US Army Corps
of Engineers
Portland District

Public Notice

Proposal to Issue a Regional General Permit for Aquatic Habitat Restoration

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Corps of Engineers Action ID: NWP-2007-999

Interested parties are hereby notified that, in accordance with 33 CFR 325.3(b), the U.S. Army Corps of Engineers, Portland District (Corps) proposes to develop a regional general permit (RGP) authorizing the U.S. Forest Service (USFS) and U.S. Bureau of Land Management (BLM) to conduct aquatic habitat restoration activities within the state of Oregon pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C.) and Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344).

PURPOSE: The purpose of the RGP is to expedite the authorization of recurring activities that are similar in nature and have minor individual and cumulative adverse impact on the aquatic environment. Use of the RGP is intended to reduce the amount of paperwork and time required to authorize qualifying projects by making available for use an already issued Department of the Army general permit that includes a concluded Endangered Species Act and Essential Fish Habitat consultation, and State water quality certification and coastal zone management consistency concurrence.

PROJECT LOCATION: Projects will occur on USFS or BLM administered lands within the state of Oregon. Projects may also occur on non-federal lands when such projects directly assist the USFS and/or BLM in achieving their aquatic restoration goals and are funded in part by the USFS and BLM. The USFS and BLM are permitted to fund such projects under Wyden Amendment authority (16 U.S.C. 1011(a), as amended by Section 136 of PL 105-277).

PROJECT DESCRIPTION: The BLM and USFS propose to implement projects under 13 aquatic restoration activity categories, listed below, that will be conducted below the ordinary high water mark of streams or other water bodies and in wetlands. These restoration activities will maintain, enhance, and/or restore watershed functions to benefit fish species, other aquatic organisms, water quality, riparian areas, floodplains, and wetlands. The proposed activities are commonly implemented on BLM and USFS administered lands, predictable as to their effects, and consistent with broad scale aquatic conservation strategies and the best available science. The 13 categories are as follows:

1. Large Wood, Boulder, and Gravel Placement
2. Reconnection of Existing Side Channels and Alcoves
3. Headcut Stabilization and Associated Fish Passage
4. Streambank Stabilization
5. Fish Passage Culvert and Bridge Projects
6. Irrigation Screen Installation and Replacement & Weir Removal
7. Floodplain Overburden Removal

8. Reduction of Recreation Impacts
9. Riparian Exclusion Fencing that include Stream Crossings and Water Gaps
10. Riparian Planting
11. Road Treatments
12. Removal of Legacy Structures
13. Riparian Juniper Treatment

A detail description of the 13 categories of activities proposed to be included within this RGP is attached to this public notice.

The number of projects to be implemented each year by the BLM and FS in the State of Oregon will not exceed 170. As part of the 170 project limit, no more than 10 projects can be conducted within a 5th field watershed each year. The 10 projects can be comprised of a mixture of the 13 project types described above and fully described in attached document. The definition of an individual project is given for each of the 13 activity categories in the attached document.

On occasion, more than 10 projects can occur in a 5th field watershed. This can occur when the BLM and USFS meet with the NOAA and/or USFWS representatives and reach a conclusion that the allowable effects described in the biological opinions issued for these activities are not exceeded. The BLM and USFS would then notify the Corps requesting email concurrence that projects may proceed under the RGP. The BLM and USFS anticipate the need for more than 10 projects will occur primarily after a flood event, when damaged infrastructure (e.g. culverts and roads) must be addressed.

For each individual project proposed to be implemented under this RGP, the USFS and BLM will notify the Corps 30 days prior to the proposed start date. Notification will include project location, projected start and completion dates, activity type, and brief project description. Final details of the notification process will be developed as part of the evaluation process of this RGP.

WATER QUALITY CERTIFICATION: Activities to be covered under this proposed RGP fall within the categories of activities authorized by the Corps' 2007 Nationwide Permits. Therefore, the Corps has preliminarily determined the Water Quality Certification issued on July 18, 2007, by the Oregon Department of Environmental Quality (DEQ) for the Nationwide Permits will be applicable to this proposed RGP. The Corps is requesting DEQ confirm this determination.

COASTAL ZONE MANAGEMENT ACT CERTIFICATION: Activities to be covered under this proposed RGP fall within the categories of activities authorized by the Corps' 2007 Nationwide Permits. Therefore, the Corps has preliminarily determined the Coastal Zone Concurrence issued on August 3, 2007, by the Oregon Department of Land Conservation and Development (DLCD) for the Nationwide Permits will be applicable to this proposed RGP. The Corps is requesting DLCD confirm this determination.

ENDANGERED SPECIES: The FS and BLM have received biological opinions from both the National Marine Fisheries Service and U.S. Fish and Wildlife for the aquatic habitat restoration activities proposed for inclusion within this RGP.

- NOAA BO: Endangered Species Act – Section 7 Programmatic Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation Act Essential Fish Habitat for Fish Habitat Restoration Activities in Oregon and Washington, CY2007-CY2012. (FS-2008/03505, BLM-2008/03506, BIA-2008/03507). Issued June 27, 2008.
- USFWS BO: Biological Opinion and Letter of Concurrence, USDA Forest Service, USDI Bureau of Land Management, and the Coquille Indian Tribe for Programmatic Aquatic Habitat Restoration Activities in Oregon and Washington that Affect ESA-listed Fish,

Habitat Restoration Activities in Oregon and Washington that Affect ESA-listed Fish, Wildlife, and Plant Species and their Critical Habitat. (8330.F0055[07], TS Number 07-516, Tails Number 13420-2007-F-0055). Issued June 14, 2007.

CULTURAL RESOURCES: The USFS and BLM will ensure compliance with all cultural resource laws and regulations for each project proposed for authorization under this RGP. Such review will occur as part of their evaluation process under the National Environmental Policy Act (NEPA). The USFS and BLM will also coordinate with appropriate Native American Tribes and the Oregon State Historic Preservation Office (SHPO) to ensure proposed projects will not impact such things as cultural resources, treaty fishing access sites, usual and accustomed areas, burial sites, or Traditional Cultural Properties.

EVALUATION: The ultimate decision whether to issue the RGP will be based on an evaluation of the probable impacts including cumulative impacts of the described activities on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the described activities must be balanced against their reasonably foreseeable detriments. All factors, which may be relevant to the described activities will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people.

The Corps is soliciting comments from the public; Federal, state, and local agencies and officials; Native American Tribes; and other interested parties in order to consider and evaluate the impacts of the activities proposed to be authorized by this RGP. Any comments received will be considered by the Corps of Engineers in its decision on the RGP. Comments received by the Corps during the development of the RGP will be considered in the preparation of an Environmental Assessment pursuant to the National Environmental Policy Act. Comments will also be used to determine the need for a public hearing and to determine the overall public interest of the proposed activities. Any person may request, in writing, within the comment period specified in this notice that a public hearing be held to consider this proposal. Requests for a public hearing must specifically state the reasons for holding the hearing.

The evaluation of the likely impact of the proposed RGP on the public interest will include application of the guidelines promulgated by the Administrator, Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act. This evaluation will include an alternatives analysis.

COMMENTS: Comments on the proposed RGP should reference the U.S. Army Corps of Engineers number shown above and should reach this office no later than the expiration date of this public notice to become part of the record and to be considered in the decision. Comments should be mailed to the following address:

U.S Army Corps of Engineers, Portland District
Attn: CENWP-OD-G (Judy Linton)
P.O. Box 2946
Portland, OR 97208

Comments may also be sent by email to: judy.l.linton@usace.army.mil

Proposed USFS/BLM Aquatic Habitat Restoration RGP
General Conservation Measures and Project Descriptions for the 13 RGP Aquatic Restoration Categories.

A. General Conservation Measures and Practices that apply to all Aquatic Restoration Activity Categories listed below

1. General Conservation Measures Applicable to All Activity Categories.

- **a)** All projects will be guided by Project Design Criteria (PDC) and Conservation Measures (CM) that help restore or enhance stream channel, riparian, wetland, and/or upland functions that would occur under natural disturbance regimes.
- **b)** Conservation Measures are intended to minimize effects to the aquatic environment, and the following apply, when relevant, to all 13 activity types:
  - **i.** Technical Skill and Planning Requirements
    - **a.** Ensure that an experienced professional fisheries biologist, hydrologist or technician is involved in the design of all projects covered by this Department of the Army Regional General Permit (RGP). The experience should be commensurate with technical requirements of a project. If ESA-listed wildlife/plant species occur in the planning area, as determined by a unit wildlife biologist or botanist, the appropriate specialist will assist with project design.
    - **b.** Planning and design includes field evaluations and site-specific surveys, which may include reference reach evaluations that describe the appropriate geomorphic context in which to implement the project. Planning and design involves appropriate expertise from professional staff or experienced technicians (e.g., engineer, silviculturist, fire/fuels specialists.)
    - **c.** The project biologist should insure that PDCs and CMs are incorporated into any implementation contract agreements. If a biologist is not the Contracting Officers Representative (COR), then the biologist must regularly coordinate with the project COR to insure the PDCs and CMs are being followed.
    - **d.** Project planning will incorporate guidance from the Oregon Aquatic Habitat Guide and Oregon Road/Stream Crossing Guide.
    - **e.** Wetland Identification and Impact Analysis:
      - **i.** Conduct an inspection for all projects to identify wetland areas. Wetlands are defined and identified through criteria set forth in the Corps 1987 Wetland Delineation Manual and regional supplements. http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf http://www.oregonstatelands.us/DSL/WETLAND/docs/fact4.pdf (laymen edition) http://www.oregonstatelands.us/DSL/WETLAND/wetlandfacts.shtml
      - **ii.** Initial wetland inspections will rely on a survey conducted by a botanist (or a person with technical expertise in plant identification) to

determine if hydrophytic vegetation is present in the project area as that may indicate presence of a wetland. Hydrophytic vegetation is identified in the ***National List of Plant Species that Occur in Wetlands,*** **USFWS** 1988 and 1993 update. http://www.fws.gov/nwi/Plants/plants.htm Any questionable areas may require additional inspection by a hydrologist and/or soils scientist to determine if the criteria for a wetland are present.

iii. If wetlands exist in the project site, use the following practices in preferential order:

a. Flag off wetlands or potential wetlands and avoid construction activities or operating machinery.

b. If wetlands cannot be avoided for access, equipment access through wetlands shall occur only when the wetlands are dry or over removable mats or pads to prevent compaction or rutting. Any compaction, rutting, or other disturbance shall be restored to pre-existing conditions following construction.

c. Wetland projects that do not require pre-approval under this RGP include the following:

i. If a project converts wetlands to other waters of the United States to improve or restore fish habitat lost by past land use activities. This practice applies only to Reconnection of Existing Side Channel and Alcove projects, where disconnected side channels and alcoves contain wetland features that will be converted (upon project completion) to a flowing water regime.

ii. As part of Large Wood Placement projects, large wood may be placed in wetlands, which are located in floodplains, as long as wetland values and functions are not diminished.

d. If project removal or fill actions cannot meet these criteria, contact DSL and Corps field staff and coordinate during project planning.

ii. State and Federal Requirements

a. Follow the appropriate state (Oregon Department of Fish and Wildlife (ODFW) guidelines for timing of in-water work. Exceptions to ODFW in-water work windows must be requested and granted in writing (email is appropriate) from the local ODFW fish biologist and NMFS, where relevant. Such guidelines are intended to prevent project implementation in fish spawning habitat when fish spawning is taking place or while eggs and young fish are in or associated with channel substrates.

b. Project actions will follow all provisions and requirements (including permits) of the Clean Water Act for maintenance of water quality standards as described by Oregon Department of Environmental Quality.

c. All regulatory permits and official project authorizations will be secured prior to project implementation.

iii. Pollution and Erosion Control Plans – Administrative Units will develop and implement a Pollution and Erosion Control Plan (PECP) for each authorized project, one that includes methods and measures to minimize erosion and

sedimentation associated with the project. The following measures will assist in the creation of a PECP.

a. Spill Prevention Control and Containment Plan (SPCCP) – The contractor will be required to have a written SPCCP, which describes measures to prevent or reduce impacts from potential spills (fuel, hydraulic fluid, etc). The SPCCP shall contain a description of the hazardous materials that will be used, including inventory, storage, handling procedures; a description of quick response containment supplies that will be available on the site (e.g., a silt fence, straw bales, and an oil-absorbing, floating boom whenever surface water is present.)

b. The PECP should be included in construction contracts or force account work plans.

c. The PECP must be commensurate with the scale of the project and include the pertinent elements of iv, v, and vi listed below.

iv. Minimize Site Preparation Impacts

a. Establish staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, hazardous material storage, etc) beyond the 100-year floodplain and outside of wetlands in a location and manner that will preclude erosion into or contamination of the stream or floodplain.

b. Minimize clearing and grubbing activities when preparing staging, project, and or stockpile areas. Stockpile large wood, trees, vegetation, sand, topsoil and other excavated material, that is removed when establishing area(s) for site restoration.

c. Materials used for implementation of aquatic restoration categories (e.g., large wood, boulders, fencing material etc.) can be staged within the 100-year floodplain. This excludes equipment.

d. Prior to construction, flag critical riparian vegetation areas, wetlands, and other sensitive sites to prevent non-permitted ground disturbance in these areas.

e. Place sediment barriers prior to construction around sites where significant levels of erosion may enter the stream directly or through road ditches. Maintain barriers throughout construction.

f. Where appropriate, include hazard tree removal (amount and type) in project design. Fell hazard trees within riparian areas when they pose a safety risk. If possible, fell trees towards the stream. Keep felled trees on-site when needed to meet coarse woody debris objectives.

g. Wildlife biologist will determine if a hazard tree is a potential ESA listed bird nest tree. Nesting trees that are hazardous to restoration activities may only be removed outside of active nesting season. No Bald Eagle nest trees will be removed. Hazard trees that are also suitable Northern Spotted Owl and murrelet nest trees may only be removed if there are sufficient alternative suitable Northern Spotted Owl and murrelet nest trees within the same stand that the hazard tree is located.

v. Minimize Heavy Equipment Impacts

a. Consider contracting with operators who use non-petroleum lubricants and fluids in their machinery.

b. The size and capability of heavy equipment will be commensurate with the project.
c. All equipment used for in-stream work shall be cleaned and leaks repaired prior to entering the project area. Remove external oil and grease, along with dirt and mud prior to construction. Thereafter, inspect equipment daily for leaks or accumulations of grease, and fix any identified problems before entering streams or areas that drain directly to streams or wetlands.
d. All equipment shall be cleaned of all dirt and weeds before entering the project area to prevent the spread of noxious weeds.
e. Equipment used for in-stream or riparian work shall be fueled and serviced in an established staging areas. When not in use, vehicles shall be stored in the staging area.
f. Minimize the number and length of stream crossings and access routes through riparian areas. Crossings and access routes shall be as close to right angles as possible. Stream crossings shall not increase risks of channel re-routing at low and high water conditions and shall avoid potential listed fish spawning areas when possible.
g. Existing roadways or travel paths will be used whenever reasonable. Minimize the number of new access paths to minimize impacts to riparian vegetation and functions.
h. Project operations must cease under high flow conditions that inundate the project area, except for efforts to avoid or minimize resource damage resulting from the inundation.
i. Minimize time in which heavy equipment is in stream channels, riparian areas, and wetlands. When operating heavy equipment in stream channels it is because project specialists reasoned that such actions are the only reasonable alternative for implementation and/or would result in less sediment in the stream channel or damage (short- or long-term) to the overall aquatic/riparian ecosystem relative to other alternatives.

vi. Site Restoration
a. Upon project completion, remove project related waste.
b. Initiate rehabilitation of all disturbed areas in a manner that results in similar or better than pre-work conditions through spreading of stockpiled materials, seeding, and/or planting with locally native seed mixes or plants. Planting shall be completed no later than spring planting season of the year following construction
c. 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.
d. All riparian plantings shall follow one or both of the following direction documents: Regional FS letter to Units, Use of Native and Nonnative Plants on National Forests and Grasslands, May 2006 (Final Draft), and

BLM Instruction Memorandum No. OR-2001-014, Policy on the Use of Native Species Plant Materials.

e. When necessary, loosen compacted areas, such as access roads, stream crossings, staging, and stockpile areas.

B. Description of 13 Aquatic Restoration Categories

1. Large Wood, Boulder, and Gravel Placement

Description – Land management actions carried out over the last 150 years such as logging, road building, stream clearing, and splash damming have greatly reduced the amount of large woody debris and boulders in streams in Oregon and Washington (Murphy 1995, McIntosh et al.1994). Therefore, the BLM and Forest Service propose to place large wood and/or boulders in stream channels and adjacent floodplains to increase channel stability, rearing habitat, pool formation, spawning gravel deposition, channel complexity, hiding cover, low velocity areas, and floodplain function. In areas where natural gravel supplies are low (immediately below reservoirs, for instance), gravel placement may be used to improve spawning habitat. Full channel spanning porous boulder weirs (boulder weirs) can only be installed in streams with a legacy of splash damming, stream cleaning, or other activities that have resulted in highly uniform, incised, bedrock-dominated channels with few boulders or woody debris. Large wood, boulder, and gravel projects would include the use of log trucks and dump trucks for transport and excavator-type machinery, spyders, cable yarders, draft horses, or helicopters for placement.

a) Design Criteria

i. Natural Large Wood , Boulder, and Gravel Placement

a. Place LW and boulders only in those areas where they would naturally occur and in a manner that closely mimic natural accumulations for that particular stream type.

b. LW includes whole conifer and hardwood trees, logs, and root wads. LW size (diameter and length) should account for bankfull width and stream discharge rates. When available, trees with rootwads should be a minimum of 1.5x bankfull channel width, while logs without rootwads should be a minimum of 2.0 x bankfull width. Structures may partially or completely span stream channels or be positioned along stream banks.

c. No conifers should be felled in the riparian area for in-channel LW placement unless conifers are fully stocked and are consistent with PDCs in vegetation treatment categories. Felled hazard trees can be used for in-channel wood placement.

d. Key boulders (footings) or LW can be buried into the stream bank or channel but shall not constitute the dominant placement method of boulders and LW. Dimensions of excavation sites to key in structures will be commensurate with size of material, as described in i. b. of this section.

e. Anchoring LW with cable should be used as a last resort, primarily for the protection of infrastructure and in consideration of downstream landowner concerns. Before using cable, attempt to use, when feasible, the following anchoring alternatives, in preferential order: 1) use adequate sized wood sufficient for stability; 2) orient and place adequate sized wood in such a way that wood movement is unlikely; 3) use ballasting (gravel and/or rock) to increase the mass of the structure to resist movement; 4) use large boulders as anchor points for the LW; and 5) pin wood to large rock with rebar to increase wood weight.

f. Gravel augmentation should only occur in areas where the natural supply has been eliminated or significantly reduced through anthropogenic means. Gravel to be placed in streams shall be a properly sized gradation for that stream, clean, and nonangular. When possible use gravel of the same lithology as found in the watershed. After gravel placement, allow the stream to naturally sort and distribute the material.

ii. Boulder Weirs in Degraded Bedrock Streams – Full channel spanning boulder weirs are to be installed only in highly uniform, incised, bedrock-dominated channels to enhance or provide fish habitat in stream reaches where log placements are not practicable due to channel conditions (not feasible to place logs of sufficient length, bedrock dominated channels, deeply incised channels, artificially constrained reaches, etc.), where damage to infrastructure on public or private lands is of concern, or where private landowners will not allow log placements due to concerns about damage to their streambanks or property.

a. Install boulder weirs low in relation to channel dimensions so that they are completely overtopped during channel-forming flow events (approximately a 1.5- year flow event). If larger boulders are needed to withstand bankfull flows, boulder size should be determined through a site-specific analysis – such as a shear stress analysis – and should not promote bank scouring and channel routing around the structure.

b. Boulder weirs are to be placed diagonally across the channel or in more traditional "V" or "U" configurations with the apex oriented upstream. Boulder weirs are to be constructed to allow upstream and downstream passage of all native fish species and life stages that occur in the stream. This will be accomplished by providing plunges no greater than 6" in height, allowing for juvenile fish passage at all flows.

c. The use of gabions, cable or other means to prevent the movement of individual boulders in a boulder weir is not allowed.

d. Rock for boulder weirs shall be durable and of suitable quality to assure permanence in the climate in which it is to be used. Rock sizing depends on the size of the stream, maximum depth of flow, plan form, entrenchment, and ice and debris loading.

e. The project designer or an inspector experienced in these structures should be present during installation.

f. Full spanning boulder weir placement should be coupled with measures to improve habitat complexity and protection of riparian areas to provide long-term inputs of LWD.

iii. Excluded projects: an individual structure, such as a log jam, shall not exceed a length of 7 bankfull channel widths up and down a stream (e.g. maximum longitudinal length of a structure along a streambank is 70' when bankfull width is 10'); full spanning boulder weir structures installed perpendicular to the streamflow in bed-rock dominated streams; full spanning, downstream pointed U or V style weirs.

c) Maximum Removal & Fill Estimates

i. Project Extent: For large wood projects, the annual maximum extent of one project is equal to 15 stream miles of helicopter placement or five miles using cable yarding equipment or one stream mile of placement with excavator-type equipment. For boulder and gravel placement projects, the maximum extent of one project is equal one stream mile of placement with excavator and/or dump truck equipment. A site is defined as a single location within the project length.

ii. Large Wood Placement Projects
   - **a.** No more than 400 logs per mile will be placed within the OHW. Additional logs can be placed in the floodplain (above OHW) and associated wetlands as long as wetland functions and values are not impaired.
   - **b.** Placement of boulders to stabilize large wood may be used.
   - **c.** Removal and fill associated with streambank excavation sites to anchor log structures into stream banks will be commensurate with structure size. In general, the width of excavation trenches will not exceed 2x the structure or log width, and trench length will not exceed ½ the structure or log length.

iii. Boulder Placement
   - **a.** For natural/random boulder placement, no more than 1,000 cubic yards of boulders will be placed within the OHW per mile. No more than 100 cubic yards of material will be placed at one site.
   - **b.** For boulder weirs in bedrock systems, no more than 1,500 cubic yards of boulders will be placed within the OHW per mile, an upper limit that will accommodate severely degraded coastal streams. No more than 150 cubic yards of material will be used to construct a single weir.
   - **c.** Removal and fill associated with streambank excavation sites to anchor boulder structures into stream banks will be commensurate with structure size. In general, the width of excavation trenches will not exceed 2x the structure or boulder width, and trench length will not exceed 30'. Slight amounts of bank armoring (20' up- and downstream of the excavation site) can be used to prevent bank scour.

iv. Gravel Placement: No more than 1,500 cubic yards of material will be placed within the OHW per mile. Spawning gravel will be comprised of clean, rounded river rock and its size determined by the need of fish species (typically 0.25 - 6 inches). No more than 250 cubic yards of material can be placed at one site.

v. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

2. Reconnection of Existing Side Channels and Alcoves

a) Description – Side channels and alcoves serve as important rearing habitat for listed fish, especially during early and juvenile life-history stages. Functioning side channels have inlet and outlet connections to the main channel and often contain flow only during flood events—bankfull or greater—but can contain stream flow throughout a year. Functioning alcoves are back-water channels that typically contain water during both low and high flows. Many side channels and alcoves have been blocked from main stream channels for flood control or other land management activities, or have ceased functioning due to other in-stream sediment imbalances. After side channels were blocked, peak flows were confined to the main stream channel, often resulting in channel incision. (This does not include main stem river channels cut off by past land use activities or natural disturbances.)

The BLM and Forest Service propose to reconnect and/or restore existing side channels and alcoves to increase rearing habitat for juvenile fish and high flow refuge areas for all life stages of fish. This action includes the removal of plugs which block water movement through side channels and alcoves. Further, side channel and alcove improvements can include fill removal within channels and alcoves, LW and/or boulder placement, riparian planting, etc. Boulder placement may be used in the main river to stabilize the channel and bring the entrance of the side channel into alignment (vertically and horizontally). Construction would involve use of heavy equipment, such as excavators, spyders, backhoes, and dump trucks.

b) Design Criteria

i. Excavated material removed from side-channels or alcoves shall be hauled to an upland site or spread across the adjacent floodplain in a manner that does not restrict floodplain capacity.

ii. Design and construct side-channels in such a manner as to prevent the capture and relocation of the main channel.

iii. Design project to naturally maintain inlet and outlet connections with the main stream channel (i.e., placement of LW to increase local scour).

iv. Should fish rescue occur, use fish handling criteria listed under Fish Passage Culvert and Bridge Projects activity category.

v. Excluded Activities – The following activities are not included in this RGP: Creation of new side channels; Excavation of severely aggraded (completely filled in and channel dimensions are undistinguishable) side channels and alcoves

c) Maximum Removal & Fill Estimates

i. Project Extent: One project is equal to one side channel or alcove project. This does not include abandoned river channels.

ii. No more than 1,500 cubic yards of material will be removed below the proposed OHW and from wetlands from one project in a single year. Removal is limited to the inlet, outlet, and within a side channel or within an alcove area.

iii. No more than 400 cubic yards or material will be removed below the existing OHW and from wetlands from one project in a single year. Removal is limited to the inlet and outlet of a side channel or within an alcove area.

iv. When constructing log or boulder structures in the main channel to restore side channel flow, fill shall not exceed 100 cubic yards for small streams (bankfull <40') and 350 cubic yards for larger streams or mainstem rivers (bankfull >40'). Boulder weir construction will follow project design criteria provided in the Large Wood, Boulder, and Gravel Placement category (part d. iii).

v. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

3. **Head-cut Stabilization and Associated Fish Passage**

a) **Description** – Left unchecked, head-cuts lead to channel incision, deposition of fine sediments in downstream substrates, and disconnection of a stream from its floodplain (USFWS 2007). The BLM and Forest Service propose to stabilize active or potentially active head-cuts with large wood, rock, or weirs to prevent further channel degradation (upstream migration of head-cut) and to promote downstream channel aggradation. In streams currently or historically occupied by fish, fish passage will be provided over the stabilized headcut. Construction would involve use of heavy equipment, such as excavators, spyders, backhoes, dump trucks.

b) **Project Design Criteria** – Two design choices are provided below. The design choice will be based on site characteristics and limitations (i.e., channel slope, bed material type), but may also be based on material availability, economics, land use, design competence or familiarity, and/or regulatory restrictions (i.e., jump heights for fish).

i. Rock and Organic Material Headcut Armoring – This method is often used on severe headcuts in meadow areas east of the Cascade Mountains to stop further channel incision. Stream types are typically Rosgen "C" and "E" channel types.

a. Armor head-cut with sufficiently sized and amounts of material to prevent continued up-stream movement of the headcut. Rock material should be sized as to not be mobile during design floods. Materials can include both rock and organic materials (e.g. juniper, woody debris) which are native to the area and sized appropriately for the system.

b. Focus stabilization efforts in the plunge pool, head cut, as well as no more than a 20 foot distance upstream of the headcut.

c. Minimize lateral migration of channel around head cut ("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.

d. In streams with current or historic fish presence, provide fish passage over stabilized head-cut through a series of log or rock weir structures as described in section b.ii below.

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 head cut stabilization action and be completed during the first subsequent in-water work period.

f. In streams with current or historic fish presence, it is recommended to construct a series of downstream log or rock weirs to expedite channel aggradation and promote fish passage in low gradient streams (generally less than 2%).

i. Rock and log weirs (check dams/aggradation structures) are very low channel spanning structures that promote aggradation and provide for fish passage in low gradient streams. Such structures are used in conjunction with armoring of headcuts.

ii. Construct weirs in a 'V' shape, oriented with the apex upstream, and lower in the center to direct flows to the middle of channel.

iii. Key weirs into the stream bed to minimize structure undermining due to scour, preferably at least 2.5x their exposure height. The weir should also be keyed greater than 8 feet into both banks, if feasible, and no greater than 20 feet.

iv. If several structures will be used in series, space the weirs at the appropriate distances to promote fish passage of all life stages of native fish. Incorporate State fish passage criteria (jump height, pool depth, etc.) in the design of weir structures. Recommended weir spacing should be no closer than the net drop divided by the channel slope (for example, a one-foot high weir in a stream with a two-percent gradient will have a minimum spacing of 50-feet [1/0.02])

v. Include fine material in the weir material mix to help seal the weir/channel bed, thereby preventing subsurface flow. Fines excavated from sites to key-in aggradation structures can be used. Geotextile material can be used as an alternative approach to prevent subsurface flow.

ii. Large Roughness Elements (Wood and Boulder Placements) – This treatment type is preferred for those areas where LW and boulders provide natural grade control. This technique is applicable to a wide range of stream types, from low gradient meandering streams (less than 1%) to high gradient cascade channels (up to 12%). The goal of using large roughness elements is not to completely halt the incision process, but rather to slow it down and spread the elevation change over a greater length of channel. Because log jams are porous structures, not all of the sediment will be held in place; sediment inputs, however, will be spread out over time and space.

a. Rock and wood structures will mimic natural colluvial features, such as debris flow or landslide deposits, to provide channel stabilization.

b. Rock and wood will be sized so that it is not mobile during the design flood. For guidance, refer to an engineering technical note regarding buoyancy is available through NRCS (http://www.or.nrcs.usda.gov/technical/engineering/eng-notes.html).

c. To promote or maintain fish passage, ensure that structures contain enough spaces to allow for up and downstream movement of fish.

iv. Excluded Activities – The following activities are not included in this RGP: Any structures that include the use of gabion baskets, sheet pile, concrete, articulated

concrete block, and/or cable anchors; Straight weirs, which disperse flows and can cause channel widening and thus structure "flanking" (erosion around the ends of the structure).

c) Maximum Removal & Fill Estimates

- **i.** For Rock and Organic Material Headcut Armoring projects
  - **a.** Project Extent: One project is equal to the stabilization of one headcut project and associated fish passage structures. Project length, from the headcut to the last downstream weir, shall not exceed 400 feet.
  - **b.** No more than 1,000 cubic yards of material will be placed within a stream channel with no more than 150 cubic yards to be used for an individual structure, such as an aggradation structure (check dam) or headcut armor.
  - **c.** Fill to armor a headcut may extend into wetland areas immediately above the headcut.
  - **d.** Removal and fill associated with streambank excavation sites to key-in aggradation structures (check dams) will be commensurate with structure size. The width of a single excavation trench will not exceed 2x the structure width, and trench length will not exceed 20 feet.
- **ii.** For project under the Large Roughness Elements (Wood and Boulder Placements) category, follow fill guidelines under the Large Wood, Boulder, and Gravel Placement category
- **iii.** If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

4. Streambank Stabilization

a) Description – Streambanks covered with well-rooted woody vegetation can withstand critical sheer stress three times more than that of weakly vegetated streambanks or streambanks covered with shallow rooted grass (Millar and Quick 1998). Such conditions can result in undercut banks, which provide quality habitat for fish of all life stages. Many streambanks on federal lands have been degraded due to past livestock grazing, road construction, and other activities.

The BLM and Forest Service propose to stabilize eroding streambanks using bioengineering methods. Projects will typically occur in meadow stream reaches (e.g. Rosgen "C" and 'E" stream types) and to a lesser degree in forested reaches (e.g. Rosgen "B" stream types). Further, projects will not significantly restrict the channel migration zone (natural sinuosity potential) and ability of the channel to form and maintain habitat.

b) Design Criteria

- **i.** Work will focus on eroding stream banks, primarily the outside edge of meander bends.
- **ii.** Limit bank restoration projects to those sites where existing channel conditions are at or near reference channel conditions—radius of curvature, etc. use bank stabilizing materials that would naturally occur at that site (such as LW, woody

and herbaceous plantings, native sedge/rush mats, and native rock. Native rock shall originate from within the watershed and be of the size and shape of those found within the project site. Rock placement shall not extend above the bankfull elevation, unless such material occurs naturally above that elevation.

iii. Banks will be reshaped and sloped where the objective is to reduce blank slope angle to provide more favorable planting surfaces. Such work will not change the location of the bank toe.

iv. Jute matting or other biodegradable material can be used with plantings to help prevent erosion of affected banks.

v. Sedge or rush mats will be taken from nearby floodplains (above the bankfull elevation), in areas where such vegetation is abundant. Mats will be excavated in strips, up to 3'x 6' in size, and taken in such a manner as to leave undisturbed vegetation of equal size between each excavated mat. Plant sedge or rush plugs and/or seeds throughout excavated area to promote regrowth.

vi. Excluded Activities – The following activities are not included in this RGP: Use of dikes, groins, buried groins, drop structures, porous weirs, weirs, riprap, rock toes, and similar structures to stabilize streambanks.

c) Maximum Removal & Fill Estimates

i. Project Extent: One project is equal to stabilization of eroding banks along less than 0.5 mile of stream.

ii. No more than 1,500 feet of stream bank will be excavated and sloped per 0.5 miles within a single year.

iii. Individual stream banks to be excavated and sloped shall not exceed 500 feet in length and 8 feet in height.

iv. Banks will be excavated in the following manner: at bankfull elevation excavate horizontally followed by sloping (up to 3:1 [h/v] slope); sloping from channel edge up to a 3:1 slope. Excavation can begin from the slope toe (under OHW) to better connect channel and newly constructed streambank.

v. When using sedge or rush mats, no more than 500 mats (3'x 6'x 1') shall be used to stabilize banks. Mat placement can extend below the OHW but most will occur above the OHW. To minimize potential effects to wetlands, harvest of mats shall be distributed across the project area and not from a single location. At harvest sites, mats will be taken in such a manner as to leave undisturbed vegetation of equal size between each excavated mat.

vi. If other aquatic restoration activities (e.g. Large Wood and Boulder Placement and Riparian Planting) covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

5. Fish Passage Culvert and Bridge Projects

a) Description – Fish passage impediments at road-stream crossings are common throughout federal lands in Oregon due to road construction to access natural resources and provide public access. Passage barriers are typically culverts that are undersized and/or perched, which result in increased stream velocities and jumping heights that prohibit fish access through the culvert and into upstream habitat.

The BLM and Forest Service propose to remove or replace existing road-stream crossing structures—culverts and bridges—that restrict fish passage with stream simulation structures to restore up and downstream passage for all life stages of native fish. This category includes those projects with minor road and stream realignment to restore a natural stream course as well as those where temporary bypasses are required. Construction would involve use of heavy equipment, such as excavators, cranes, backhoes, front-end loaders, dump trucks, bull dozers, and on occasion pile-drivers and helicopters.

b) Design Criteria

- **i.** Fish passage projects will be designed by an experienced engineer with design input from an experienced fisheries biologist and hydrologist. Such personnel shall oversee or review the project during construction to ensure that project design criteria and conservation measures are being properly implemented.
- **ii.** Forest Service Design Assistance Teams or the BLM equivalent will provide design review for projects that exceed $100,000 in cost or will result in structures (excluding road fill) that are greater than 20' in width.
- **iii.** Assess sites for a potential to headcut below the natural stream gradient. Along with field surveys, refer to Castro article (reference) for a guide to assess headcut potential. Projects that lead to headcutting below the natural stream gradient are excluded from this consultation.
- **iv.** Design Standards
  - **a.** Structure Type – Structure types include closed-bottomed culverts, open-bottomed arch culverts, and bridges. Structure material must be concrete or metal.
  - **b.** Structure Width – The structure width shall never be less than the bankfull channel width. (The stream width inside the culvert or between bridge footings shall be equal to or greater than the bankfull width). The minimum structure width and height for a closed bottom culvert shall be 6 feet to allow manual placement of stream simulation material. Structures must accommodate a 100-year flood flow while maintaining sediment continuity (similar particle size distribution) within the culvert as compared to the upstream and downstream reaches. To meet this requirement, unconfined channel types (Rosgen C, E, and B channel types, Rosgen 1996) may require structures wider than bankfull and/or the addition of flood relief culverts or other comparable flood relief methods.
  - **c.** When possible, flood relief culverts will be designed to restore and maintain access to off-channel holding areas for juvenile and adult fish. Therefore, existing floodplain channels should be the first priority for location of flood relief culverts. Flood relief culverts should be installed in a manner that match floodplain gradient and do not lead to scour at the outlet.
  - **d.** Channel Slope – The structure slope shall approximate the average channel gradient of the natural stream up and downstream of the structure. The maximum slope for closed-bottomed culverts shall not exceed 6% because of difficulties in retaining substrate in the culvert at higher gradients. Open-bottom arches can be placed in channel gradients that exceed 6%.

e. Embedment – If a closed culvert is used, the bottom of the culvert shall be buried into the streambed not less than 20% and not more than 50% of the culvert height. For open-bottomed arches and bridges, the footings or foundation shall be designed to be stable at the largest anticipated scour depth. Substrate and habitat patterns within the culvert should mimic stream patterns that naturally occur above and below the culvert. Coarser material may be incorporated to create velocity breaks during high flows, thereby improving fish passage, and to provide substrate stability.

f. Rip Rap – The use of riprap is permissible above bankfull height to protect the inlet or outlet of new culverts or open-bottomed arches. If the use of riprap is required for culvert stability, then an additional analysis may be required to ensure that the structure is not undersized. Riprap may only be placed below bankfull height when necessary for protection of abutments and pilings for bridges. However, the amount and placement of riprap around the abutments and/or pilings should not constrict the bankfull flow.

g. Grade Control Structures – Grade control structures are permitted to prevent headcutting above or below the culvert or bridge. Grade control typically consists of boulder structures that are keyed into the banks, span the channel, and are buried in the substrate.

h. Road Dips – Where applicable, incorporate road dips into stream crossing design, to ensure catastrophic flood events will transport overflow back into the stream channel instead of onto the road bed.

i. Structures containing concrete must be cured or dried before they come into contact with stream flow.

iv. In cases of structure removal or when removing an existing structure and replacing it with a bridge, restore the stream channel and reconnect the floodplain at the site using applicable restoration categories.

v. When removing woody debris from the road-crossing inlet, place the debris downstream of the road crossing.

vi. Monitor structures after high flow events, which occur during the first fall/winter/spring after project completion. Assess the following parameters: headcutting below natural stream gradient, substrate embeddedness in the culvert, scour at the culvert outlet, and erosion from sites associated with project construction. If necessary, apply remedial actions (using project design criteria and conservation measures) if projects do not meet the intended goals.

vii. If other aquatic restoration activities included in this RGP are used as complementary actions, follow the associated project design criteria and conservation measures.

viii. Conservation Measures – Along with the general conservation measures applicable to all activity categories, the following conservation measures will be used to minimize sediment and turbidity and effects of fish handling/transport.

a. Isolate Construction Area and Remove Fish from Project Area

1. All fish capture, removal, and handling activities shall be conducted by an experienced fisheries biologist or technician.
2. Isolate Capture Area – Install block nets at up and downstream locations 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 fish capture and transport activities 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. Fish Capture Alternatives

1. Collect fish by hand or dip nets, as the area is slowly dewatered.
2. Seining – Use seine with mesh of such a size to ensure entrapment of the residing ESA-listed fish.
3. Minnow traps – Traps will be left in place overnight and in conjunction with seining.
4. Electrofishing – Prior to dewatering, use electrofishing only where other means of fish capture may not be feasible or effective. The protocol for electrofishing includes the following:
   - 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.
   - Only Direct Current (DC) or Pulsed Direct Current (PDC) shall be used.
   - Conductivity <100 use voltage ranges from 900 to 1100. Conductivity from 100 to 300 then use voltage ranges from 500 to 800. Conductivity greater than 300 then use voltage to 400.
   - 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.
   - 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 below. Dark bands on the fish indicate injury, suggesting a reduction in voltage and pulse width and longer recovery time.

c. Handling and Release –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. As rapidly as possible (especially for temperature-sensitive bull trout), but after fish have recovered, release fish upstream of the isolated reach in a pool or area that provides cover and flow refuge. Document all fish injuries or mortalities and include in annual report.

d. Dewater Construction Site – Upstream of the isolated construction area, divert flow around the construction site with a coffer dam (built with non-erosive materials such as sand bags, concrete blocks, etc) and an associated pump or a by-pass culvert. Diversions constructed with material mined from the streambed or floodplain is not permitted. Small amounts of in-stream material can be moved to help seal and secure diversion structures. Pumps must have fish screens and be operated in accordance with NMFS fish screen criteria

(NMFS 1995). Dissipate flow energy at the bypass outflow to prevent damage to riparian vegetation or stream channel. If diversion allows for downstream fish passage (i.e., is not screened), 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.

e. 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 increase in stream turbidity. Monitor downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

xi. Excluded Activities – The following activities are not included in this RGP: use of treated wood for replacement bridges; bridge piers and abutments will not be constructed in the bankfull width; the hydraulic method will not be used (e.g., culverts with constructed metal baffles or weirs); projects that permit exotic fish into isolated bull trout populations or other native fish populations.

c) Maximum Removal & Fill Estimates

i. Project Extent: One project is equal to the replacement or removal of one road stream crossing structure (culvert or bridge). Project length shall not exceed 300'.

ii. For culvert replacement projects, both removal and fill will not exceed 700 cubic yards below OHW. (This will accommodate large structures, such as open-bottom arches, 30'x100'). Substrate will be imported to embed culverts or open-bottom arches. The majority of projects will fall below this upper limit.

iii. For culvert removal and channel restoration projects, removal and fill amounts will be commensurate with that needed to restore floodplain and stream channel dimensions.

iv. If temporary bypass roads are required, follow the process under the *Wetland Identification and Impact Analysis* listed in the *General Conservation Measures and Practices that apply to all Aquatic Restoration Activity Categories.*

v. If other aquatic restoration activities (e.g. Large Wood and Boulder Placement Banks Stabilization, and Riparian Planting) covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

6. Irrigation Screen Installation and Replacement

a) Description – Unscreened or improperly screened irrigation diversion structures can entrain fish into canals or impinge fish on fish screens, where they become trapped and die (USFWS 2007). If approach velocities are too fast, fish can also be impinged against the screen surface (NOAA 2008). The BLM and Forest Service propose to install, replace, or upgrade off-channel screens to improve fish passage or prevent fish entrapment at existing irrigation diversions. This action also includes the removal of non-needed existing diversion weirs that are less than six feet high and impound less than 15 acre feet of water. Construction would

involve use of heavy equipment, such as excavators, backhoes, front-end loaders, dump trucks, and bull dozers.

b) Design Criteria

- **i.** All fish screens must be sized to match the landowner's documented or estimated historic water use and legal water right(s) which ever is less.
- **ii.** Irrigation 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 irrigation system.
- **iii.** Screens, including screens installed in temporary and permanent pump intakes, must meet ODFW and NMFS (1995) fish screen and passage criteria. NMFS 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, and Warner sucker under Service jurisdiction.
- **iv.** Size of bypass structure should be big enough to pass kelt steelhead and migratory bull trout back into the stream.
- **v.** Abandoned ditches and other similar structures will be plugged or backfilled, as appropriate, to prevent fish from swimming or being entrained into them.
- **vi.** When making improvements to pressurized irrigation systems, 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.
- **vii.** Diversion Removal
  - **a.** Construction Actions – Remove diversion dam and water routing equipment. Heavy machinery operating from the bank or within the channel may be used to aid in removal of diversion structures. Re-watering the construction site occurs at such a rate as to prevent loss of surface water downstream as the construction site streambed absorbs water. Use Fish Passage Culvert and Bridge Projects' conservation measures, which include dewatering the construction site, fish capture and release, rewatering the restored site.
  - **b.** Construction Impacts – Stream channel substrate will be minimally disturbed with the removal of the diversion dam. Restored stream flow will flush out substrate fines within the formerly dewatered area, resulting in increased but short-lived stream turbidity (usually less than 2 hours).
- **viii.** Excluded Activities - The following activities are not included in this RGP: effects from the issuance of Action Agency permit to divert water from Federal lands; large diversions/structures which have substantial accumulations of sediment that may be released and adversely affect downstream fish, critical and or essential fish habitat; consolidation, improvement, and modification of diversions.

c) Maximum Removal & Fill Estimates

- **i.** One project is equal to removal of one in-channel weir structure and/or installation or replacement of one irrigation screen.

ii. No more than 500 cubic yards of material can be removed from the stream channel above the location of an irrigation weir that has been removed. Such material will constitute the weir and channel substrates that have aggraded above the natural stream gradient, which can be placed immediately downstream of the weir location to restore the natural grade of the stream channel.

iii. No more than 75 cubic yards can be removed below the OHW to accommodate the installation or replacement of fish screen/diversion structures

iv. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

7. Floodplain Overburden Removal

a) **Description** – Levees, berms, and dikes are commonly found along mid- to large-sized rivers for flood control or infrastructure protection and can severely disrupt ecosystem function (Gergel et al. 2002) and fish community structure (Freyer and Healy 2003). Similarly, mine tailings left by dredging for precious metals can have comparable effects on small streams. The BLM and Forest Service propose to remove anthropogenic overburden and fill, such as dredged mine tailings, railroad beds, dikes, berms, levees, from floodplains to restore natural floodplain functions. Such functions include overland flow during high-water events, dissipation of flood energy, increased water storage to augment low flows, sediment and debris deposition, growth of riparian vegetation, nutrient cycling, and development of side channels and alcoves. Construction would involve use of heavy equipment, such as excavators, earthmovers, scrapers, backhoes, front-end loaders, dump trucks, and bull dozers.

b) **Design Criteria**

i. Create floodplain characteristics—elevation, width, gradient, length, and roughness— that mimic, to the greatest degree possible, those that would naturally occur at that stream and valley type.

ii. Overburden or fill comprised of native materials, which originated from the project area, may be used to reshape the floodplain, placed in small mounds on the floodplain, used to fill anthropogenic holes, buried on site, and/or disposed into upland areas.

iii. To the greatest degree possible, non-native fill material, originating from outside the project area, shall be removed from the floodplain to an upland site.

iv. Where it is not possible to remove all portions of dikes and berms, create openings with culverts and/or breaches. Place culverts through or remove portions of such structures to pass high flows—bankfull or greater— into floodplain areas. The width of a culvert or breach should be equal to or greater than the bankfull width of the stream. Culverts and breaches should be located at a depositional area of the channel. Design proper number and location of culvert and breach sites to help prevent fish stranding as high flows recede.

v. Conduct a contaminant survey for mine tailing removal projects prior to project implantation. If contaminants are found above levels set by the Environmental Protection Agency, a separate consultation is required.
vi. Consider decompaction of soils once overburden material is removed.

c) **Maximum Removal & Fill Estimates**
i. One project is equal to overburden removal along ½ mile of stream. Includes floodplains on both sides of stream.
ii. Overburden material will be removed or redistributed above the OHW and minor amounts can be removed/recontoured below OHW (<10' horizontal extension into channel) to better connect the stream and reconstructed floodplain.
iii. Removal amounts associated with restoration of tributary and/or side channels, which were blocked and covered by overburden material, will be commensurate with natural channel dimensions.
iv. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

8. **Reduction of Recreation Impacts**

a) **Description** – Developed and dispersed campgrounds and other recreational sites are commonly found along streams and within riparian areas on BLM and Forest Service lands. Recreation infrastructure and related use often confines stream channels, disrupt floodplain functions, and degrade riparian vegetation communities.

The BLM and Forest Service propose to close or better control recreation use along streams and within riparian areas. This includes removal of designated campgrounds, dispersed camp sites, and foot trails as well as treatments of off-road vehicle (ORV) roads/trails in riparian areas. Actions that reduce aquatic disturbances within recreation sites to be left open are included. Dispersed and developed campground restoration usually includes some or all of the following: removal of campground fill material and/or structures, such as berms, toilets, fences, picnic tables; ripping or sub-soiling sites to remove compaction; stream bank restoration; placement of rock or other barriers such as fences to block vehicle access; gravel surfacing of existing sites to designate access routes and parking; planting shrubs and trees to restore streamside, floodplain, and meadow vegetation; reducing or clearing noxious weeds. Construction would involve use of heavy equipment, such as excavators, earthmovers, scrapers, backhoes, front-end loaders, dump trucks, and bull dozers.

b) **Design Criteria**
i. Design remedial actions to restore floodplain characteristics—elevation, width, gradient, length, and roughness—in a manner that closely mimics, to the greatest degree possible, those that would naturally occur at that stream and valley type.
ii. Overburden or fill comprised native materials, which originated from the project area, can be used to reshape the floodplain, placed in small mounds on the

floodplain, used to fill anthropogenic holes, buried on site, and/or disposed into upland areas.

iii. To the greatest degree possible, non-native fill material, originating from outside the project area, shall be removed from the floodplain to an upland site.

iv. Consider de-compaction of soils once overburden material is removed.

v. Place barriers—boulders, fences, gates, etc—outside of the bankfull width and across traffic routes to prevent ORV access into and across streams.

c) Maximum Removal & Fill Estimates

i. Project Extent: One project is equal to restoration work conducted at one recreation site.

ii. No more than 500 cubic yards of material can be removed or altered below the OHW or in wetlands. Work would involve removal of anthropogenic material along streambanks and in floodplains and wetlands to prepare for stream channel, bank, floodplain, and/or wetland restoration projects.

iii. If other aquatic restoration activities covered by the RGP (e.g. Streambank Stabilization) are used as complementary actions, follow the associated design criteria and fill and removal limits.

9. Riparian Exclusion Fencing (with water gaps and stream crossings)

a) Description – Livestock grazing, which has occurred on federal lands since the late 1880s, has degraded riparian habitat in localized areas along streams and riparian areas. Even though grazing practices have drastically improved through reductions in AUMs and seasonal restrictions relative to past decades, legacy impacts remain. Fencing sensitive riparian areas is a very effective way of protecting riparian resources, fish habitat and fish populations.

The BLM and Forest Service propose to construct and replace fences around selected riparian areas to restrict or eliminate human and livestock use to maintain or restore stream channels, riparian vegetation, and floodplain functions. Fence types may include the following: permanent barbed-wire, high-tension, smooth-wire, let-down, electric, buck and pole, and other similar types. In association with riparian fence projects, livestock water gaps and crossings will be constructed. Construction may involve use of dump trucks and excavator-type equipment along with all-terrain vehicles, flatbed trucks, and manual/power tools.

b) Design Criteria

i. Fence placement should allow for lateral movement of a stream.

ii. Minimize vegetation removal, especially potential LW recruitment sources, when constructing fence lines.

iii. When constructing livestock crossings at streams and/or water gaps, use the following PDCs:

a. Locate crossings and/or water gaps where stream banks are naturally low.

b. When possible, crossings and gaps should not be constructed within known or suspected spawning areas (e.g., pool tail-outs where spawning may occur).

c. Fences at stream crossings and water gaps should not inhibit up or downstream movement of fish and or significantly impede bedload movement. Where appropriate, construct fences at water gaps as to allow passage of LW and other debris.
d. If necessary, the stream bank and approach lanes can be stabilized with native vegetation and/or angular rock to reduce chronic sedimentation. The stream crossing or water gap should be armored with up to cobble-size rock, and use angular rock if natural substrate is not of adequate size.
e. Livestock crossings or water gaps must not be located in areas where compaction or other damage may occur to sensitive soils and vegetation (e.g., wetlands) due to congregating livestock or the placement of angular rock.
f. The maximum width of a water gap or stream crossing should be no less than 10 feet and no more than 20 feet wide in the upstream-downstream direction.
g. When using pressure treated lumber for fence posts only, complete all cutting/drilling offsite so that treated wood chips and debris does not enter water or flood prone areas.

iv. Excluded Activities – The following activities are not included in this BO: riparian fencing to create livestock handling facilities

c) Maximum Removal & Fill Estimates

i. One project is equal to one stream crossing or water gap
ii. No more than 40 cubic yards of material shall be placed within the OHW to construct a water gap. Minimal channel scraping, smoothing, and removal will occur to prepare foundation for rock placement.
iii. No more than 20 cubic yards shall be removed above OHW to slope water gap entrance/exit.
iv. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

10. Riparian Planting

a) Description – Past management activities, such as grazing, road construction, recreation, and more, have removed riparian vegetation along streams in localized areas. Even though forest and range management practices have been improved to prevent removal of riparian vegetation, legacy impacts remain. The BLM and Forest Service propose to conduct riparian vegetation planting as a means to help restore plant species composition and structure that would occur under natural disturbance regimes. The resulting benefits to the aquatic system can include desired levels of stream shade, bank stability, stream nutrients, LW inputs, increased grasses, forbs, and shrubs, and reduced soil erosion. Activities may include the following: planting conifers, deciduous tress and shrubs; placement of sedge and or rush mats; gathering and planting willow cuttings. Equipment may include excavators, backhoes, dump trucks, power augers, chainsaws, and manual tools.

b) Design Criteria

i. An experienced silviculturist, botanist, ecologist, or associated technician shall be involved in designing vegetation treatments.
ii. No roads or landings will be constructed.
iii. Species to be planted must be of the same species that naturally occurs in the project area.
iv. Tree and shrub species as well as sedge and rush mats to be used as transplant material shall come from outside the bankfull width, typically in abandoned flood plains, and where such plants are abundant.
v. Sedge and rush mats should be sized as to prevent their movement during high flow events.
vi. Concentrate plantings above the bankfull elevation.

c) Maximum Removal & Fill Estimates

i. Project Extent: One project equals an action that uses heavy machinery to cross a stream or conduct work activities in one mile of stream below the OHW.
ii. For the planting of mature willow along with sapling cottonwood, alder, and other riparian deciduous vegetation, no more than 500 cubic yards will be removed and filled for each project. Such material will be a result of excavation and re-filling of transplant holes or trenches.
iii. Sedge or rush (plugs or mats) will be taken from nearby floodplains (above the bankfull elevation), in areas where such vegetation is abundant. No more than 500 mats will be excavated in strips, up to 3'x 6' x 1' in size and used for riparian plantings. To minimize potential effects to wetlands, harvest of mats shall be distributed across the project area and not from a single location. At harvest sites, mats will be taken in such a manner as to leave undisturbed vegetation of equal size between each excavated mat. Plant sedge or rush plugs and/or seeds throughout excavated area to promote regrowth.
iv. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

11. Road Treatments

a) Description – Over the past century, roads have been constructed throughout Federal lands in Oregon and Washington to access timber and to mine, facilitate fire suppression, and access recreation areas. Roads and associated ditch systems increase watershed drainage networks, intercept overland flow, and shift timing of peak flows. Improperly constructed road-stream crossings, particularly culverts, can impede fish passage. During precipitation events, fine sediments can be washed from the road surface into streams. This is especially true for poorly maintained roads. Roads constructed in close proximity to streams constrain the stream channel and eliminate the stream's access to its floodplain (NOAA 2008).

The BLM and Forest Service propose to implement road treatments, from simple closures to more complex road obliteration and removal, with an overall goal of restoring hydrologic functions and associated fish habitat. This category includes stormproofing roads intended to remain open, thereby hydrologically disconnecting such roads from watershed streams. Actions such as bridge and culvert removal, removal of asphalt and gravel, installing drainage culverts, constructing road dips, subsoiling or ripping of road surfaces, outsloping, waterbarring, fill removal, sidecast pullback, re-vegetating with native species and placement of LW and/or boulders are included. Roadway barricading to exclude vehicular traffic is covered only if the overall road remediation project substantively addresses restoration of hydrologic function. For culvert removals on closed roads, limited cutting or removal of vegetation on the closed road-bed to access the culvert site may be required. Construction would involve use of heavy equipment, such as excavators, backhoes, front-end loaders, dump trucks, and bull dozers.

b) Design Criteria

i. For road removal projects within riparian areas, recontour the affected area to mimic natural floodplain contours and gradient to the greatest degree possible.

ii. When obliterating or removing segments immediately adjacent to a stream or wetlands, use sediment control barriers, to the extent practicable or as described in a Section 401 Water Quality Certification, between the project and the stream or wetland.

iii. Drainage features used for stormproofing and treatment projects should be spaced as to hydrologically disconnect road surface runoff from stream channels.

iv. Dispose of slide and waste material in stable sites out of the flood prone area. Waste material other than hardened surface material (asphalt, concrete, etc) may be used to restore natural or near-natural floodplain and bankfull contours.

v. Minimize disturbance of existing vegetation in ditches and at stream crossings to the greatest extent possible.

vi. Conduct activities during dry-field conditions—low to moderate soil moisture levels.

vii. Culvert removal on fish bearing streams shall adhere to project design criteria and removal and fill estimates listed under Fish Passage Culvert and Bridge Projects category. When removing a culvert from a first or second order, non-fishing bearing stream, project specialists shall determine if culvert removal should follow conservation measures listed under Fish Passage Culvert and Bridge Projects project design criteria.

viii. For culvert removal projects, restore natural drainage patterns (floodplain and bankfull) and when possible promote passage of all fish species and life stages present in the area. Evaluate channel incision risk and construct in-channel grade control structures when necessary.

ix. Excluded Activities – The following activities are not included in this RGP: new road construction; routine road maintenance.

c) **Maximum Removal & Fill Estimates**

i. One project is up to one mile of road treatments where the road-bed is altered with heavy equipment within the bankfull channel, wetlands, or above bankfull when high degree of connectivity occurs between road and listed fish stream.

ii. No more than 2500 cubic yards of material can be removed below the OHW. Material for removal would include road fill (bed and/or fill slopes) and bank-hardening structures, such as rock gabions and rip rap. Such removal would be conducted to prepare for implementation of one or more RGP restoration actions (e.g. Large Wood, Boulder, and Gravel placement, Streambank Stabilization, Riparian Planting) to restore stream channels, banks, and associate floodplains impacted by the road.

iii. Excavated material shall not be placed in wetlands.

iv. For culvert projects, follow removal & fill estimates described in the Fish Passage Culvert and Bridge Projects category.

v. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

12. Removal of Legacy Structures

a) **Description** – During the 1980s and early 1990s, many habitat-forming structures, such as log weirs, boulder weirs, and gabions, were placed in an effort to create pool habitat. Many of these structures were placed in a manner that interfered with natural stream function, and therefore have been continually degrading stream habitat since their installation (USFWS 2007). The BLM and Forest Service propose to remove large wood, boulders, rock gabions, and other in-channel structures that were constructed to improve fish habitat but were installed in a manner that was and continues to be inappropriate for the given stream type. Removal of legacy structures would include the use of excavator-type machinery, spyders, backhoes, and dump trucks.

b) **Design Criteria**

i. If the structure being removed contains material (i.e., LW, boulders, etc) not typically found within the stream or floodplain at that site, remove material from the 100-year floodplain.

ii. If the structure being removed contains material (i.e., LW, boulders, etc) that is typically found within the stream or floodplain at that site, the material can be reused to implement habitat improvements described under Large Wood, Boulder, and Gravel Placement activity category in this RGP. Any such project must follow PDCs for Large Wood, Boulder, and Gravel Placement activity category within this RGP.

iii. If the structure being removed is keyed into the bank, fill in "key" holes with native materials as to restore contours of stream bank and floodplain. Compact the fill material adequately to prevent washing out of the soil during over bank flooding. Do not mine material from the stream channel to fill in "key" holes.

iv. When removal of buried (keyed) structures may result in significant disruption to riparian vegetation and/or the floodplain, consider using a chainsaw to extract the portion of log within the channel and leaving the buried sections within the streambank.

v. Assess sites for a potential to headcut below the natural stream gradient. Along with field surveys, refer to Appendix 1 for a guide to assess headcut potential.

vi. If headcutting and channel incision are likely to occur due to structure removal, additional measures must be taken to reduce these impacts (see grade control options described under Headcut Stabilization activity category (part d. ii or iii).

vii. If the structure is being removed because it has caused an over-widening of the channel, consider implementing other RGP restoration categories to decrease the width to depth ratio of the stream at that location to a level commensurate with upstream and downstream (within the same channel type)

viii. Protect riparian vegetation that has grown around legacy structures to the greatest degree possible.

ix. Excluded Activities – The following activities are not included in this RGP: dams and diversions.

c) Maximum Removal & Fill Estimates

i. Project Extent: One project is equal to one stream mile of legacy structure removal. A site is defined as a single location within the project length.

ii. For large wood legacy structures, up to 350 logs may be removed or altered with no more than 50 logs at any given site.

iii. For boulder and gabion projects, removal will not exceed 2,500 cubic yards with no more than 250 cubic yards at any given site, such as a single weir or a 100' stream section that was treated with integrated boulders. Legacy boulder structures may be altered to better accommodate natural conditions.

iv. Stream channel substrate that has accumulated above removed legacy structures can be used to fill associated scour holes to help restore stream gradient.

v. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.

13. Riparian Juniper Treatment (non- commercial)

a) Description – Western junipers have expanded rapidly into neighboring plant communities in the past 130 years, primarily due to climatic influences, livestock grazing, and fire suppression (Miller et al. 2005). Some authors have concluded that the unnaturally large number of juniper trees currently present in some areas may cause decreased stream flow due to evapo-transpiration and increased soil erosion (Miller et al. 2005). In response, the BLM and FS propose to fell juniper trees occurring in riparian and associated uplands to help restore natural plant species composition and structure that would occur under natural fire regimes. The associated benefits to aquatic and riparian environments include the following: reduction of soil erosion into stream channels; increased frequencies and diversity of herbaceous, shrub, and tree species; increased bank stability and stream nutrients. Associated

uplands include those areas where juniper stands are or will create conditions that result in lost ground cover and increased sedimentation into stream channels; upland treatments would only be covered if those treatments directly benefit the aquatic environment. Treatments will emphasize the removal of junipers above natural stocking levels. Equipment may include the use of feller-buncher type equipment, slashbuster, chainsaws, winch machinery, and/or prescribed fire.

b) Design Criteria

i. Do not cut old-growth juniper, which typically has several of the following features: sparse limbs, dead limbed or spiked-tops, deeply furrowed and fibrous bark, branches covered with bright-green arboreal lichens, noticeable decay of cambium layer at base of tree, and limited terminal leader growth in upper branches (Miller et al. 2005).

ii. Where ground vegetation is sparse, leave felled juniper in sufficient quantities to promote reestablishment of vegetation and prevent erosion.

iii. If seeding is a part of the action, consider whether seeding would be most appropriate before or after juniper treatment.

iv. Where appropriate, move cut juniper stems into the stream channel and floodplain to provide aquatic benefits. Juniper can be felled or placed into the stream to promote channel aggradation as long as such actions do not obstruct fish movement, cover spawning gravels of ESA-listed fish or increase width to depth ratios.

v. When using feller-buncher and slash-buster equipment, operate equipment in a manner that minimizes soil compaction and disturbance to soils and desired native vegetation to the greatest degree possible. Equipment exclusion areas (buffer area along stream channels) should be as wide as the feller-buncher or slash-buster arm.

vi. If other aquatic restoration activities included in this BO are used as complementary actions, follow the associated PDCs and CMs.

vii. Excluded Activities – The following activities are not included in this BO: Placement of juniper in streams where the action will preclude the stream from attaining its natural sinuosity.

c) Maximum Removal & Fill Estimates

i. Project Extent: One project is equal to juniper thinning along ½ mile of stream where felled junipers are placed in the stream channel and floodplain associated wetlands.

ii. No more than 300 trees shall be placed below OHW or in wetlands,

iii. If other aquatic restoration activities covered by the RGP are used as complementary actions, follow the associated design criteria and fill and removal limits.