

Tumalo Falls Trail Restoration Project Implementation Description

The following information will guide actions for this project that is taking place within the bounds of the Decision Notice for the 2019 Pacific Northwest Region Aquatic Restoration Project to maintain that all conservation measures, guidelines, and project design criteria are met under this guiding document.

Much of the information below is reproduced from the Decision Notice for Pacific Northwest Region Aquatic Restoration Project Decision Notice and Environmental Assessment and may cite project design criteria (PDC) numbers, literature, or other documents not referenced further in this proposal document. Please refer to the Decision Notice and Environmental Assessment for more information.

Table 1. Project information

Action identifier	To be added later from Aquatic Restoration Regulatory Reporting System (ARRRS)
Location	Tumalo Creek, Upper Tumalo Creek Subwatershed (170703010501), TS 18S, R10 E, NE 1/4 Section 7
Agency contact	Nate Dachtler, nathaniel.dachtler@usda.gov Office: 541-383- 4787
Timing	Spring 2022
Activity type	Road and Trail Erosion Control and Decommissioning
Extent	Approximately 20 acres and 1.3 miles of unauthorized trails on NFS lands
Species affected	Redband Trout
Date of submittal	2/10/2022
Site assessment for contaminants	N/A
Approval correspondence	N/A

Project Description

Heavy recreational use along Tumalo Creek from the Tumalo Falls Trailhead to a point .25 miles upstream of the overlook has resulted in degraded riparian vegetation and soil stability. The area is extremely popular with hikers, bikers, and runners. While a system trail does parallel Tumalo Creek, 1.87 miles of unauthorized trail segments and pathways to and along the stream have been created within the 20-acre project area (Figure 1). The unauthorized trails compact the soils, reduce vegetation, cause streambank erosion, and alter the natural appearance of the area (Photos 1 and 2). Riparian and soil degradation results in overland flow of sediments to the stream with potential to degrade water quality and instream habitat for fish spawning and macroinvertebrate production. High use on the system trail has also led to over-widening and drainage issues.

The purpose of this project is to address the recreational impacts listed above and provide a setting that more sustainably balances ongoing recreation with protection of other resources. The project will include the activities detailed below: Downed wood, rocks, and small boulders from the surrounding area will be placed to discourage off-trail use, define foot traffic patterns, and designate stream access points on 1.33 miles of unauthorized trail. Some ground disturbance might be required to stably set these materials in place. Additional rail fencing will be installed as needed on the downhill side of the system trail (within 2-4 feet of the trail). A short section of chain link fence above the falls will be replaced with a split rail fence, this section of fence will

be extended from the viewpoint uphill to the system trail. Trees will be cut from a regenerating stand uphill from the trail to provide additional woody debris and to be used for natural rail fencing. Lodgepole and ponderosa (approximately 8-12 inch DBH) will be cut up to a spacing of 23 feet. The trail will be closed during any cutting activities to provide for visitor safety. Native plants and seed will be selectively used to speed up regeneration on unauthorized trails and impacted shoreline. Signs to discourage use will be installed in the middle of a shoreline trail that accesses the bottom of the falls. These signs will not be visible from the system trail, as to not attract additional use from curious visitors. Existing system trail will be re-contoured for outslope, slough and berms from existing tread removed, and additional drainage will be installed per USFS Trail Manual Specifications. Impacted area = 20 acres.

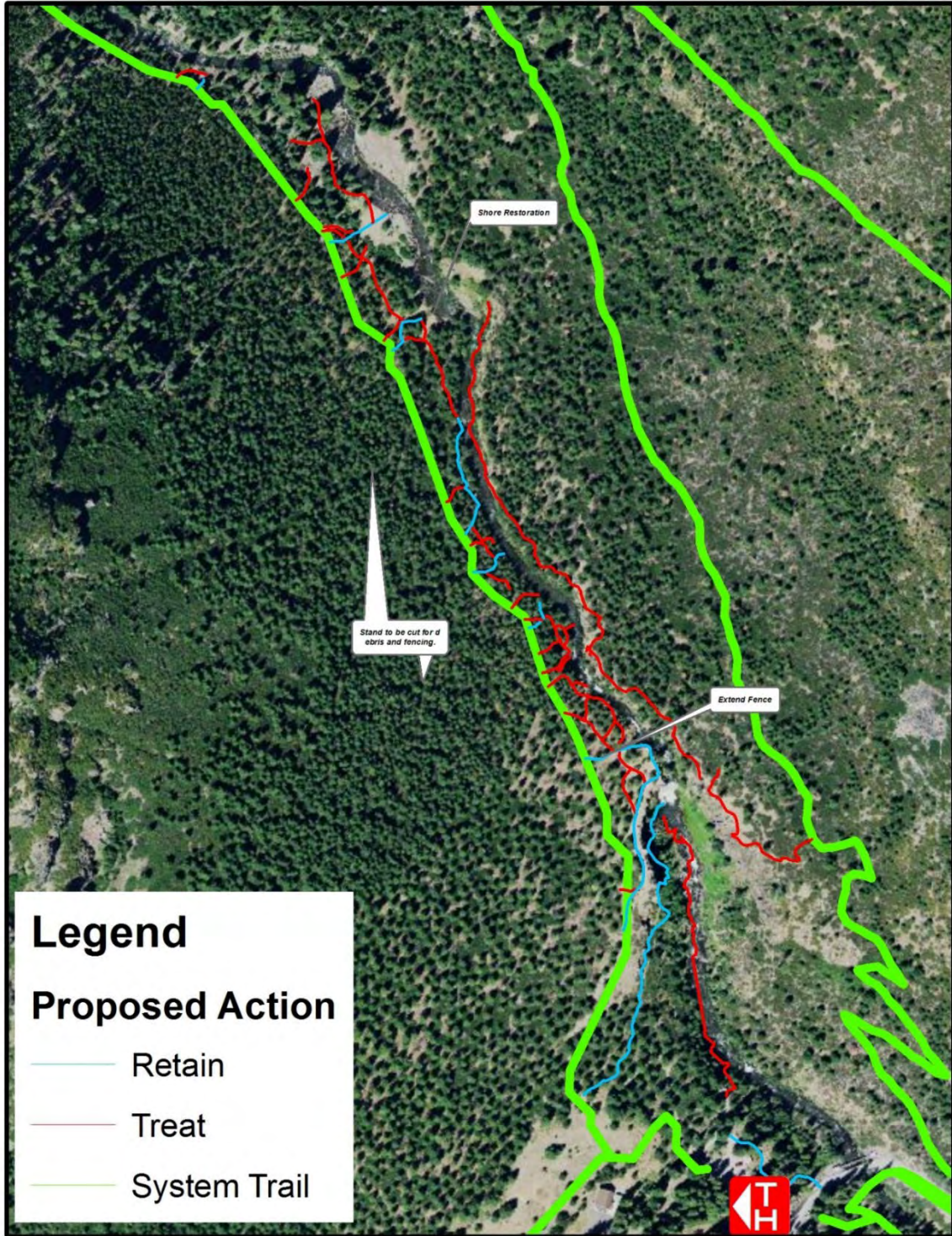


Figure 1. Tumalo Falls Restoration Project system trails and unauthorized trails to retain or treat.



Photo 1. Unauthorized trail leading to Tumalo Creek.



Photo 2. Unauthorized trail paralleling Tumalo Creek.

Land Use Plan Conformance

The Action Alternative meets all applicable standards and guidelines in the Deschutes National Forest Land and Resource Management Plan (LRMP) (USDA Forest Service 1990) as amended by the Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (Northwest Forest Plan) (USDA and USDI 1994). Portions of the project are located in Riparian Reserves as designated by the NFWP (Northwest Forest Plan). The following standards and guidelines are applicable to the project:

Deschutes Land and Resource Management Plan Standards and Guidelines

The project is located with the Deschutes Land and Resource Management Plan Scenic Views land allocation. The following standards and guidelines from the Deschutes Land and Resource Management Plan are applicable to the project:

Riparian (RP-2) Maintain or enhance riparian areas and the riparian dependent resources (water quality and quantity, fish, and certain wildlife and vegetation that owe their existence to riparian areas) associated with these areas.

Riparian (RP-3) Give preference to riparian area dependent resources over other resources.

Riparian (RP-17) Roads and trails will be at the lowest density which meets long term resource needs. Where existing roads or trails are inhibiting the achievement of fisheries or water quality objectives, measures shall be taken to eliminate the problem.

Compliance with the Northwest Forest Plan: Key Watersheds and Riparian Reserves

The NWFP provides standards and guidelines for Key Watersheds and Riparian Reserves (RRs) that prohibit or regulate activities that retard or prevent attainment of the ACS Objectives at the watershed scale (see below). Key watersheds under the NWFP contribute directly to the conservation of the threatened bull trout and resident fish populations (USDA and USDI 1994). The project is located with the NWFP Matrix land allocation.

The Tumalo Creek Trail Restoration Project will comply with the Riparian Reserve and Key Watershed standards and guidelines in the NWFP. Key watersheds have the highest priority for watershed restoration and watershed analysis is required to set priorities for restoration. Based on the evaluation of the short-term, long-term, and cumulative effects, the Tumalo Creek Trail Restoration Project is designed to “contribute to maintaining the fifth-field watershed over the long-term.”

The following standards and guidelines apply to the project:

(RM-1) New recreational facilities within Riparian Reserves, including trails and dispersed sites, should be designed to not prevent meeting ACS objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreational facilities with Riparian Reserves, evaluate and mitigate impact to ensure these do not prevent, and the to the extent practicable, contribute to the attainment of ACS objectives.

(WR-1) Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that promotes long term ecological integrity of ecosystems, conserves the genetic diversity of native species and attains Aquatic Conservation Strategy objectives.

(FW-1) Design and implement fish and wildlife restoration and enhancement activities in a manner that contributes to the attainment of Aquatic Conservation Strategy objectives.

Compliance with the Aquatic Conservation Strategy

An essential piece of the Northwest Forest Plan is the Aquatic Conservation Strategy (ACS) which “was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands” (USFS 1994, B-9). Management activities proposed for watersheds must meet the nine ACS objectives as specified in the Northwest Forest Plan (pages C31-C38). The Tumalo Creek Trail Restoration Project addresses the intent of the Aquatic Conservation Strategy Objectives of the Northwest Forest Plan and complies with the ACS by protecting and restoring hydrologic functions, fisheries habitat and wildlife habitat.

Applicable Project Design Criteria Common to all Aquatic Restoration Categories

Required Legal Compliance

Follow the land and resource management plan for the relevant National Forest System unit, other relevant laws, policies, recovery plans, and conservation strategies. These include but are not limited to:

- Forest plan amendments (i.e. Eastside Screens)
- Forest plan revisions as they are completed
- Land allocation areas (i.e. Late Successional Reserves)
- Forest Service Manual and Handbook relevant direction
- All threatened and endangered species recovery plans
- Signed conservation agreements or current conservation strategies
- Current sage grouse conservation measures
- Inventoried roadless areas

Use best available science and established best management practices at all times.

Site Considerations

Site Assessment

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 more than 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:

- Review of readily available records, such as former site use, building plans, records of any prior contamination events.
- Site visit to observe the areas used for various industrial processes and the condition of the property
- Interviews with knowledgeable people, such as site owners, operators, occupants, neighbors, and local government officials.
- Report that includes an assessment of the likelihood that contaminants are present at the site.

Site Preparation

1. Flag sensitive areas
 - Prior to construction, flag and avoid critical riparian vegetation areas, wetlands, and other sensitive sites to minimize ground disturbance and effects to such resources.
2. Minimize ground disturbance
 - Follow project design criteria for soils.
3. Staging areas
 - Establish staging areas for storage of vehicles, equipment, and fuels to minimize erosion into or contamination of streams and floodplains.

- Follow project design criteria for soils and vegetation.
 - There are no topographical restrictions.
 - Place staging area 150 feet or more from any natural waterbody or wetland in areas where topography does not restrict such a distance.
 - Place staging area away from any natural waterbody or wetland to the greatest extent possible in areas with high topographical restriction, such as constricted valley types.
 - Avoid putting staging areas and other work areas in areas where there are high snag densities.
 - Avoid putting staging areas and other work areas in areas with unique vegetation or large diameter trees.
4. Temporary erosion controls
 - Place sediment barriers, such as straw bales and silt fencing, 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 occurs and will be removed once the site has been stabilized following construction activities.
 5. 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 (such as large wood, boulders, or fencing material) may be staged within the 100-year floodplain.

Site Restoration

1. Initiate rehabilitation
 - Upon project completion and prior to the normal heavy rainfall period, rehabilitate all disturbed areas in a manner that results in similar or better than pre-work conditions by removing project-related waste, spreading stockpiled materials (soil, large wood, trees, etc.), and seeding or planting with local native seed mixes or plants.
2. Waterbars
 - If necessary, to prevent erosion and flow into stream channels, construct waterbars on travel routes and landings after use or before significant rainfall.
3. Short-term stabilization
 - Measures may include the use of nonnative, nonpersistent sterile seed mix (when appropriate native seed sources 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 3 days of construction completion.
4. Revegetation
 - Replant each area requiring revegetation before or at the beginning of the first growing season following construction. Achieve reestablishment of vegetation in disturbed areas to at least 70 percent of pre-project levels within 3 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. No nonnative species will be used for revegetation. Barriers will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized people.

Project Level Technical Skills, Qualifications, and Program Coordination

Ensure that experienced personnel are involved in the design of the restoration projects as appropriate.

1. Experienced means someone qualified at the journey level and classified under the professional series of their respective area (i.e. Botanist 0430, Wildlife 0486).
2. Interdisciplinary teams or project review teams would normally include a botanist, engineer, geneticist, geomorphologist, ecologist, fuels and fire staff, invasive species coordinator, recreation staff, range staff, silviculturist, and wildlife biologist.

Discipline-specific Project Design Criteria

Archaeologist and Tribal Liaison

1. Compliance with section 106 of the National Historic Preservation Act¹ for activities authorized under this analysis will be completed and concurred with by the appropriate State Historic Preservation Office before any ground-disturbing action takes place.
2. Any identified cultural resource sites that are listed on, or have the potential to be listed on, the National Register of Historic Places would be avoided or any potential impacts would be mitigated following processes developed in consultation with the appropriate State Historic Preservation Office and any other interested parties including American Indian Tribes.
3. If previously unidentified cultural resources are located during project implementation, ground-disturbing work will be halted until the resources are evaluated by the Forest Service unit's archaeologist. If the cultural resources are determined to be potentially eligible for listing on the National Register of Historic Places, work either will avoid the newly identified cultural resources or a mitigation plan will be developed in consultation with the appropriate State Historic Preservation Office and any other interested parties including American Indian Tribes.
4. Consultation with area tribes will occur when planning and designing aquatic restoration projects.

Botanist

1. All botany-related work will be completed by or at the direction of a GS-0430 botanist.
2. Pre-implementation surveys for sensitive plants will be completed for any ground-disturbing work if deemed necessary by the project botanist.
 - Botanists will use the Regional Forester sensitive species list in force at the time of the survey, and survey targets will be broadened to include Regional Forester sensitive species that are known from adjacent Forest Service units in similar habitats.
 - Surveys will occur in the project area or other areas that might be affected by the action, especially uplands.
3. The integrity of sensitive plant populations shall be maintained. Operational activities shall not be allowed in any documented sensitive plant sites unless it is for the demonstrated benefit or protection of the site. Short-term impacts followed by long-term

¹ Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties and to provide the Advisory Council on Historic Preservation with a reasonable opportunity to comment. In addition, Federal agencies are required to consult on the section 106 process with State Historic Preservation Offices, Tribal Historic Preservation Offices, Indian Tribes (to include Alaska Natives), and Native Hawaiian Organizations.

benefits are acceptable. All sensitive plant populations—including those found during surveys or known from corporate or unit databases—shall be buffered to 100 feet and avoided unless other conservation measures are approved by the project botanist. Larger buffers may be required for species that are highly sensitive to changes in microclimate, and smaller buffers may be appropriate where habitat restoration is required for rare plant maintenance or recovery.

- Rare plants or those of local concern that are not on the Regional Forester’s sensitive species list should be protected to a practical extent. This may include strategic species or plants or fungi known to have limited distribution locally or globally.
4. Degraded habitat for sensitive or locally significant rare plants in the project area shall be restored to a practical extent during project activities in consultation with the project botanist.
 5. Avoidance of sensitive botanical resources is the mitigation of choice. Rare plant transplantation or removal to offsite locations for subsequent reintroduction or reestablishment of affected populations from seeds, cuttings, plugs, or any other plant materials is strongly discouraged due to high risk of failure.
 6. Mitigation considerations and evaluation of rare plant population persistence must consider and accommodate future project effects such as hydrological alteration, changes in microclimate and insolation, changes in upland or riparian ungulate utilization that may affect rare upland species, the competitive effects of revegetation and subsequent growth, changes in expected successional patterns, changed recreational use, and other similar contingencies.
 7. The integrity of sensitive and unique habitats shall be maintained. Rare, unusual, sensitive, or special natural communities as defined in the forest plan or so assessed by the project botanist or ecologist—particularly including groundwater dependent ecosystems—will be fully protected or enhanced using best management practices.
 - Cutting or disturbance of legacy vegetation features (those developed over centuries) is prohibited.
 - Spring development shall not occur if sensitive plants are present.
 - Any modification of groundwater-dependent ecosystems shall be to return them to a more natural and properly functioning condition.
 8. Disturbed ground, erosion-prone sites, or areas treated to remove invasive species shall be revegetated using best management practices according to prevailing regional native plant materials guidance.
 - All plant materials used in projects shall be native species from appropriate seed zones and elevations. Local material is preferred. The project botanist should be consulted to write a specific revegetation plan if one is needed.
 - The use of fish- and wildlife-friendly native plants for restoration is highly encouraged, especially those that support birds and other wildlife, pollinators and other invertebrates, and those that discourage the establishment of invasive species.
 9. As part of post-project monitoring, the effectiveness of the above design criteria will be evaluated and results shall be used to improve future work authorized by this environmental assessment.

Hydrologist/Watershed Specialist and Fisheries Biologist

Follow relevant best management practices described in the National Best Management Practices for Water Quality Management on National Forest System Lands (USDA Forest Service 2012).

Follow the appropriate State (ODFW 2008, WDFW 2010, CDFW 2013 or most recent) guidelines for timing of in-water work:

- Oregon Department of Fish and Wildlife:
(http://www.dfw.state.or.us/lands/inwater/Oregon_Guidelines_for_Timing_of_%20InWater_work2008.pdf)
- Washington Department of Fish and Wildlife:
(http://wdfw.wa.gov/licensing/hpa/freshwater_incubation_avoidance_times_28may2010.pdf)
- California Department of Fish and Game:
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=58055>

Exceptions to in-water work windows must be requested and granted through Level I National Marine Fisheries Service and/or U.S. Fish and Wildlife Service representatives (for federally listed species only) as well as essential State agencies. For national forests in the state of Washington, the Forest Service will work with Washington Department of Fish and Wildlife to determine in-water work periods, using the process contained in the 2011 Memorandum of Understanding between the Washington Department of Fish and Wildlife and USDA Forest Service, Pacific Northwest Region regarding hydrologic permits. See also seasonal restriction timeline.

1. Climate change
 - Consider climate change information, such as predictive hydrographs for a given watershed or region or local assessments if completed when designing projects.
2. Fish passage
 - Fish passage will be provided for any adult or juvenile fish likely to be present in the action area during construction, unless passage did not exist before construction, stream isolation and dewatering is required during project implementation, or where the stream reach is naturally impassible at the time of construction. After construction, adult and juvenile passage that meets National Marine Fisheries Service fish passage criteria (NMFS 2011) will be provided for the life of the action.
3. Lamprey
 - To the extent possible, incorporate lamprey best management practices found in Best Management Practices to Minimize Adverse Effects to Pacific Lamprey, *Entosphenus tridentatus* (USFWS 2010).
4. Work area isolation and aquatic organism capture and release
 - Isolate the Construction Area: Remove fish, amphibians, and other aquatic organisms (such as mussels) 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, small dam removal, and channel reconstruction/relocation.
 - Isolate Capture Area: Install block nets at up and downstream locations outside of the construction zone and leave in a secured position 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 aquatic animal (fish and amphibian) predation in the trap.

- Capture and Release: Fish and other aquatic organisms 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 animals (fish and amphibians) by seine or dip nets as the area is slowly dewatered, and place minnow traps overnight. Animals must be handled with extreme care and kept in water the maximum extent possible during transfer procedures. A healthy environment for the stressed animals shall be provided—large buckets (five-gallon minimum to prevent overcrowding) and minimal handling of organisms. Place large fish and amphibians in buckets separate from smaller prey-sized individuals. Monitor water temperature in buckets and well-being of captured animals. If buckets are not being immediately transported, use aerators to maintain water quality. As rapidly as possible (especially for temperature-sensitive bull trout), but after fish and amphibians have recovered, release individuals. In cases where the stream is intermittent upstream, release animals in downstream areas and away from the influence of the construction. Capture and release will be supervised by a fish or wildlife biologist experienced with work area isolation and safe handling of all captured animals.

5. Electrofishing

- Use electrofishing only where other means of capture may not be feasible or effective. If electrofishing will be used to capture fish for salvage, National Marine Fisheries Service electrofishing guidelines will be followed (NMFS 2000 - <http://www.nwr.noaa.gov/ESASalmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf>). Those guidelines are available from the National Marine Fisheries Service Northwest Region, Protected Resources Division in Portland, Oregon.
- If fish are observed spawning during the in-water work period, electrofishing shall not be conducted in the vicinity of spawning adult fish or active redds. Electrofishing will not occur in areas where there is observed amphibian egg clusters or where there is observed amphibian egg laying.
- Only direct current (DC) or pulsed direct current (PDC) shall be used.
- For conductivity less than 100, use voltage ranges from 900 to 1100. For conductivity from 100 to 300, use voltage ranges from 500 to 800. For conductivity greater than 300, use voltage to 400.
- Reasonable effort should be made to avoid handling fish and other aquatic animals 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 20 degrees Celsius or are expected to rise above this temperature prior to concluding the fish capture.
- Begin electrofishing with minimum pulse width and recommended voltage and then gradually increase to the point where animals (fish/amphibians) are immobilized and captured. Turn off current once animals are immobilized.
- Do not allow fish or other aquatic organisms to come into contact with anode. Do not electrofish an area for an extended period of time. Remove animals immediately from water and handle as described below. Dark bands on the fish indicate injury, suggesting a reduction in voltage and pulse width and longer recovery time.

- If mortality of fish and amphibians is occurring during salvage, immediately discontinue salvage operations, reevaluate the current procedures, and adjust or postpone procedures to reduce mortality.
6. 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) and an associated pump, 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. Pumps must have fish screens and be operated in accordance with National Marine Fisheries Service fish screen criteria described in the next 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. When necessary, 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.
7. Fish screens for dewatering - National Marine Fisheries Service hydro fish passage review and approve
- When using fish screens for surface water that is diverted by gravity or by pumping at a rate that exceeds 3 cubic feet per second, ensure that the action is individually reviewed by the Portland office of the National Marine Fisheries Service Habitat Conservation Division for consistency with criteria in NOAA Fisheries Anadromous Salmonid Passage Facility Design (NMFS 2011), located at: <http://www.nwr.noaa.gov/SalmonHydropower/FERC/upload/Fish-Passage-Design.pdf>.
 - For the dewatering of a work site to remove or install culverts, bridge abutments, or other structures, a fish screen must be used on the pump intake to avoid juvenile fish entrainment that meets criteria specified by National Marine Fisheries Service (2011, or most recent version).
 - All other diversions will have a fish screen that meets the following specifications: (a) An automated cleaning device with a minimum effective surface area of 2.5 square feet per cubic feet per second, and a nominal maximum approach velocity of 0.4 feet per second, or no automated cleaning device, a minimum effective surface area of 1 square foot per cubic feet per second, and a nominal maximum approach rate of 0.2 feet per second; and (b) a round or square screen mesh that is no larger than 2.38 millimeters (0.094 inches) in the narrow dimension, or any other shape that is no larger than 1.75 millimeters (0.069 inches) in the narrow dimension.
 - Each fish screen will be installed, operated, and maintained according to National Marine Fisheries Service fish screen criteria (NMFS 2011, or most recent version). National Marine Fisheries Service fish screen criteria applies to federally listed salmonid species under their jurisdiction as well as bull trout, Oregon chub, shortnose sucker, Lahontan cutthroat trout, Lost River sucker, Modoc sucker, and Warner sucker under U.S. Fish and Wildlife Service jurisdiction.
8. Stream rewatering
- 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 increase in stream turbidity. Monitor downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

9. Report fish salvage

- If a sick, injured, or dead specimen of a threatened or endangered species is found in the project exclusion area, the finder must notify National Marine Fisheries Service through the contact person identified in the transmittal letter for this opinion, or through the National Marine Fisheries Service Office of Law Enforcement at 1-800-853-2064, and follow any instructions. If the proposed action may worsen the fish's condition before National Marine Fisheries Service can be contacted, the finder should attempt to move the fish to a suitable location near the capture site while keeping the fish in the water and reducing its stress as much as possible. Do not disturb the fish after it has been moved. If the fish is dead, or dies while being captured or moved, report the following information: (a) National Marine Fisheries Service consultation number; (b) the date, time, and location of discovery; (c) a brief description of circumstances and any information that may show the cause of death; and (d) photographs of the fish and where it was found. The National Marine Fisheries Service also suggests that the finder coordinate with local biologists to recover any tags or other relevant research information. If the specimen is not needed by local biologists for tag recovery or by National Marine Fisheries Service for analysis, the specimen should be returned to the water in which it was found, or otherwise discarded.

Soil Scientist

1. Ground-based equipment will not operate on slopes greater than 30 percent unless approved by Forest Service staff.
2. To minimize project area disturbance, existing landings, temporary haul roads, and old primary skid roads will be used to the extent practicable.
3. Heavy equipment use will be commensurate with the project and operated in a manner that minimizes adverse effects to the environment (minimally sized, low pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).
4. Construction operations will be staged as needed to limit the extent of disturbed areas without installed stabilization measures.
5. Clearing and grubbing activities will be minimized 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.
6. Compacted areas such as access routes and paths, stream crossings, staging, and stockpile areas will be loosened as necessary.
7. Fills will be properly compacted to avoid or minimize erosion.
8. No off-road, ground-based equipment will be used during wet soil conditions to limit the likelihood of detrimental soil conditions, limit surface erosion and sediment transport, and reduce the intensity and duration of anticipated short-term turbidity increases. This restriction may be waived with the concurrence of a soil scientist or watershed specialist, if periods of dry weather are anticipated.

Wildlife Biologist/Ecologist

1. All wildlife-related work will be completed by or at the direction of a GS-0486/0408 wildlife biologist/ecologist, including the identification of nesting trees, developing project maps and applying timing restrictions.

2. All food and garbage will be properly stored while working on-site to avoid attracting corvids and scavengers. It is highly recommended that bear proof containers be used especially if food and smelly refuse will be left over night. If the project lies within a known grizzly bear recovery area or if the project area has a food storage order in place, bear certified storage must be used.
3. If an active den, nest, roost, rendezvous site, or other important habitat feature is found near the treatment site, consult the project wildlife biologist for measures to protect the species or site.
4. The unit wildlife biologist may shorten or extend restricted seasons based on site-specific information, such as a late or recycle nesting attempt.
5. Blasting activities must be carefully evaluated and timed to avoid impacts to wildlife. All seasonal and timing restrictions will be observed. Consultation with the project wildlife biologist is required.
6. Amphibians/Reptiles
 - Avoid conducting projects in high gradient (6% gradient or more), head-water streams with known occurrences of sensitive amphibians (tailed frogs, torrent salamanders). If work is necessary to restore the headwater, then a supplemental analysis shall be completed for up-to-date and local information. This may include timing restrictions.
 - Avoid conducting projects in identified suitable habitat for foothill yellow-legged frog and western pond turtle during the breeding season. See Table 2 for avoidance periods.
7. Butterflies/Terrestrial Invertebrates
 - Minimize impacts to host plants species of listed and sensitive invertebrates, and work with the project wildlife biologist and botanist to restore host plants and habitats. Protection may include timing restrictions to protect various life stages.
 - Avoid prescribed burning in known sensitive invertebrate habitat when species is less mobile (when there are eggs, larvae, pupae, etc.)
 - Minimize travel routes of heavy equipment over undisturbed forest and riparian areas to minimize soil compaction and crushing of invertebrates.

Table 2. Sensitive periods that should be avoided to the greatest extent possible

Species affected	Breeding season
Northern spotted owl	March 1 – July 15
Northern spotted owl (ORCPP)	March 1 – July 7
Marbled murrelet	March 1 – August 5
Canada lynx (denning)	May 1 – August 31
Gray wolf (active dens / rendezvous sites)	April 15 – June 30
Grizzly bear (denning)	October 15 – May 15
Grizzly bear (early foraging habitat)	March 15 – July 15
Grizzly bear (late foraging habitat)	July 16 – November 15
Woodland caribou	October 1 – March 1
Bald eagle (winter roost)	November 1 – April 30
Great blue heron	March 1 – August 31
Great gray owl	March 1 – June 30
Northern goshawk	March 1 – August 31
Landbirds	May 15 – July 5
Cavity nesters	May 1 – July 15
Waterfowl	March 1 – August 31

Species affected	Breeding season
Pollinators	March 15 – September 30
Amphibians (breeding)	March 1 – June 1
Amphibians (migration)	September 1 – November 1
Oregon chub (no water work)	June 1 – August 31
Bull trout (spawning)	May 1 – July 31

8. Birds

- To the extent possible, avoid disturbance to nesting birds. See Table 2.
- If work needs to be done during nesting and rearing periods, consult a wildlife biologist for site-specific surveys and restrictions.

9. Federally Threatened, Endangered, or Proposed Wildlife

- Federally listed species are fully addressed in ARBO II (U.S. Fish and Wildlife Service 2013; see appendix 1) and will not be considered further here.
- If a recently proposed or listed threatened and endangered wildlife species is found in the project area (such as Oregon spotted frog, yellow-billed cuckoo, or wolverine), discontinue project work and consult the project wildlife biologist immediately.

Survey and Manage Species

- For four aquatic restoration activities (bull trout protection, fencing and stream crossings to protect aquatic restoration projects, juniper removal, and riparian vegetation treatment controlled burning), if suitable habitat for a survey and manage species occurs within the project area and the activity is considered to be habitat-disturbing, the activity or project must be modified or the project location moved to avoid the species' habitats. This design criterion then provides for a reasonable assurance of species persistence and eliminates actions that require pre-disturbance surveys, which are not covered in this analysis.

Diseases and Invasive Species

1. All project areas will be surveyed for invasive plant infestations prior to implementation.
2. A botanist or invasive plant specialist will be notified a minimum of two weeks prior to any project implementation in order to treat or properly flag infested areas during the field season.
3. All invasive nonnative plant infestations within the project area or along travel routes near the project area will be treated where feasible or "flagged and avoided" according to the species present and project constraints.
4. Invasive plant treatment must tier to existing unit's decisions on invasive plant treatment. For sites not covered by existing decisions, or for units without existing decisions, site-specific environmental analysis and a decision would need to be made prior to any invasive plant treatments.
5. Control weeds as necessary at project sites.
6. Grass seed will be certified by the states of Oregon or Washington as weed-free or grown under government-supervised contracts to assure noxious weed-free status.
7. Use State certified weed-free straw and mulch or material procured through government supervised contracts. If State certified products are not available, straw and mulch from sources determined to be weed free can be used.
8. Disturbed areas will be revegetated to prevent the establishment or spread of invasive plants and noxious weeds.
9. Seed mixes must be approved by a botanist or revegetation specialist.

10. Landings or staging areas for equipment, materials, or crews will not be situated in invasive plant or noxious weed infested areas until they have been treated.
11. Soil moved from a site infested with noxious weeds should be disposed of at a designated site coordinated by a botanist or invasive plant coordinator.
12. Any new invasive plants found in the project area will be documented and a botanist or invasive plant coordinator will be notified of the infestation location.
13. Conduct post-project monitoring to address new invasions of invasive plants.
14. A qualified weed specialist will inspect active gravel, fill, sand stockpiles, quarry sites and borrow material for invasive plants before use and transport. Use only gravel, fill, sand, and rock that is judged to be weed free by a qualified weed specialist (including material from commercial sites) (Prevention Standard 7 - Regional Invasive Plants FEIS).
15. Wherever possible reestablish native plants on sites where weeds are removed as well as in areas where fallow ground provides optimal habitat for weeds to colonize.
16. Disturbed ground, erosion-prone sites, or areas treated to remove invasive species shall be revegetated using best management practices according to prevailing regional native plant materials guidance.
17. All equipment used for work that will be in or near water will be cleaned for dirt, plant material (to prevent the spread of noxious weeds), and leaks repaired prior to entering National Forest System lands and the project area. Such equipment includes large machinery, stationary power equipment (generators, canes, etc.), and gas-powered equipment with tanks larger than five gallons. If the equipment is coming from known aquatic invasive hot spots, there will be a full equipment inspection for invasive species prior to entry into the project area, and equipment will be cleaned with pressure and heat for sterility.
18. All work that will be in or near water will use decontamination protocols for aquatic pathogens like whirling disease and chytrid fungus. Follow decontamination procedures in Northwest Partners in Amphibian and Reptile Conservation "Habitat management guidelines for amphibians and reptiles of the Northwestern United States and Western Canada. Technical Publication HMG-4. Appendix G "Disinfection Guidelines for individuals working in freshwater habitats.
https://static1.squarespace.com/static/57e01f421b631ba91823f357/t/57ffc473beba9d1102029/1476379779446/NWPARC_habitat_management_guidelines.pdf

Vegetation, Snags, and Down Wood

1. Retain existing vegetative connectivity between upland and aquatic areas to facilitate animal movement.
2. To the extent possible, retain all unique riparian habitat features. For example, retain large diameter trees within riparian areas if these are rare or unique to the area.
3. Retain old growth or legacy vegetation and vegetation features (such as ancient moss mats).
4. Large woody debris in all stages of decay is important habitat for many organisms, especially fungi, amphibians and reptiles, and invertebrates; it shall be retained in the project area.
5. "Leave-trees" damaged during project operations will be left on the project site for future snag and down wood recruitment.

Monitoring

Implementation

1. Visually monitor during project implementation to ensure effects are not greater (amount, extent) than anticipated and to contact Level 1 representatives if problems arise.
2. Fix any problems that arise during project implementation.
3. Ensure regular biologist/hydrologist coordination with the contracting officer's representative if biologist/hydrologist is not always on site is necessary to ensure contractor is following all stipulations. 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; Memorandum of Understanding between the Washington Department of Fish and Wildlife and Forest Service regarding Hydraulic Projects Conducted by Forest Service, Pacific Northwest Region; or California 401 Certification protocols.

Post-Project Review

1. A post-project review shall be conducted after winter and spring high flows.
2. For each project, conduct a walk through and visual observation to determine if there are post-project affects that were not considered during consultation.
3. When post-project monitoring determines that remedial actions are required, such actions are permitted without additional analysis if they use relevant project design criteria and the effects described in this environmental assessment are not exceeded.

Revegetation

- For all plant treatment projects, including site restoration, monitor for and remove invasive plants until native plants become established.

Category-Specific Project Design Criteria

Road and Trail Erosion Control and Decommissioning.

1. For road and trail decommissioning projects within riparian areas, recontour the affected area to mimic natural floodplain contours and gradient to the extent possible.
2. When obliterating or removing segments immediately adjacent to a stream, use sediment-control barriers between the project and stream.
3. Dispose of slide and waste material in stable sites out of the flood-prone area. Native material may be used to restore natural or near-natural contours.
4. Minimize disturbance of existing vegetation in ditches and at stream crossings.
5. Conduct activities during dry field conditions (generally May 15 to October 15) when the soil is more resistant to compaction and soil moisture is low.
6. When removing a culvert from a first- or second-order, non-fish-bearing stream, project specialists shall determine if culvert removal should include stream isolation and rerouting in project design. Culvert removal on fish-bearing streams shall adhere to the measures described in the "Fish Passage Restoration" section on page 56 and the culvert discussion on page 60 in the "Design Criteria" section.

7. For culvert removal projects, restore natural drainage patterns and channel morphology. Evaluate channel incision risk and construct in-channel grade control structures when necessary.