

**Forest Aquatic Restoration Project
NEPA Compliance and Implementation Checklist**

Wiwaanaytt Creek Culvert #3 - 2018

Project Number: 04012018 **Date:** 01/18/2018 **Location:** T¹² J S R 35 1/2 E, sec. 15, NE NW
Category: Category 1: Fish Passage Restoration (Culvert Replacement) and Category 14: Riparian Vegetation Planting
Project Description: Replace existing culvert on FSR 2645-104 with an Aquatic Organism Passage design culvert which will allow for passage of aquatic organisms at all stream flows and life stages.

Heritage (to be completed by heritage specialist)

Y N Initial
 RLD Specific PDC for Heritage addressed (Heritage Surveys; Avoidance areas).

Botany (to be completed by botany specialist)

Y N Initial
 JK Specific PDC for Botany addressed (Sensitive Plant Surveys). NO TES PLANTS OF CONCERN
 JK Specific PDC for Nox. Weeds addressed.

Land Management Consistency (is the proposed project within the management area? Check yes or no. If yes, comments should indicate whether proposed actions are consistent with the standards for the management area.)

Y	N	Initial		Y	N	Initial	
<input type="checkbox"/>	X	<u>JK</u>	4A Big Game Winter range	<input type="checkbox"/>	X	<u>JK</u>	9 Research Natural Areas
<input type="checkbox"/>	X	<u>JK</u>	6A & 6B Wilderness	<input type="checkbox"/>	X	<u>JK</u>	10 Semi-Primitive Non-Motorized Recreation Areas
<input type="checkbox"/>	X	<u>JK</u>	7 Scenic Area	<input type="checkbox"/>	X	<u>JK</u>	22/22A Wild and Scenic River
<input type="checkbox"/>	X	<u>JK</u>	8 Special Interest Areas	<input type="checkbox"/>	X	<u>JK</u>	Inventoried Roadless Areas

Comments:

Table 1. Projects Design Criteria and Forest Plan compliance checklist.

I have reviewed this project and have determined it is compliant with the Forest Plan and Aquatic EA Project Design Criteria identified for my resource.			
Resource	Signature	Date	Comments (additional PDCs may be noted if necessary)
Heritage	<u>RLD</u>	3/21/2018	NO GROUND DISTURBING ACTIVITIES UNTIL NADP CONCURRENCE IS DETERMINED.
Botany	<u>JK</u>	23-JAN-18	NO TES OF CONCERN, NO DOCUMENTED INVASIVES AT SITE
Invasive Plants	<u>JK</u>	23-JAN-18	
Wildlife	<u>JK</u>	1-19-18	
Fish*	<u>JK</u>	2/14/2018	
Hydrology*	<u>JK</u>	1-19-18	
Range	<u>JK</u>	1-19-18	
Soils	<u>JK</u>	1-21-18	TINY AREA AFFECTED
Recreation	<u>JK</u>	2/23/18	
Special Uses	<u>JK</u>	1/24/18	State reclamation permit application with BLP application concurrently being processed by Forest & 3 miles down stream from project area
Oil and Gas / Mining	<u>JK</u>	1/29/18	NO mine claims present
Engineering	<u>JK</u>	1/29/18	
Fuels / Fire	<u>JK</u>	1/19/18	
Silviculture	<u>JK</u>	1/19/18	

* Ensure that an experienced fisheries biologist or hydrologist is involved in the design of all projects covered by Aquatic Restoration Biological Opinion II. The experience should be commensurate with technical requirements of a project.

District Environmental Coordinator: [Signature] Date: 3/2/18

Line Officer Signature: [Signature] Date: 4/3/18

Recommend
Verify applicant
submit materials

Implementation Description:

Wiwaanaytt Creek Culvert #3 - 2018

Category 1: Fish Passage Restoration (Culvert Replacement) Category 14: Riparian Vegetation Planting	Lead Preparer: Jeff Nelson
Applicant: Prairie City Aquatics	NEPA Reference: DN For Aquatic Restoration EA (http://www.fs.usda.gov/detailfull/malheur/landmanagement/?cid=STELPRD3817723&width=full)
Location: (T/R, sec.,¼,¼) T 11 S R 35½ E, sec. 15, NE NW USGS Quad: Austin	Lease/ /Case File/ Serial #: na (Reference #):na
Begin Date: 12/04/17	Due Date: 5/01/2018

Purpose/Need:

Wiwaanaytt Creek (formerly Squaw Creek), together with Summit Creek, forms the headwaters of the Middle Fork John Day River (MFJDR). Wiwaanaytt Creek contains approximately 5.9 miles of MCR steelhead critical habitat as designated by the National Marine Fisheries Service (NMFS). Forest Service Road (FSR) 2645-104 crosses Wiwaanaytt Creek approximately 5 miles upstream of the confluence of Wiwaanaytt and Summit Creeks. The existing culvert on FSR 2645-104 is a 46" baffled, circular culvert which is undersized and slightly perched (~0.5 feet) restricting movement of juvenile Mid-Columbia River steelhead and other resident fishes and impeding natural sediment transport processes on Wiwaanaytt Creek.

Bankfull width in the vicinity of the FSR 2645-104 crossing ranges from approximately six to eight feet. Culverts which are narrower than bankfull width interrupt sediment transport processes in two ways. At high flows, undersized culverts create a backwater effect where water velocity is reduced upstream of the culvert causing sediment to drop out of the water column, reducing the amount of sediment available for deposition downstream. Undersized culverts also increase water velocity downstream of the culvert as stream flow is forced through a constriction. Increased water velocity increases the rate of erosion downstream of the undersized culvert.

Under current conditions, the culvert does not allow for passage of all life stages of Mid-Columbia River steelhead throughout the water year and does not allow for natural sediment transport processes to occur. The purposes of this project are twofold: 1) provide stream passage for all life stages of aquatic organisms including Mid-Columbia River steelhead, which are listed as Threatened under the Endangered Species Act and 2) restore natural sediment transport processes. In order to meet these objectives the undersized culvert on FSR 2645-104 will be replaced with a single span, open bottom arch culvert, the dimensions of which will enable the culvert to pass aquatic organisms and transport sediment at natural rates under a normal range of discharges.

Land Use Plan Conformance:

The project falls under Management Area (MA) 3B “Anadromous Riparian Areas” of the Malheur National Forest Land and Resource Management Plan (LRMP). The goal of MA3B is to “Manage riparian areas to protect and enhance their value for wildlife, anadromous fish habitat and water quality... Design and conduct management in all riparian areas to maintain or improve water quality and beneficial uses” (USDA Forest Service, 1990). Wiwaanaytt Creek is within a category 1 Riparian Habitat Conservation Area (fish-bearing stream) as designated by PACFISH/INFISH and is listed as designated critical habitat for Mid-Columbia River steelhead by the National Marine Fisheries Service (NMFS). The adjacent management areas to the proposed treatment sites are classified as General Forest and Rangeland (MA1 & MA2).

Project activities are located in the Squaw Creek (HUC 170702030102) subwatershed within the Bridge Creek – Middle Fork John Day River (HUC 1707020301) watershed.

Implementation Plan:

The existing culvert on FSR 2645-104 will be replaced with a single span, open bottom arch culvert designed to provide complete aquatic organism passage as well as allow for improved hydrologic function. Removing and replacing the existing structures will include the following activities:

- Dewatering (temporary diversion of stream flow around construction site), and use of a temporary, flexible culvert,
- Excavation and stockpiling of existing fill and removal of existing culverts,
- Placement of new structures, including excavation and placement of footings, if needed,
- Placement of stream simulation material (boulders, cobbles and finer material) inside new culvert,
- Backfilling and road surfacing over the new structure,
- Seeding or planting of disturbed ground, if needed, and
- Installation of in-channel grade control structures, depending on the site-specific engineering design. In-channel grade controls will require heavy equipment use in the stream and on the floodplain within 200 feet of the new culvert, both upstream and downstream.

Implementation will require short-term road closures; alternative access routes will be identified and provided in advance to local media and posted on maps locally. Signs to direct traffic and provide for public safety would be posted in accordance with the Manual of Uniform Traffic Control Devices. All new material needed for stream simulation substrate and any additional road fill or surfacing material will be borrowed from the existing Dixie Summit or Austin gravel pits. Any excess fill material remaining after construction will be stored at the existing Dry Fork gravel pit. The engineered culvert design is available for specialist review upon request.

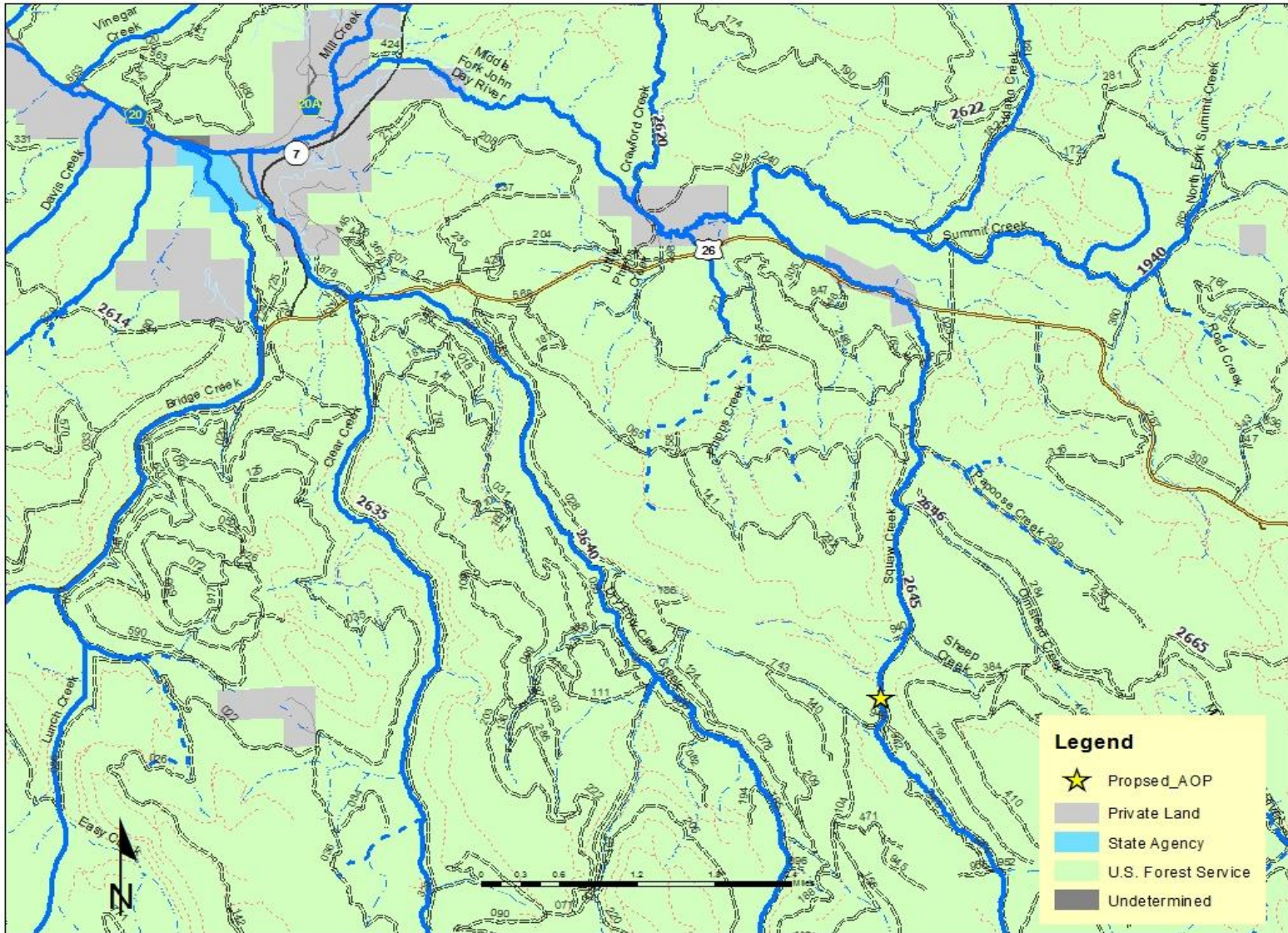


Figure 1: General location of proposed culvert replacement on Forest Road 2645-104 and Wiwaanaytt Creek.



Figure 2: General site overview of proposed culvert replacement location on FSR 2645-104.



Figure 3: Existing culvert on FSR 2645-104 facing upstream. Stream channel is obscured by woody debris.



Figure 4: Existing culvert on FSR 2645-104 facing downstream.



Figure 5: Inlet of existing culvert on FSR 2645-104 showing rock and steel baffles inside pipe.

Appendix to the Aquatic Restoration EA Implementation Description

Project Title: Wiwaanaytt Culvert #3 - 2018

Project Number:

Category 1: Fish Passage Restoration a) Stream Simulation Culvert and Bridge Projects

Category 14: Riparian Vegetation Planting

The following information will guide actions for this project that is taking place within the bounds of the Decision Notice for the 2014 Malheur National Forest Aquatic Restoration Environmental Assessment to maintain that all conservation measures, guidelines and project design criteria (PDCs) are met under this guiding document.

Program Administration

1. Integration of project design criteria and conservation measures and terms and conditions into project design and contract language
 - a. This document is to outline the conservation measures and PDCs that will be used during project implementation to remain compliant with the aquatic restoration BA as well as ARBO II.
2. Project notification: The following information will be provided to the NMFS Level 1 Aquatics members 30 days prior to implementation as a Project Notification Form 7.

a. **Action identifier-**

b. Project name- Wiwaanaytt Culvert #3

c. Location-

Project	Wiwaanaytt Culvert #3
Stream Name	Wiwaanaytt Creek
6 th field HUC	170702030106 (Squaw Creek)
Latitude (Decimal Degrees)	44.527147
Longitude (Decimal Degrees)	-118.409637

d. Agency contact- Jeff Nelson, jeffreynelson@fs.fed.us, 541-575-3159

e. Timing- Work will occur during 2018, with in-stream work happening between July 15 and August 15. In-stream work may occur before or after the in-stream work window if dry channel conditions exist. Floodplain work may occur before or after instream window.

f. Activity category-

Category 1: Fish Passage Restoration a) Stream Simulation Culvert and Bridge Projects

Category 14: Riparian Vegetation Planting

g. Project description- Project description is available in the Implementation Description under the section “Implementation Plan” above.

h. Extent- Instream work will take place within the road prism of FSR 2645-104 and up to 200 feet upstream and downstream of road crossing.

i. Species affected-

i. Listed species: Mid-Columbia River steelhead

- ii. MIS Species: Steelhead and redband trout
 - j. Date of submittal- To be completed in Spring of 2018, at least 60 day prior to implementation
 - k. Site assessments- Assessment for contaminants is not required at these locations.
 - l. Review- NMFS fish passage review and Restoration Review Team review are not required.
 - m. Verification- _____
 - n. SOD project notification- _____
3. Minor Variance: No variances from the criteria specified in the aquatic restoration document are being considered.
 4. NMFS Fish Passage Review and Approval: This work does not require review by the NFMS level 1 team member.
 5. Restoration Review Team: This work does not require review by the restoration review team.
 6. Project Completion Report: To be completed after implementation
 7. Annual Program Report: This project will be completed within one year, completion and annual reporting will occur in the winter of FY19 before February 15th.

General Aquatic Conservation Measures¹

8. Technical Skill and Planning Requirements:
 - a. An appropriately qualified fisheries biologist or hydrologist will be involved in the design of this project.
 - b. The scope of this project is limited in both space and context. Field evaluations and site-specific surveys will require little work. Appropriate time will be allotted for these actions prior to implementation. Planning and design will involve appropriate expertise.
 - c. The assigned fisheries biologist or hydrologist will make sure that any applicable conservation measures and project design criteria are met through the contracting process.
9. Climate Change: due to the small scale of this work, future climate changes impacts will not have dramatic effects on this work.
10. In-Water Work Period: In-stream activities will occur between July 15th and August 15th.
11. Fish passage: Not applicable.
12. Site Assessment For Contaminants: In developed or previously developed sites, such as areas with past dredge mines or sites with known or suspected contamination, a site assessment for contaminants will be conducted on projects that involve excavation of >20 cubic yards of material. The action agencies will complete a site assessment to identify the type, quantity, and extent of any potential contamination. The level of detail and resources committed to such an assessment will be commensurate with the level and type of past or current development at the site. The assessment may include the following:
 - a. Review of readily available records, such as former site use, building plans, records of any prior contamination events.
 - b. Site visit to observe the areas used for various industrial processes and the condition of the property.

¹ These General Aquatic Conservation Measures are sourced from the Malheur National Forest Aquatic Restoration Environmental Assessment Appendix A.

- c. Interviews with knowledgeable people, such as site owners, operators, occupants, neighbors, local government officials, etc.
 - d. Report that includes an assessment of the likelihood that contaminants are present at the site.
13. Pollution and Erosion Control Measures: Implement the following pollution and erosion control measures:
- a. Project Contact: Identify a project contact (name, phone number, an address) that will be responsible for implementing pollution and erosion control measures.
 - b. List and describe any hazardous material that would be used at the project site, including procedures for inventory, storage, handling, and monitoring; notification procedures; specific clean-up and disposal instructions for different products available on the site; proposed methods for disposal of spilled material; and employee training for spill containment.
 - c. Temporarily store any waste liquids generated at the staging areas under cover on an impervious surface, such as tarpaulins, until such time they can be properly transported to and treated at an approved facility for treatment of hazardous materials.
 - d. Procedures based on best management practices to confine, remove, and dispose of construction waste, including every type of debris, discharge water, concrete, cement, grout, washout facility, welding slag, petroleum product, or other hazardous materials generated, used, or stored on-site.
 - e. Procedures to contain and control a spill of any hazardous material generated, used or stored on-site, including notification of proper authorities. Ensure that materials for emergency erosion and hazardous materials control are onsite (e.g., silt fence, straw bales, oil-absorbing floating boom whenever surface water is present).
 - f. Best management practices to confine vegetation and soil disturbance to the minimum area, and minimum length of time, as necessary to complete the action, and otherwise prevent or minimize erosion associated with the action area.
 - g. No uncured concrete or form materials will be allowed to enter the active stream channel.
 - h. Steps to cease work under high flows, except for efforts to avoid or minimize resource damage.
14. Site Preparation
- a. Flagging sensitive areas –Prior to construction, clearly mark critical riparian vegetation areas, wetlands, and other sensitive sites to minimize ground disturbance.
 - b. Staging area –Establish staging areas for storage of vehicles, equipment, and fuels to minimize erosion into or contamination of streams and floodplains.
 - i. No Topographical Restrictions –place staging area 150 feet or more from any natural water body or wetland in areas where topography does not restrict such a distance.
 - ii. Topographical Restrictions –place staging area away from any natural water body or wetland to the greatest extent possible in areas with high topographical restriction, such as constricted valley types.

- c. Temporary erosion controls –Place sediment barriers prior to construction around sites where significant levels of erosion may enter the stream directly or through road ditches. Temporary erosion controls will be in place before any significant alteration of the action site and will be removed once the site has been stabilized following construction activities.
 - d. Stockpile materials –Minimize clearing and grubbing activities when preparing staging, project, and or stockpile areas. Any large wood, topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration. Materials used for implementation of aquatic restoration categories (e.g., large wood, boulders, fencing material) may be staged within the 100-year floodplain.
 - e. Hazard trees –Where appropriate, include hazard tree removal (amount and type) in project design. Fell hazard trees when they pose a safety risk. If possible, fell hazard trees within riparian areas towards a stream. Keep felled trees on site when needed to meet coarse large wood objectives.
15. Heavy Equipment Use
- a. Choice of equipment – Heavy equipment will be commensurate with the project and operated in a manner that minimizes adverse effects to the environment (e.g., minimally-sized, low pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).
 - b. Fueling and cleaning and inspection for petroleum products and invasive weeds
 - i. All equipment used for instream work will be cleaned for petroleum accumulations, dirt, plant material (to prevent the spread of noxious weeds), and leaks repaired prior to entering the project area. Such equipment includes large machinery, stationary power equipment (e.g., generators, canes), and gas-powered equipment with tanks larger than five gallons.
 - ii. Store and fuel equipment in staging areas after daily use.
 - iii. Inspect daily for fluid leaks before leaving the vehicle staging area for operation.
 - iv. Thoroughly clean equipment before operation below ordinary high water or within 50 feet of any natural water body or areas that drain directly to streams or wetlands and as often as necessary during operation to remain grease-free.
 - c. Temporary access roads – Existing roadways will be used whenever possible. Minimize the number of temporary access roads and travel paths to lessen soil disturbance and compaction and impacts to vegetation. Temporary access roads will not be built on slopes where grade, soil, or other features suggest a likelihood of excessive erosion or failure. When necessary, temporary access roads will be obliterated or revegetated. Temporary roads in wet or flooded areas will be restored by the end of the applicable in-water work period. Construction of new permanent roads is not permitted.
 - d. Stream crossings – Minimize number and length of stream crossings. Such crossings will be at right angles and avoid potential spawning areas to the greatest extent possible. Stream crossings shall not increase the risk of channel re-routing at low and high water conditions. After project completion, temporary stream

- e. Work from top of bank – To the extent feasible, heavy equipment will work from the top of the bank, unless work instream would result in less damage to the aquatic ecosystem.
- f. Timely completion – Minimize time in which heavy equipment is in stream channels, riparian areas, and wetlands. Complete earthwork (including drilling, excavation, dredging, filling and compacting) as quickly as possible. During excavation, stockpile native streambed materials above the bankfull elevation, where it cannot reenter the stream, for later use.

16. Site Restoration

- a. Initiate rehabilitation – Upon project completion, rehabilitate all disturbed areas in a manner that results in similar or better than pre-work conditions through removal of project-related waste, spreading of stockpiled materials (soil, large wood, trees, etc.) seeding, or planting with local native seed mixes or plants.
- b. Short-term stabilization – Measures may include the use of non-native sterile seed mix (when native seeds are not available), weed-free certified straw, jute matting, and other similar techniques. Short-term stabilization measures will be maintained until permanent erosion control measures are effective. Stabilization measures will be instigated within three days of construction completion.
- c. Revegetation – Replant each area requiring revegetation prior to or at the beginning of the first growing season following construction. Achieve reestablishment of vegetation in disturbed areas to at least 70% of pre-project levels within three years. Use an appropriate mix of species that will achieve establishment and erosion control objectives, preferably forb, grass, shrub, or tree species native to the project area or region and appropriate to the site. Barriers will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.
- d. Planting manuals – All riparian plantings shall follow Forest Service direction described in the Regional letter to Units, Use of Native and Nonnative Plants on National Forests and Grasslands May 2006 (Final Draft), and or BLM Instruction Memorandum No. OR-2001-014, Policy on the Use of Native Species Plant Material.
- e. Decomact soils – Decomact soil by scarifying the soil surface of roads and paths, stream crossings, staging, and stockpile areas so that seeds and plantings can root.

17. Monitoring

Monitoring will be conducted by Action Agency staff, as appropriate for that project, during and after a project to track effects and compliance with this opinion.

- a. Implementation
 - i. Visually monitor during project implementation to ensure effects are not greater (amount, extent) than anticipated and to contact Level 1 representatives if problems arise.
 - ii. Fix any problems that arise during project implementation.
 - iii. Regular biologist/hydrologist coordination if biologist/hydrologist is not always on site to ensure contractor is following all stipulations.
- b. 401 Certification – To minimize short-term degradation to water quality during project implementation, follow current 401 Certification provisions of the Federal

Clean Water Act for maintenance or water quality standards described by the following: Oregon Department of Environmental Quality (Oregon BLM, Forest Service, and BIA); Washington Department of Ecology (Washington BLM); and the Memorandum of Understanding between the Washington Department of Fish and Wildlife and Forest Service regarding Hydraulic Projects Conducted by Forest Service, Pacific Northwest Region (WDFW and USDA-Forest Service 2012); California, Idaho, or Nevada 401 Certification protocols (BLM and Forest Service).

- c. Post project – A post-project review shall be conducted after winter and spring high flows.
 - i. For each project, conduct a walk through/visual observation to determine if there are post-project effects that were not considered during consultation. For fish passage and revegetation projects, monitor in the following manner:
 - ii. Fish Passage Projects – Note any problems with channel scour or bedload deposition, substrate, discontinuous flow, vegetation establishment, or invasive plant infestation.
 - iii. Revegetation – For all plant treatment projects, including site restoration, monitor for and remove invasive plants until native plants become established.
 - iv. In cases where remedial action is required, such actions are permitted without additional consultation if they use relevant PDC and aquatic conservation measures and the effects of the action categories are not exceeded.
18. Work Area Isolation, Surface Water Withdrawals, and Fish Capture and Release –Isolate the construction area and remove fish from a project site for projects that include concentrated and major excavation at a single location within the stream channel. This condition will typically apply to the following aquatic restoration categories: Fish Passage Restoration; Dam, Tidegate, and Legacy Structure Removal; Channel Reconstruction/Relocation.
- a. Isolate capture area – Install block nets at up and downstream locations outside of the construction zone to exclude fish from entering the project area. Leave nets secured to the stream channel bed and banks until construction activities within the stream channel are complete. If block nets or traps remain in place more than one day, monitor the nets and or traps at least on a daily basis to ensure they are secured to the banks and free of organic accumulation and to minimize fish predation in the trap.
 - b. Capture and release – Fish trapped within the isolated work area will be captured and released as prudent to minimize the risk of injury, then released at a safe release site, preferably upstream of the isolated reach in a pool or other area that provides cover and flow refuge. Collect fish in the best manner to minimize potential stranding and stress by seine or dip nets as the area is slowly dewatered, baited minnow traps placed overnight, or electrofishing (if other options are ineffective). Fish must be handled with extreme care and kept in water the maximum extent possible during transfer procedures. A healthy environment for the stressed fish shall be provided—large buckets (five-gallon minimum to

prevent overcrowding) and minimal handling of fish. Place large fish in buckets separate from smaller prey-sized fish. Monitor water temperature in buckets and well-being of captured fish. If buckets are not being immediately transported, use aerators to maintain water quality. As rapidly as possible, but after fish have recovered, release fish. In cases where the stream is intermittent upstream, release fish in downstream areas and away from the influence of the construction. Capture and release will be supervised by a fishery biologist experienced with work area isolation and safe handling of all fish.

- c. Electrofishing – Use electrofishing only where other means of fish capture may not be feasible or effective. If electrofishing will be used to capture fish for salvage, NMFS’s electrofishing guidelines will be followed (NMFS 2000).
 - i. Reasonable effort should be made to avoid handling fish in warm water temperatures, such as conducting fish evacuation first thing in the morning, when the water temperature would likely be coolest. No electrofishing should occur when water temperatures are above 18°C or are expected to rise above this temperature prior to concluding the fish capture.
 - ii. If fish are observed spawning during the in-water work period, electrofishing shall not be conducted in the vicinity of spawning fish or active redds.
 - iii. Only Direct Current (DC) or Pulsed Direct Current shall be used.
 - iv. Conductivity <100, use voltage ranges from 900 to 1100. Conductivity from 100 to 300, use voltage ranges from 500 to 800. Conductivity greater than 300, use voltage to 400.
 - v. Begin electrofishing with minimum pulse width and recommended voltage and then gradually increase to the point where fish are immobilized and captured. Turn off current once fish are immobilized. vi. Do not allow fish to come into contact with anode. Do not electrofish an area for an extended period of time. Remove fish immediately from water and handle as described above (PDC 20b). Dark bands on the fish indicate injury, suggesting a reduction in voltage and pulse width and longer recovery time.
 - vi. If mortality is occurring during salvage, immediately discontinue salvage operations (unless this would result in additional fish mortality), reevaluate the current procedures, and adjust or postpone procedures to reduce mortality.
- d. Dewater construction site –When dewatering is necessary to protect species or critical habitat, divert flow around the construction site with a coffer dam (built with non-erosive materials), taking care to not dewater downstream channels during dewatering. Pass flow and fish downstream with a by-pass culvert or a water-proof lined diversion ditch. Diversion sandbags can be filled with material mined from the floodplain as long as such material is replaced at end of project. Small amounts of instream material can be moved to help seal and secure diversion structures. If ESA listed-fish may be present and pumps are required to dewater, the intake must have a fish screen(s) and be operated in accordance with NMFS fish screen criteria described below (in part e.iv) of this section. Dissipate

flow energy at the bypass outflow to prevent damage to riparian vegetation or stream channel. If diversion allows for downstream fish passage, place diversion outlet in a location to promote safe reentry of fish into the stream channel, preferably into pool habitat with cover. Pump seepage water from the de-watered work area to a temporary storage and treatment site or into upland areas and allow water to filter through vegetation prior to reentering the stream channel.

- e. Surface water withdrawals
 - i. Surface water may be diverted to meet construction needs, but only if developed sources are unavailable or inadequate. Where ESA-listed fish may be present, diversions may not exceed 10% of the available flow and fish screen(s) will be installed, operated, and maintained according to NMFS's fish screen criteria (NMFS 2011e).
 - ii. For the dewatering of a work site to remove or install culverts, bridge abutments etc., if ESA-listed fish may be present, a fish screen that meets criteria specified by NMFS (2011e) must be used on the intake to avoid juvenile fish entrainment. If ESA-listed salmon, steelhead, eulachon, or green sturgeon may be present, the Action Agencies will ensure that the fish screen design is reviewed and approved by NMFS for consistency with NMFS (2011e) criteria if the diversion (gravity or pump) is at a rate greater than 3 cfs. NMFS approved fish screens have the following specifications: a) An automated cleaning device with a minimum effective surface area of 2.5 square feet per cfs, and a nominal maximum approach velocity of 0.4 feet per second (fps), or no automated cleaning device, a minimum effective surface area of 1 square foot per cfs, and a nominal maximum approach rate of 0.2 fps; and b) a round or square screen mesh that is no larger than 2.38 mm (0.094 inches) in the narrow dimension, or any other shape that is no larger than 1.75 mm (0.069 inches) in the narrow dimension.
- f. Stream re-watering – Upon project completion, 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 release of suspended sediment. Monitor downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

Applicable Project Design Criteria²

Project Design Criteria for Aquatic Restoration Activity Categories

1. Fish Passage Restoration includes the following: total removal of culverts or bridges, or replacing culverts or bridges with properly sized culverts and bridges, replacing a damaged culvert or bridge, and resetting an existing culvert that was improperly installed or damaged; stabilizing and providing passage over headcuts; removing, constructing (including relocations), repairing, or maintaining fish ladders; and constructing or replacing fish screens for irrigation diversions. Such projects

² These Project Design Criteria are sourced from the Malheur National Forest Aquatic Restoration Environmental Assessment Appendix A. All references included in this section can be found in the Aquatic Restoration EA.

will take place where fish passage has been partially or completely eliminated through road construction, stream degradation, creation of small dams and weirs, and irrigation diversions. Equipment such as excavators, bull dozers, dump trucks, front-end loaders, and similar equipment may be used to implement projects.

a. **Stream Simulation Culvert and Bridge Projects** – All road-stream crossing structures shall simulate stream channel conditions per *Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road- Stream Crossings* (USDA-Forest Service 2008), located at: http://stream.fs.fed.us/fishxing/aop_pdfs.html

i. **Culvert criteria** – Within the considerations of stream simulation, the structure shall, at a minimum, accommodate a bankfull wide channel plus constructed banks to provide for passage of all life stages of native fish species (for more information, reference Chapter 6, page 35 of the USFS Stream Simulation Guide). The following crossing-width guidance applies to specific ranges of entrenchment ratios as defined by Rosgen (1996):

1. Non-entrenched Streams: If a stream is not fully entrenched (entrenchment ratio of greater than 1.4), the minimum culvert width shall be at least 1.3 times the bankfull channel width. This is consistent with *Anadromous Salmonid Passage Facility Design* (section 7.4.2 “Stream Simulation Design”) (NMFS 2011e). However, if the appropriate structure width is determined to be less than 1.3 times the bankfull channel width, processes for variances are listed in “iv” and “v” below.
2. Entrenched Streams: If a stream is entrenched (entrenchment ratio of less than 1.4), the culvert width must be greater than bankfull channel width, allow sufficient vertical clearance to allow ease of construction and maintenance activities, and provide adequate room for the construction of natural channel banks. Consideration should be given to accommodate the floodprone width. Floodprone width is the width measured at twice the maximum bankfull depth (Rosgen 1996).

ii. **Bridge Design**

1. Bridges with vertical abutments, including concrete box culverts, which are constructed as bridges, shall have channel widths that are designed using the culvert criteria (above). This opinion does not cover bridges that require pile driving within a wetted stream channels.
2. Primary structural elements must be concrete, metal, fiberglass, or untreated timber. Concrete must be sufficiently cured or dried before coming into contact with stream flow.
3. Riprap must not be placed within the bankfull width of the stream. Riprap may only be placed below bankfull height when necessary for protection of abutments and pilings. However, the amount and placement of riprap should not constrict the bankfull flow.

iii. **Crossing Design**

1. Crossings shall be designed using an interdisciplinary design team consisting of an experienced Engineer, Fisheries Biologist, and Hydrologist/Geomorphologist.
2. Forest Service crossing structures wider than 20 feet or with costs that exceed \$100,000 shall be reviewed by the USDA-Forest Service, Region 6, Aquatic Organism Passage Design Assistance Team.
3. At least one member of the design team shall be trained in a weeklong Aquatic Organism Passage course based *Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings* (USDA-Forest Service 2008).
4. Bankfull width shall be based on the upper end of the distribution of bankfull width measurements as measured in the reference reach to account for channel variability and dynamics.

iv. **NMFS fish passage review and approve** – If the structure width is determined to be less than the established width criteria as defined above, a variance must be requested from NMFS for consistency with criteria in NMFS (2011e).

v. **Opportunity for individual consultation** – The Action Agencies have a legal duty under the ESA to consult with NMFS and USFWS on a project specific basis if they prefer to operate outside the conditions in this opinion. The standards provided in this document are conservative for the purpose of this programmatic and may or may not be applicable to projects that undergo individual Level 1 Consultation. The standards in ARBO II are not new defaults to be used universally outside the programmatic arena.

vi. **Headcut and grade stabilization** – Headcuts often occur in meadow areas, typically on Rosgen “C” and “E” channel types. Headcuts develop and migrate during bankfull and larger floods, when the sinuous path of Rosgen E type streams may become unstable in erosive, alluvial sediments, causing avulsions, meander cut-offs, bank failure, and development of an entrenched Rosgen G gully channel (Rosgen 1994).

1. **Stabilize Headcuts**

a. In streams with current or historic fish presence, provide fish passage over stabilized headcut through constructed riffles for pool/riffle streams or a series of log or rock structures for step/pool channels as described in part ii below.

b. Armor headcut with sufficiently sized and amounts of material to prevent continued up-stream migration of the headcut. Materials can include both rock and organic materials which are native to the area. Material shall not contain gabion baskets, sheet pile, concrete, articulated concrete block, and cable anchors.

c. Focus stabilization efforts in the plunge pool, the headcut, as well as a short distance of stream above the headcut.

d. Minimize lateral migration of channel around headcut (“flanking”) by placing rocks and organic material at a lower elevation in the center of the channel cross section to direct flows to the middle of channel.

e. Short-term headcut stabilization (including emergency stabilization projects) may occur without associated fish passage measures. However, fish passage must be incorporated into the final headcut stabilization action and be completed during the first subsequent in-water work period.

f. In streams without current or historic fish presence, it is recommended to construct a series of downstream log or rock structures as described in part ii below to expedite channel aggradation.

vii. **Grade stabilization to promote fish passage associated with headcut stabilization**

1. **NMFS fish passage review and approve** – If a grade stabilization structure spans the channel and creates one or more discrete longitudinal drops > 6 inches, the Action Agencies will ensure that the action is individually reviewed and approved by the NMFS for consistency with criteria in *Anadromous Salmonid Passage Facility Design* (NMFS 2011e).

2. Provide fish passage over stabilized headcut through constructed riffles for pool/riffle streams or a series of log or rock structures for step/pool channels. If large wood and boulder placement will be used for headcut stabilization, refer to Large Wood, Boulder, and Gravel Placement (PDC 22) in Appendix B of the Malheur National Forest Aquatic Restoration Environmental Assessment.

3. Construct structures in a ‘V’ or ‘U’ shape, oriented with the apex upstream, and lower in the center to direct flows to the middle of channel.

4. Key structures into the stream bed to minimize structure undermining due to scour, preferably at least 2.5x their exposure height. The structures should also be keyed into both banks—if feasible greater than 8 feet.

5. If several structures will be used in series, space them at the appropriate distances to promote fish passage of all life stages of native fish. Incorporate NMFS fish passage criteria

(jump height, pool depth, *etc.*) in the design of step structures. Recommended spacing should be no closer than the net drop divided by the channel slope (for example, a one-foot high step structure in a stream with a two-percent gradient will have a minimum spacing of 50-feet [1/0.02]).

6. Include gradated (cobble to fine) material in the rock structure material mix to help seal the structure/channel bed, thereby preventing subsurface flow and ensuring fish passage immediately following construction if natural flows are sufficient.

7. If a project involves the removal of multiple barriers on one stream or in one watershed over the course of a work season, remove the most upstream barrier first if possible.

b. Fish Ladders

i. **NMFS fish passage review and approve** – The Action Agencies will ensure that the action is individually reviewed and approved by NMFS for consistency with criteria in *Anadromous Salmonid Passage Facility Design* (NMFS 2011e).

ii. Design preference is based on project type, level of maintenance, and required monitoring essential for reliable fish passage. Typical fishway designs include:

1. roughened channels/boulder step structures
2. channel spanning concrete sills
3. pool and chute, and
4. pool and weir fishways.

Roughened channel and boulder step structure fishways consist of a graded mix of rock and sediment in an open channel that creates enough roughness and diversity to facilitate fish passage. NMFS's review will include any appurtenant facilities (*i.e.*, fish counting equipment, pit tag detectors, lighting, trash racks, attraction water) that may be included with the fish ladder design. See: the most recent version of *Anadromous Salmonid Passage Facility Design* (NMFS 2011e) for guidelines and design criteria. Through the NMFS Level 1 team member, collaborate with NMFS engineering staff prior to the conceptual design process of fishway projects to solicit NMFS's preferred design type.

iii. If a project involves the removal of multiple barriers on one stream or in one watershed over the course of a work season, remove the most upstream barrier first if possible.

c. Irrigation Diversion Replacement/Relocation & Screen Installation/Replacement

i. **NMFS fish passage review and approve** – The Action Agencies will ensure that the action is individually reviewed and approved by National Marine Fisheries Service (NMFS) for consistency with criteria in *Anadromous Salmonid Passage Facility Design* (NMFS 2011e).

ii. Diversion structures—associated with points of diversion and future fish screens—must pass all life stages of threatened and endangered aquatic species that historically used the affected aquatic habitat.

iii. Water diversion intake and return points must be designed (to the greatest degree possible) to prevent all native fish life stages from swimming or being entrained into the diversion.

iv. NMFS fish screen criteria (NMFS 2011e) applies to federally listed salmonid species under their jurisdiction. This includes screens in temporary and permanent pump intakes.

v. All fish screens will be sized to match the irrigator's state water right or estimated historic water use, whichever is less.

vi. Size of bypass structure should be big enough to pass steelhead kelt into the stream.

vii. Abandoned ditches and other similar structures will be plugged or backfilled, as appropriate, to prevent fish from swimming or being entrained into them.

viii. When making improvements to pressurized diversions, install a totalizing flow meter capable of measuring rate and duty of water use. For non-pressurized systems, install a staff gage or other measuring device capable of measuring instantaneous rate of water flow.

ix. Conversion of instream diversions to groundwater wells will only be used in circumstances where there is an agreement to ensure that any surface water made available for instream flows is protected from surface withdrawal by another water-user.

x. For the removal of diversion structures constructed of local rock and dirt, the project sponsor will dispose of the removed material in the following manner:

1. Material more than 60% silt or clay will be disposed in uplands, outside of the active floodplain.
2. Material with more than 40% gravel will be deposited within the active floodplain, but not in wetlands.
3. Material with more than 50% gravel and less than 30% fines (silt or clay) may be deposited below the ordinary high water mark (HWM).

14. Riparian Vegetation Planting includes the planting of native riparian species that would occur under natural disturbance regimes. Activities may include the following: planting conifers, deciduous trees and shrubs; placement of sedge and or rush mats; gathering and planting willow cuttings. The resulting benefits to the aquatic system can include desired levels of stream shade, bank stability, stream nutrients, large wood inputs, increased grasses, forbs, and shrubs, and reduced soil erosion. Equipment may include excavators, backhoes, dump trucks, power augers, chainsaws, and manual tools.

- a. Experienced silviculturists, botanists, ecologists, or associated technicians shall be involved in designing vegetation treatments.
- b. Species to be planted will be of the same species that naturally occur in the project area. Acquire native seed or plant sources as close to the watershed as possible.
- c. Tree and shrub species, willow cuttings, as well as sedge and rush mats to be used as transplant material shall come from outside the bankfull width, typically in terraces (abandoned flood plains), or where such plants are abundant.
- d. Sedge and rush mats should be sized to prevent their movement during high flow events.
- e. Concentrate plantings above the bankfull elevation.
- f. Removal of native and non-native vegetation that will compete with plantings is permitted.
- g. Exclosure fencing to prevent utilization of plantings by deer, elk, and livestock is permitted.