractor during critical construction periods.
4. **Downstream key-in and transition** - We agree that the downstream key-in and design/construction is critical to the success of this fish passage design and have re-evaluated our pool at the bottom to re-construct the existing weir as previously shown to a constructed energy dissipation pool with the downstream lip at existing channel grade. We have also extended this pool downstream such that our fish bypass pipe will exit into this perennial pool feature.
5. **ESM material less than D50 to be rounded** - While we agree that rounded material will provide better aesthetics and may be appreciated by fish passing through this reach, we are of the opinion that this design requires angular material. Our reasons include past experience with roughened channels at or approaching our proposed grade of 5%. This slope is severe and at the upper limit of roughened channel design. Our concern is piping or movement of material

out of the ramp that is not replenished by natural sediment transport. Our experience has shown that angular material locks together and may slump slightly, but does not tend to roll out of our ramp. Excess material exiting our ramp could fail the design intent and therefore, is an unacceptable risk in our opinion for this particular situation.

As mentioned, we present two different design concepts that address the majority of the concerns expressed by Gina McCoy from WDFW as follows (see attached plan views):

Option 1: Traditional roughened channel

This option includes a 110-foot long roughened channel at 5% slope with a downstream constructed energy dissipation pool transition to the existing streambed. This option has an overall slope of approximately 4-percent (5.7 feet vertical over 140 feet length.) Major changes include removing the upper and middle grade control structures as requested and enhancing the downstream most scour pool. This option will be based upon a traditional roughened channel as requested with a small nose feature along the right bank to re-direct high flows in the channel bend.

Option2: Chute-Pool design

This option includes two roughened channel sections of 50-feet and 35-feet length at 6.5% slope separated by an energy dissipation pool at the natural channel bend along with an energy dissipation pool at the downstream end similar to option 1. This option has an overall slope of approximately 4-percent (5.7 feet vertical over 140 feet length.) Major changes include removing the upper grade control structure and creating a resting/dissipation pool at the channel bend through the roughened channel. In order for this option to fit the long profile, the two ramps between pools need to be slightly out of criteria at 6.5%, but high-water surface slopes are reduced and overall channel slope would meet criteria at 4%.

In each concept, ramp sections would be designed similarly to offer diverse flow conditions and a low flow pathway while maximizing roughness through careful rock and boulder placement.

Structural performance comparison -

Structural evaluation and design has yet to be performed through analysis of appropriate hydraulic conditions to be expected. However, it is our opinion that Option 1 will likely provide a lower degree of structural failure risk than option 2 due to the uniformity of the design along with the lower ramp slope.

Fish Passage performance comparison –

Similar to structural evaluation, fish passage evaluation has yet to be assessed through appropriate hydraulic analysis of this concept. However, it is our opinion that Option 2 will likely provide a lower degree of fish passage risk as designed to Option 1 due to the ability for fish to rest in a mid-channel pool with shorter ramp sections to negotiate.

As mentioned previously, we have attempted to address your concerns through conceptual re-design of the Fort Thurlow fish passage project using the same materials that we had originally specified. We would like to construct this project this year such that fish passage can be restored to Beaver Creek. We would therefore appreciate your prompt reply as to preference of the two options presented such that we can analyze the preferred option hydraulically and complete our design.

Regards,

Reclamation Ft. Thurlow Design Team

J. Nielsen, C. Forsyth, and M. Knutson



United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Regional Office
1150 North Curtis Road, Suite 100
Boise, ID 83706-1234

IN REPLY REFER TO:

PN-3411
PRJ-8.10

JUL - 3 2013

Mr. Chris Johnson, Contracting Officer
Methow Salmon Recovery Foundation
P.O. Box 756
Winthrop, WA 98862

Subject: Technical Specifications and Drawings, Marracci Adaptive Management Project,
Methow River Basin, Columbia/Snake River Salmon Recovery Program, Washington,
Solicitation No. 13-1678-WA-004

Dear Mr. Johnson:

Enclosed for your disposition is an electronic copy of the final subject specifications and drawings for Marracci Adaptive Management Project, Methow River Basin, Columbia/Snake River Salmon Recovery Program, Washington.

Those relying on this design are advised that the liability of the Bureau of Reclamation and its Design Professional for any actions, damages, claims, demands, judgments, losses, costs, and expenses resulting out of or resulting from Reclamation's or its Design Professional's negligent acts, errors or omissions is limited to design assistance to remedy the problem.

Any changes or modifications to these designs prior to or during construction shall be approved by a Reclamation Design Professional or a Registered Professional Engineer, before the changes are executed. Reclamation or a Registered Professional Engineer shall be notified promptly and before the conditions are disturbed, of subsurface or latent conditions at the site which differ materially from those shown on the drawings or covered by the specifications. All construction modifications shall be completed as directed by a Reclamation Design Professional or a Registered Professional Engineer. Changes approved by a non-Reclamation Registered Professional Engineer shall be forwarded to Reclamation for their files.

If you have and questions regarding this design, please contact Mr. Justin Nielsen, Civil Engineer, at 208-378-5022 or by e-mail at jhnielsen@usbr.gov.

Sincerely,



Sharon Parkinson
Program Manager, Design

cc: See next page.

cc: Continued from previous page.

Ms. Jenny Molesworth
P.O. Box 918
206 Glover St.
Twisp, WA 98856

Ms. Gretchen Fitzgerald
230 Collins Road
Boise, ID 83702-4520

Mr. Greg Knott
206 Glover St.
Twisp, WA 98856

Ms. Jessica Goldberg
Methow Salmon Recovery Foundation
P.O. Box 755
Twisp, WA 98856

Mr. Colin Forsyth
301 Yakima St.
Wenatchee, WA 98801-2966
(all w/cy of attachment – electronic copy only)

Bernard and Dianne Thurlow and family,
52 Thurlow Rd.
Twisp, WA 98856

Charlene Schumacher
Natural Resource Senior Planner
Okanogan County Office of Planning and Development
123 5th Ave. N., suite 190
Okanogan, WA 98840

RECEIVED

JUL 9 - 2013

OKANOGAN COUNTY
PLANNING & DEVELOPMENT
July 7, 2013

Dear Charlene,

In reference to the Beaver Creek Weirs
Remediation Project SEPA-2013-4. The notice (attached)
in The Chronicle, June 26, 2013, states that the
Fort Thurlow diversion has been in use for more than
50 years (before 1963).

The Thurlow diversion/water rights have
been in use since 1887, for more than 125 years.
It should be referred to as the Thurlow Fort diversion,
not Fort Thurlow. Thurlow has more Nat. water right
than Fort.

The Thurlow water right diversion has been in
use since Washington Territory - before Okanogan became
a County 1888, and before Washington became a state
in 1889.

The Thurlow Ranch is a Washington State
Centennial Farm

Existing rights can not be impaired.

Sincerely,
Bern M. Thurlow
Dianne Thurlow



United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Regional Office
1150 North Curtis Road, Suite 100
Boise, ID 83706-1234

IN REPLY REFER TO:

APR 11 2012

PN-1720
ENV 3.00

CERTIFIED – RETURN RECEIPT REQUESTED

The Honorable Harry Smiskin, Chairman
Yakama Nation Tribal Council
Confederated Tribes and Bands of the Yakama Nation
P.O. Box 151
Toppenish, WA 98948

Subject: Fort-Thurlow Diversion Project (Tracking No. PNRO U12-002:12.011)

Dear Mr. Smiskin:

The Bureau of Reclamation, in partnership with the Methow Salmon Recovery Foundation, is proposing to rebuild a series of damaged weirs on Beaver Creek, a tributary to the Methow River in Okanogan County. Because we would be modifying the weirs and using a new staging area and access route, we have determined that this rebuilding project should be considered an undertaking with the potential to result in adverse effects to historic properties.

The project would involve modifications to Beaver Creek over a distance of about 175 ft. It would also entail development of an access route measuring 260 ft. long and two staging areas. The APE covers about 0.9 acres. We are also proposing to identify archaeological resources, historic properties of religious and cultural importance to Indian tribes, and historic-period structures through a combination of fieldwork, literature reviews, and oral history interviews, if needed. Please see the enclosed description for more details.

We request that you concur with the APE and the level of effort to be used in identifying historic properties as described in the enclosure.

Please contact Sean Hess, the Regional Archeologist, at (208) 378-5316 with any questions.

Sincerely,

Vincent Kozakiewicz
Deputy Program Manager
Columbia-Snake Recovery Office

Enclosure - 1

cc: Copies with enclosure

V. Kate Valdez, Tribal Historic Preservation Officer
Confederated Tribes and Bands of the Yakama Nation
P.O. Box 151
Toppenish, WA 98948

Johnson Meninick, Program Manager
Cultural Resources Program
Confederated Tribes and Bands of the Yakama Nation
P.O. Box 151
Toppenish, WA 98948

Copies without enclosure

Chris Johnson, President
Methow Salmon Recovery Foundation
P.O. Box 1608
Okanogan, WA 98840

Dr. Allyson Brooks, Washington State Historic Preservation Officer
Department of Archaeology & Historic Preservation
P.O. Box 48343
Olympia, WA 98504-8343



United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Regional Office
1150 North Curtis Road, Suite 100
Boise, ID 83706-1234

IN REPLY REFER TO:

PN-1720
ENV 3.00

APR 5 2012

CERTIFIED – RETURN RECEIPT REQUESTED

Guy Moura, Interim Tribal Historic Preservation Officer
History/Archaeology Program
Confederated Tribes of the Colville Reservation
P.O. Box 150
Nespelem, WA 99155

Subject: Fort-Thurlow Diversion Project (Tracking No. PNRO U12-002:12.010)

Dear Mr. Moura:

The Bureau of Reclamation, in partnership with the Methow Salmon Recovery Foundation, is proposing to rebuild a series of damaged weirs on Beaver Creek, a tributary to the Methow River in Okanogan County. Because we would be modifying the weirs and using a new staging area and access route, we have determined that this rebuilding project should be considered an undertaking with the potential to result in adverse effects to historic properties.

The project would involve modifications to Beaver Creek over a distance of about 175 ft. It would also entail development of an access route measuring 260 ft. long and two staging areas. The APE covers about 0.9 acres. We are also proposing to identify archaeological resources, historic properties of religious and cultural importance to Indian tribes, and historic-period structures through a combination of fieldwork, literature reviews, and oral history interviews, if needed. Please see the enclosed description for more details.

We request that you concur with the APE and the level of effort to be used in identifying historic properties as described in the enclosure.

Please contact Sean Hess, the Regional Archeologist, at (208) 378-5316 with any questions.

Sincerely,

Vincent Kozakiewicz
Deputy Program Manager
Columbia-Snake Recovery Office

Enclosure - 1

cc: Copies without enclosure
Chris Johnson, President
Methow Salmon Recovery Foundation
P.O. Box 1608
Okanogan, WA 98840

Dr. Allyson Brooks, Washington State Historic Preservation Officer
Department of Archaeology & Historic Preservation
P.O. Box 48343
Olympia, WA 98504-8343



United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Regional Office
1150 North Curtis Road, Suite 100
Boise, ID 83706-1234

IN REPLY REFER TO:

PN-1720
ENV 3.00

APR 3 2012

CERTIFIED – RETURN RECEIPT REQUESTED

Dr. Allyson Brooks, Washington State Historic Preservation Officer
Department of Archaeology & Historic Preservation
P.O. Box 48343
Olympia, WA 98504-8343

Subject: Fort-Thurlow Diversion Project (Tracking No. PNRO U12-002:12.009)

Dear Dr. Brooks:

The Bureau of Reclamation, in partnership with the Methow Salmon Recovery Foundation, is proposing to rebuild a series of damaged weirs on Beaver Creek, a tributary to the Methow River in Okanogan County. Because we would be modifying the weirs and using a new staging area and access route, we have determined that this rebuilding project should be considered an undertaking with the potential to result in adverse effects to historic properties.

The project would involve modifications to Beaver Creek over a distance of about 175 ft. It would also entail development of an access route measuring 260 ft. long and two staging areas. The APE covers about 0.9 acres. We are also proposing to identify archaeological resources, historic properties of religious and cultural importance to Indian tribes, and historic-period structures through a combination of fieldwork, literature reviews, and oral history interviews, if needed. Please see the enclosed description for more details.

We request that you concur with the APE and the level of effort to be used in identifying historic properties as described in the enclosure.

Please contact Sean Hess, the Regional Archeologist, at (208) 378-5316 with any questions.

Sincerely,

Vincent Kozakiewicz
Deputy Program Manager
Columbia-Snake Recovery Office

Enclosure - 1

cc: Copies with enclosure
Chris Johnson, President
Methow Salmon Recovery Foundation
P.O. Box 1608
Okanogan, WA 98840

Copies without enclosure

Guy Moura, Interim Tribal Historic Preservation Officer
History/Archeology Program
Confederated Tribes of the Colville Reservation
P.O. Box 150
Nespelem, WA 99155

V. Kate Valdez, Tribal Historic Preservation Officer
Confederated Tribes and Bands of the Yakama Nation
P.O. Box 151
Toppenish, WA 98948

Johnson Meninick, Program Manager
Cultural Resources Program
Confederated Tribes and Bands of the Yakama Nation
P.O. Box 151
Toppenish, WA 98948