Checklist signature page

Specific Resource Project Design Criteria for Resource Protection and Forest Plan Compliance

Summit and Bosenberg subwatersheds aquatic restoration projects - 2017 only
Malheur River & aspen restoration

Project Number: 0301-2017 **Date:** 12/1/16 **Location:** see implementation plan
Category 2: Large wood, Boulder, and Gravel placement
Category 13: Riparian Vegetation Treatment Restoration
Category 14: Riparian Vegetation Planting
Project Description: aspen restoration and large wood in Malheur River. See implementation plan for additional information

Heritage

Y	N	Initial	
☑	☐	DEJ	Specific PDC for Heritage addressed (Heritage Surveys; Avoidance areas)

Botany

Y	N	Initial	
☒	☐		Specific PDC for Botany addressed (Sensitive Plant Surveys)
☒	☐		Specific PDC for Noxious Weeds addressed

Land Management Consistency (applicable)

Y	N	Initial		Y	N	Initial	
☐	☒		4A Big Game Winter Range	☐	☒		9 Research Natural Area
☐	☒		6A/6B Wilderness	☒	☐		10 Semi-Primitive Non-Motorized Rec Areas
☐	☒		7 Scenic Area	☒	☐		22/22A Wild and Scenic River
☐	☒		8 Special Interest Areas	☐	☒		Inventoried Roadless Areas

Comments:

Project Design Criteria and Forest Plan compliance checklist

I have reviewed this project and have determined it is within the Project Design Criterial identified for my resource.

Resource	Signature	Date	Comments
Heritage		2/2/17	FOLLOW PDC'S OUTLINED IN THIS REPORT. NO GROUND DISTURBING ACTIVITIES WITHOUT CONCURRENCE FROM SHPO
Botany	Joe Rensch for A. Hardman	2/2/17	Have botanist conduct pre-implementation surveys
Wildlife		1/25/17	No wildlife concerns, follow outlined PDCs as available
Fish*		1/31/17	
Hydrology*		1/31/17	Follow PDCs - benefit to streams, floodplains & watersheds
Range		2/2/17	
Soils	Robert L. McNeil	2-16-17	M. OWENS SAYS AREAS W/ HEAVY EQUIPMENT DO NOT HAVE HEAVY EXISTING IMPACTS → NO SIGNIF. CUMUL. IMPACT
Recreation	Shannon Wingate	1/31/17	No effect to Recreation Resource
Lands and Special Uses/ MINERALS	Skimbell	2/15/17	Corridors 345 identified with Project vicinity.
	Hammond	2/15/17	No mine claims, no paleontology present
Engineering		2/24/17	Follow Road Rules & Maintenance Level 3 on Equipment on Roads.
Fuels/Fire		2/2/17	See attached PDC's
Sivilculture		1/31/17	Following PDCs

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

Line Officer Signature: _____ Date: 2/22/17
District Ranger, Prairie City

Attachments:
- Proposed Action
- Program Administration
- General Aquatic Conservation Measures
- Applicable Project Design Criteria

Implementation Description:

Summit and Bosenberg subwatersheds aquatic restoration projects 2017 only (Malheur River and aspen restoration)

Category 2 – Large Wood, Boulder, and Gravel Category 13 – Riparian Vegetation Treatment restoration Category 14 – Riparian Vegetation Planting	Lead Preparer: Hazel Owens/ Kate Olsen
Applicant: Prairie City Aquatics	NEPA Reference: Decision notice for Aquatic Restoration Project
Location: See **Table 1** below for project specific location information. See also Figure 1 below for project area general location within the forest	Lease/ /Case File/ Serial #: na (Reference #):na
Begin Date: 06/01/2017	Due Date: **Checklist for each implementation year to be signed by April 15 to ensure implementation during the field season (June-September)**

Purpose/Need:

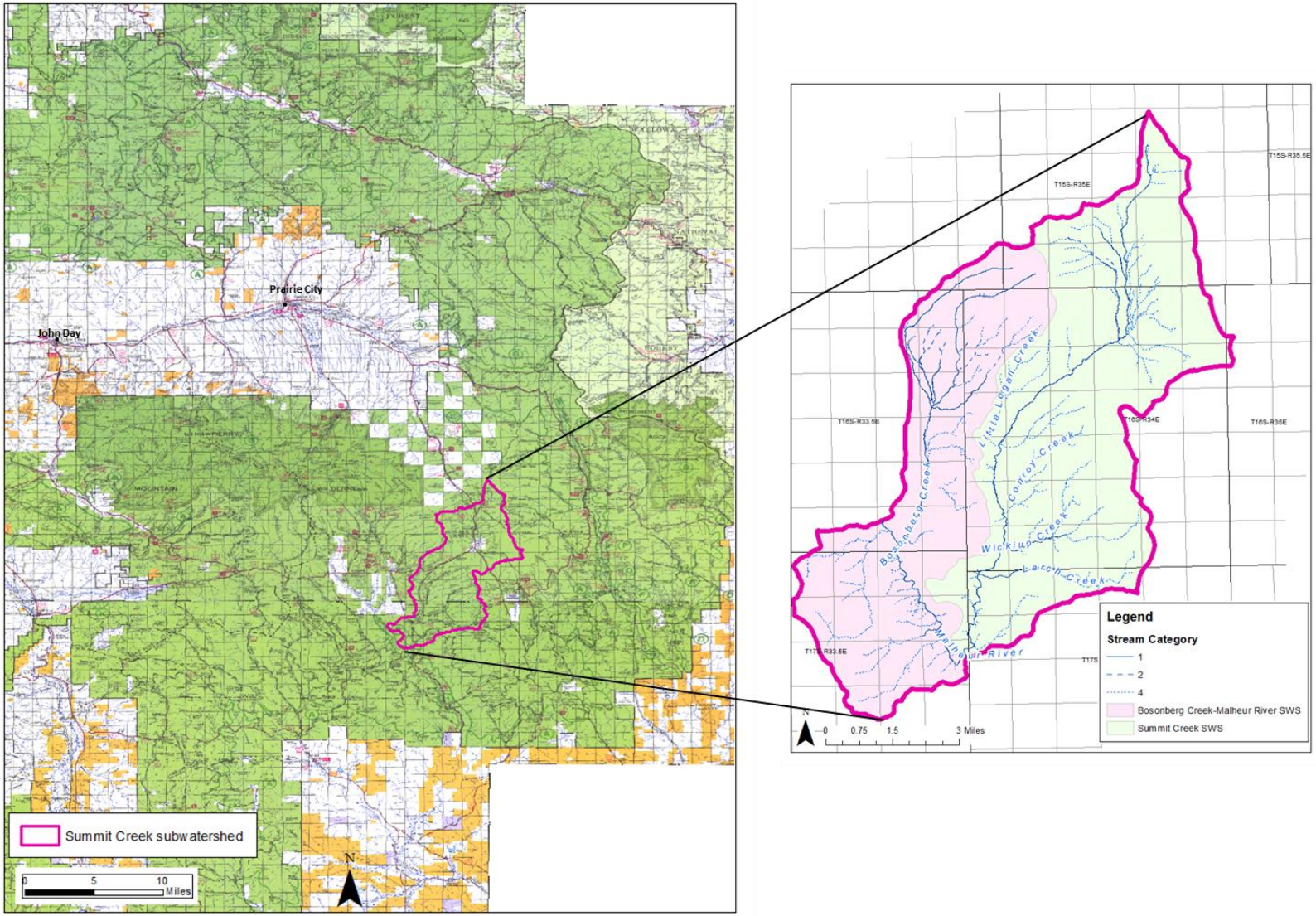
Please refer to the Aquatic Restoration EA[1] for the Purpose and Need of these actions.

Location:

[1] The Aquatic Restoration EA is available online at http://www.fs.usda.gov/detailfull/malheur/landmanagement/?cid=STELPRD3817723&width=full

These projects are located in the Summit Creek (HUC 170501160104) and Bosenberg Creek-Malheur River (170501160103) subwatershed in the Headwaters Malheur River watershed (1705011601). See Figure 1 for subwatershed location within the Malheur National Forest. See maps and tables below for location information by specific project. This implementation plan is part of a larger document with a landscape-level approach to aquatic restoration. This implementation plan is associated with checklist 0301-2017 and includes only aspen restoration and large wood restoration on the Malheur River that are ready for implementation in 2017.

Figure 1. subwatershed locations within the Malheur National Forest.

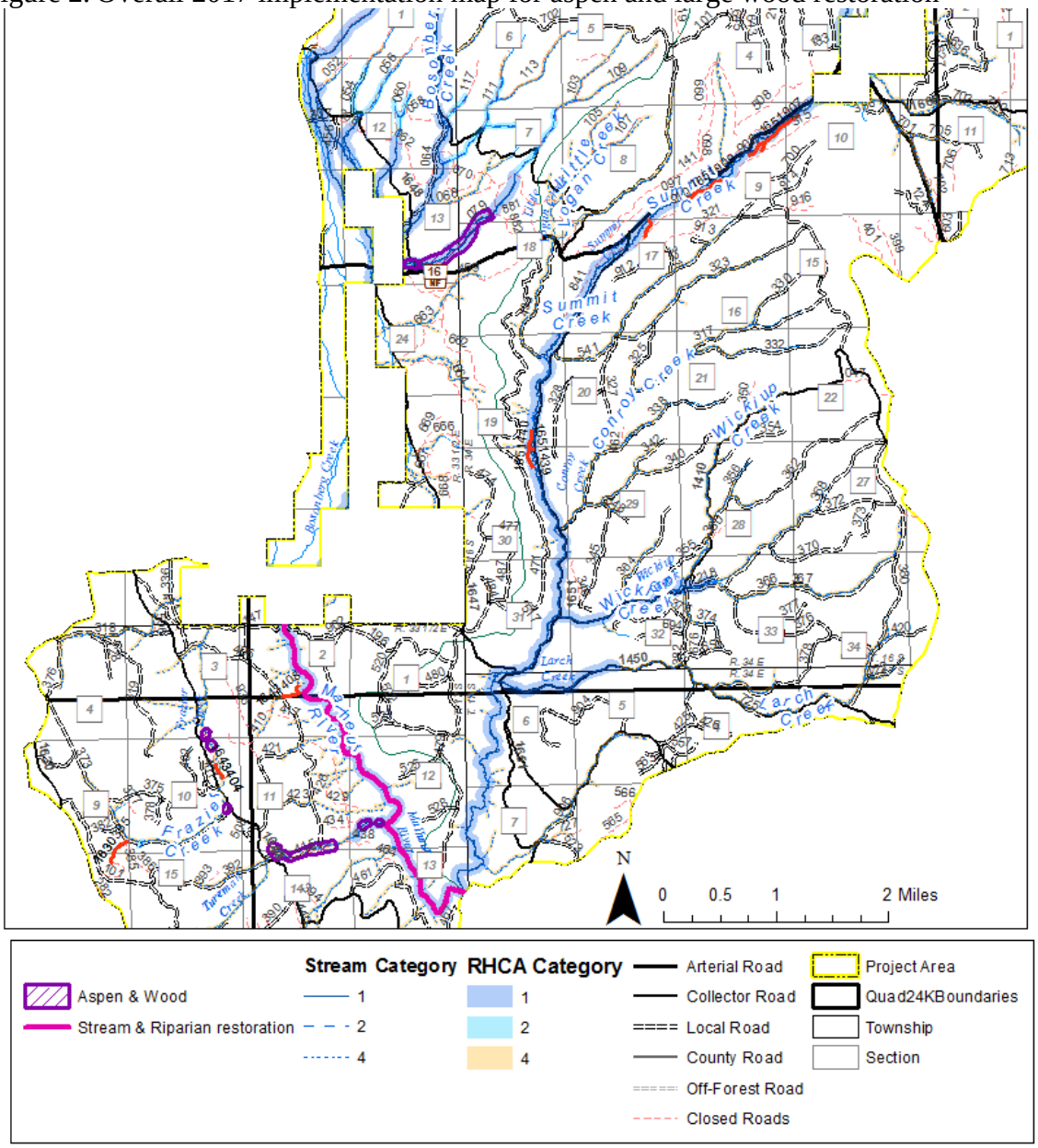


Implementation Plan by Project Type

Table 1: Project type, location, and activity category for each project

Project Type	Location(s)	Activity Categories	Checklist ID
Stream and riparian restoration (aka large wood projects)	▪ Malheur River	▪ Category 2 – Large Wood, Boulder, and Gravel ▪ Category 13 – Riparian Vegetation Treatment restoration ▪ Category 14 – Riparian Vegetation Planting	0301-2017
Aspen restoration and large wood supply	▪ Wickiup Creek ▪ Larch Creek ▪ Unnamed tributary to Bosenberg Creek ▪ Frazier Creek ▪ Tureman Creek	▪ Category 2 – Large Wood, Boulder, and Gravel ▪ Category 13 – Riparian Vegetation Treatment restoration	0301-2017

Figure 2. Overall 2017 implementation map for aspen and large wood restoration



Land Use Plan Conformance:

These projects fall under Management Area (MA) 3A "Non-Anadromous Riparian Areas" of the Malheur National Forest Land and Resource Management Plan (LRMP; USDA Forest Service, 1990). All projects are also within the RHCA as designated by PACFISH/INFISH. RHCA categories may vary by project, but include category 1, 2, 3, and 4. Some streams (e.g. Bosenberg Creek and Malheur River) are also listed as designated critical habitat for bull trout by the USFWS (US Fish and Wildlife Service).

Management areas adjacent to the RHCA are Fore-Ground Visual Corridor, General Forest- Rangeland, and Middle Ground Visual Corridor Land and resource management goals as it pertains to the projects listed in this implementation plan are listed below.

See Tables 2-7 for land use management designations for each specific project.

Land and Resources Management Plan Goals (USDA 1990):

MA1- General Forest

Emphasize timber production on a sustained yield basis while providing for other resources and values. Develop equal distribution of age classes to optimize sustained timber production. Manage at levels and intensities consist with the schedules described in this Plan to provide for other multiple uses and resources.

MA2- Rangeland

Emphasize forage production on nonforested areas on a sustained yield basis while providing for other resources and values.

MA3A- Non-Anadromous Riparian Areas

Manage riparian areas to protect and enhance their value for wildlife, anadromous fish habitat and water quality. Manage timber, grazing, and recreation to give preferential consideration to anadromous fish on that portion of the management area "suitable" for timber management, grazing, or recreation. Design and conduct management in all riparian areas to maintain or improve water quality and beneficial uses.

MA14- Visual Corridors

Manage viewshed corridors with primary consideration given to their scenic quality and the growth of large diameter trees. Visual quality objectives of retention, partial retention, and modification will be applied while providing for other uses and resources.

MA22B-Wild and Scenic River-

Tipping as a restoration tool is consistent with the Wild and Scenic river plan as it looks more natural than cut stumps and meets the objectives to restore stands towards pre-historic conditions. Post-tipping repair will

emphasize a natural appearance to fit with outstanding visual and semi-primitive values in the corridor. Other outstanding value of the scenic portion of the WSR corridor are wildlife habitat, large pine trees, and designated old growth. Identification of trees for tipping will happen in coordination with a wildlife biologist to ensure that these outstanding values are protected. This project is consistent with the outstanding values of fisheries and fishing recreation as it enhances stream habitat for redband trout and bull trout.

In regards to the General Forest- Rangeland Management Areas, (MA1 and MA2), this restoration is management that will directly "provide for other multiple uses and resources" through the improvement of areas adjacent to riparian habitat. Resources that will benefit from this management will include improved habitat for fish and wildlife and improved ecosystem services.

For Visual Corridor Management Areas (MA14) restoration projects will retain a roadside tree buffer and treatments would retain the natural character of the meadow system by using untreated materials and mimicking naturally-occurring meadow features (beaver dams, wood structures).

For Non-anadromous Riparian Areas (MA3A) these actions will allow the Forest Service to directly "manage riparian areas to protect and enhance their value" as well as "maintain or improve water quality and beneficial uses".

Stream and riparian restoration projects (large wood)

Stream and riparian restoration includes the following activity categories:

- Category 2 – Large Wood, Boulder, and Gravel
- Category 13 – Riparian Vegetation Treatment restoration
- Category 14 – Riparian Vegetation Planting

Table 2: Site-specific project description for stream and riparian restoration projects and year that implementation is scheduled to begin

Project description	Project Location	TR Location	USGS quad	Land Use Plan Conformance	Year
▪ Tip trees from within and/or outside the RHCA (wild and scenic river corridor) using heavy equipment (e.g. excavator, feller buncher, etc.). ▪ Trees for tipping would come from the bench outside the floodplain and steep canyon walls. Target trees would be 15”-24” dbh. The majority (80%) of trees would be 18”-21” dbh. ▪ Additional trees would come from aspen stands (see aspen restoration below) ▪ Up to 120 trees per stream mile would be tipped to meet forest plan standards for large wood; tipping would selectively thin around the largest, healthiest trees and may create small openings (less than ¼ acre, spaced at least 1/2 mile apart) outside the primary shade zone ▪ Add tipped trees to the channel using a	Malheur River	T.17S, R.33 1/2E, *Sections 2, 11, 12, 13	Logan Valley East (B544118) & Dollar Basin (A544118)	*Within:* Wild and Scenic River (scenic designation), Category 1 RHCA, MA3A *Adjacent to:* MA14	**2017

Project description	Project Location	TR Location	USGS quad	Land Use Plan Conformance	Year
helicopter. ▪ plant/seed riparian hardwoods (aspen, willow, cottonwood, dogwood, alder) ▪ protect hardwoods with caging, fencing, and/or shrouding					

*Includes part of section where creek/river(s) runs through

**Implementation year denotes the year that implementation is anticipated to begin. Start year may vary based on funding. Some projects may not be completed in one year.

Desired Conditions

Malheur River is critical habitat for bull trout. While the specific channel dimensions, riparian hardwood species composition, elevation, aspect, etc. of each stream may vary, the general desired conditions for each stream are the same. The general desired conditions for these fish-bearing streams are described below:

- A riparian area with vigorous and abundant hardwood communities (including a diversity of willows, dogwoods, aspen, cottonwood, and/or alder) to provide forage and habitat for a variety of wildlife species, to increase shade, bank stabilization, and habitat complexity within the stream, and to deliver leafy material to the stream to support aquatic food webs. The floodplain would also contain a variety of hydric graminoids (sedges, rushes, grasses, etc.) with rooting zones that store water and stabilize the floodplain during high flow events. The width of the desired vegetation corridor would extend to the floodprone width of the floodplain (to the toe slope or base of an abandoned terrace).

- A floodplain with maximum capacity to store water for slow release through the dry season. Water table elevations would approach the ground surface elevation of the floodplain for the majority of the dry season, except at naturally occurring high spots, mounds, and abandoned terraces. Stream channels would have floodplain connectivity during high flows to allow inundation of the floodplain for sediment and nutrient deposition and energy dissipation.

- Fish habitat to support all life stages of native fish species, particularly bull trout (threatened under the ESA [endangered species act]) and increase the competitive advantage of bull trout over invasive brook trout. The stream channel would be a Rosgen C or E type channel with deep pools and channel complexity (containing wood, shrub roots, undercut banks, etc.) for hiding cover and forage.

- Water quality would be high; the channel would be shaded by shrubs, stream temperatures would be suitable for bull trout spawning and rearing (9 ºC), and fine sediment would be stored on the channel margin and outside of sensitive spawning areas. Spawning gravels would be abundant and channels would have low width /depth ratios (below 10; USDA Forest Service, 1990).

- Habitat to support the natural expansion and reintroduction of beaver throughout the Summit and Bosenberg subwatersheds. Evidence of present or historic beaver activity has been observed throughout the entire watershed and within the streams listed above. Beaver are a keystone species defined as "a plant or animal that plays a unique and crucial role in the way an ecosystem functions. Without keystone species, the ecosystem would be dramatically different or cease to exist altogether" (*education.nationalgeographic.org/encyclopedia/**keystone-species**/)* The recovery of active beaver within these streams would provide long term maintenance of these habitats to support hardwood riparian communities, fish and wildlife diversity, and store cool water in the floodplain.

Implementation plan

To attain the desired conditions, the USFS is proposing the following actions:

1) Malheur River -

Channel, floodplain, and riparian restoration would include the following activities:

Channel, floodplain, and riparian restoration would include the following activities:

- Large wood augmentation- large wood would be placed into the channel and onto the floodplain. Wood would be placed into the channel as complex wood structures (assemblage of small and/or large wood) or individual pieces to dissipate energy and capture sediment. Large structures would be created just downstream of tributary junctions to simulate the natural recruitment of wood jams at tributary junctions and to tie into the geomorphic pinch points at those locations. Smaller wood structures and individual pieces would also be created near side channels to encourage connectivity between the mainstem and side channels during high flow events. Structures (of variable sizes) would occur ***up to*** 50 feet apart along the stream channel.

- Source of large wood- The majority of large wood would come from nearby aspen stands (see aspen restoration below) or from the bench within the RHCA and Wild and Scenic River corridors for the Malheur River. This large wood would be tipped using heavy equipment and flown in to the structure sites using a helicopter. Heavy equipment may access the floodplain at the uppermost reach to source local trees and place them in the river.

  Tree tipping in the WSR corridor will thin around the large, healthy pines and provide ecological restoration in overstocked pine stands. Tipping will move the stands toward open park-like pine stands by removing conifers within twice the canopy dripline of large, healthy pines. Some small gaps, less than 1 acre in size may occur to provide stand heterogeneity and to enhance helicopter ingress/egress and safety. The entirety of the Malheur river project would occur in 2 phases, with approximately 350 trees being utilized per phase. On average, 3-20 conifers per acre are expected to be tipped from upland stands in the WSR corridor. For more information regarding tipping and felling in aspen stands, see ‘aspen restoration’ below.

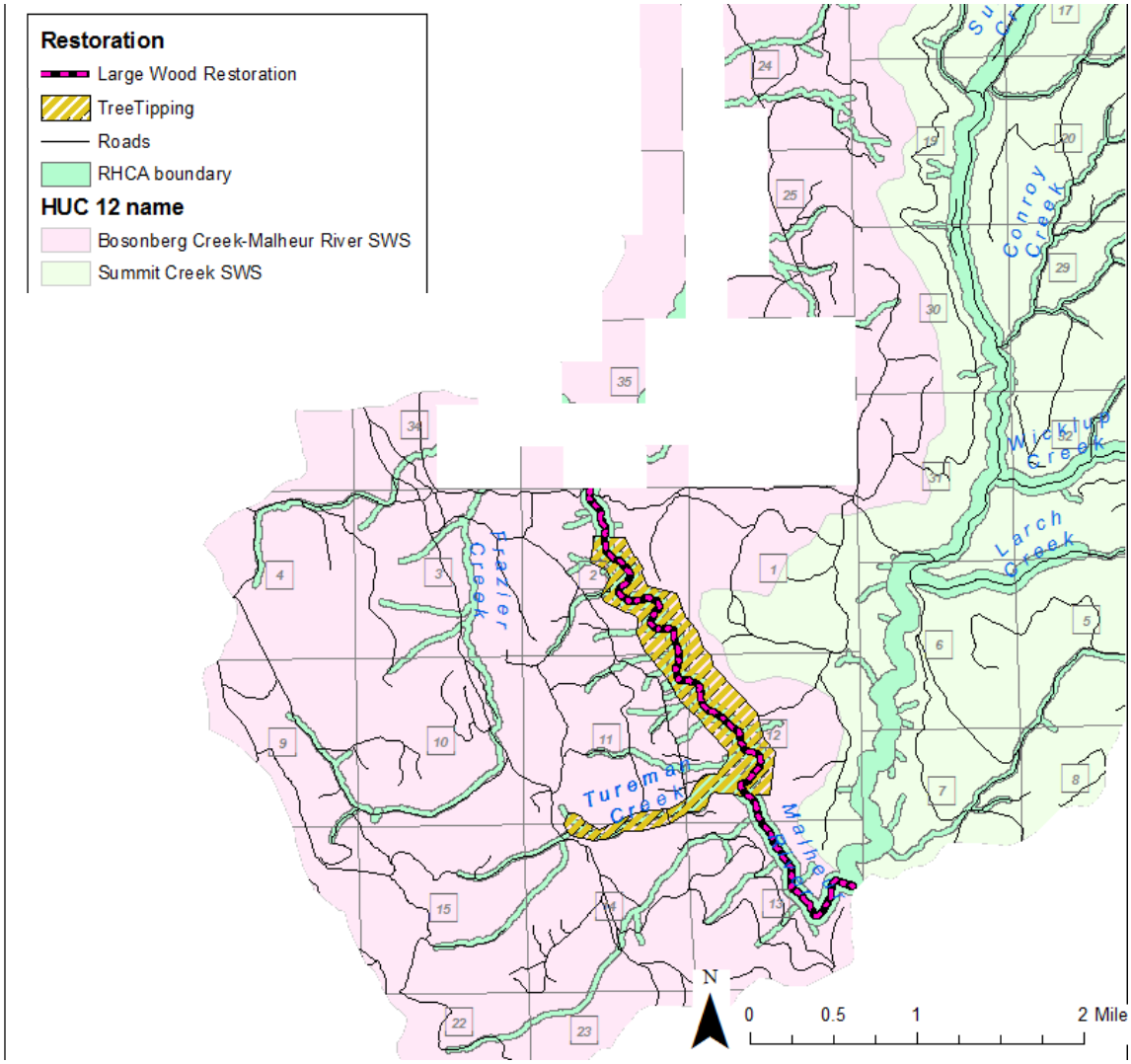
  Where heavy equipment can access the floodplain, materials may be sourced from the floodplain and toe-slope. In this case, larger trees would be tipped and smaller trees may be tipped or felled. Both sizes would be carried or dragged to the channel or floodplain using a skidder or excavator and placed into the channel.

Dynamite may also be used to add large trees, boulders, and soil to the river from the toe-slope on steep areas along the streambank. A Griphoist (winch system that can be used for individual trees) may also be utilized in locations where heavy equipment, helicopter, and dynamite is not appropriate.

- Riparian hardwood planting – The majority of planting would occur in the northernmost section of the river before the canyon restricts floodplain width. Aspen, willow, dogwood, cottonwood, and/or alder would be planted or seeded to move riparian areas toward site potential vegetation (ODEQ, 2010). Hardwoods would be planted by hand or with machinery within the floodplain. Cuttings will be locally sourced or imported from facilities equipped to produce species and drainage- specific clones (e.g. Burns FFA, USFS nursery at Clarno, etc.)

- Riparian hardwood protection- Felled conifers and slash material may be used as a natural barrier, where appropriate, to reduce access by wildlife. Exclosure fencing (including cages or temporary fence paneling) may also be used if felled trees provided insufficient protection.

Additional Map:



Aspen and large wood projects

Stream and riparian restoration includes the following activity categories:

- Category 2 – Large Wood, Boulder, and Gravel
- Category 13 – Riparian Vegetation Treatment restoration

Table 3: Site-specific project description for stream and riparian restoration projects and year that implementation is scheduled to begin

Project description	Project Location	TR Location	USGS quad	Land Use Plan Conformance	Year
▪ thinning understory conifers from the riparian aspen stand using chainsaws and/or heavy equipment ▪ adding large and coarse wood to the channel by placing with an excavator, hand-felling, or directional felling ▪ trees would be tipped using an excavator, staged, and transported for use in restoration on the Malheur River (or other streams as needed) ▪ prescribed burning ▪ planting/seeding riparian hardwoods (e.g. aspen) by hand ▪ protecting hardwoods and aspen with caging, fencing and/or shrouding	Wickiup Creek (including Wickiup meadow)	T.16S, R.34E, *Sections 31, 32, 33	Logan Valley East (B544118)	*Within*: Category 1 RHCA, MA3A *Adjacent to:* MA14	**2017
	Larch Creek	T.17S, R.34E, *Sections 3, 4, 5, 6	Logan Valley East (B544118)	*Within*: Category 1 & 4 RHCA, MA3A *Adjacent to:* MA1, MA14	**2017
	Unnamed tributary to Bosenberg Creek (unofficial name, Filbert Creek)	T.16S, R.33 1/2E, *Sections 13 & T.16S, R.34E, *Sections 7, 18	Logan Valley East (B544118)	*Within*: Category 1 RHCA, MA3A *Adjacent to:* MA1 & MA14	**2017
	Frazier Creek	T.17S, R.33 1/2E, *Section 10	Dollar Basin (A544118)	*Within*: Category 4 RHCA, MA3A *Adjacent to:* MA1	**2017

Project description	Project Location	TR Location	USGS quad	Land Use Plan Conformance	Year
	Tureman Creek	T.17S, R.33 1/2E, *Section 10	Dollar Basin (A544118)	*Within*: Category 4 RHCA, MA3A *Adjacent to:* MA1	**2017

*Includes part of section where creek/river(s) runs through
**Implementation year denotes the year that implementation is anticipated to begin. Start year may vary based on funding. Some projects may not be completed in one year.

Desired Conditions

The general desired conditions for these streams are described below:

- A riparian area with vigorous aspen and/or other hardwood communities (willows, dogwoods, and alder) to provide forage and habitat for a variety of wildlife species, to increase shade, bank stabilization, and habitat complexity within the stream, and to deliver leafy material to the stream to support aquatic food webs. The floodplain would also contain a variety of hydric graminoids (sedges, rushes, grasses, etc.) with rooting zones that store water and stabilize the floodplain during high flow events. The width of the desired vegetation corridor would extend to the floodprone width of the floodplain (to the toe slope or base of an abandoned terrace).

- A floodplain with maximum capacity to store water for slow release through the dry season. Water table elevations would approach the ground surface elevation of the floodplain for the majority of the dry season, except at naturally occurring high spots, mounds, and abandoned terraces. Stream channels would have floodplain connectivity during high flows to allow inundation of the floodplain for sediment and nutrient deposition and energy dissipation.

- Fish habitat to support all life stages of native fish species, particularly bull trout (threatened under the ESA [endangered species act]) and increase the competitive advantage of bull trout over invasive brook trout. The stream channel would be a Rosgen C or E type channel with deep pools and channel complexity (containing wood, shrub roots, undercut banks, etc.) for hiding cover and forage.

- Water quality would be high; the channel would be shaded by shrubs, stream temperatures would be suitable for bull trout spawning and rearing (9 ºC), and fine sediment would be stored on the channel margin and outside of sensitive spawning areas. Spawning gravels would be abundant and channels would have low width /depth ratios (below 10; USDA Forest Service, 1990).

- Habitat to support the natural expansion and reintroduction of beaver throughout the Summit and Bosenberg subwatersheds. Beaver are a keystone species defined as "a plant or animal that plays a unique and crucial role in the way an ecosystem functions. Without keystone species, the ecosystem would be dramatically different or cease to exist altogether" (*education.nationalgeographic.org/encyclopedia/**keystone-species**/)* The recovery of active beaver within these streams would provide long term maintenance of these habitats to support hardwood riparian communities, fish and wildlife, and store cool water in the floodplain.

Implementation plan

To attain the desired conditions, the USFS is proposing the following actions:

2) ***Wickiup Creek (including Wickiup meadow), lower reaches of Larch Creek, Frazier Creek, Tureman Creek, and unnamed tributary to Bosenberg Creek–***

Channel, floodplain, aspen, and riparian restoration would include the following activities:

- Felling and tipping– The goal of this action is to remove/reduce trees that have encroached onto the floodplain in the absence of wildfire, enhance aspen stands, and utilize a local source for in-stream wood. The encroachment of conifers have contributed to a de-watered floodplain, declining aspen stand, and incised channel. Trees located on the floodplain or from the nearby hillslope on either side of the stream would be utilized. This activity would occur through a combination of heavy equipment and hand-falling with a chainsaw. Smaller trees would be felled by hand using chainsaws and carried or dragged to the channel or floodplain by hand. Larger trees may be tipped or directionally felled towards the channel. An excavator may also carry large trees and place them in the channel.

    - Many large trees would be tipped and staged near the road for transporting to the Malheur River for restoration. Excavators would only be utilized where appropriate based on soil moistures, plant species, and/or heritage resources.

- Large wood augmentation- the tipped/felled small and large wood (from *felling and tipping* above) would be placed or directionally felled into the channel and onto the floodplain. Materials will be sourced locally, from the floodplain or hillslope. Wood would be placed into the channel as complex wood structures (assemblage of small and/or large wood) or individual pieces to dissipate energy and capture sediment. The majority of wood structures would be smaller (not requiring the use of heavy machinery). Wood structures and individual pieces would also be created near side channels to encourage connectivity between the mainstem and side channels during high flow events. Structures (of variable sizes) would occur ***up to*** 50 feet apart along the stream channel.

- Prescribed burning – In order to stimulate natural aspen and other hardwood regeneration, as well as reducing conifer shading and sapling competition, a moderate severity burn of the stand will be initiated the following season.

- Riparian hardwood planting – aspen, willow, dogwood, cottonwood, and/or alder may be planted to move riparian areas toward site potential vegetation (ODEQ, 2010). Hardwoods would be planted by hand (and potentially with machinery) within the floodplain. Cuttings will be locally sourced or imported from facilities equipped to produce species and drainage- specific clones (e.g. Burns FFA, USFS nursery at Clarno, etc.

- Riparian hardwood protection- Exclosure fencing (including cages or temporary fence) may be utilized to protect aspen stands from ungulate browse. Felled

conifers and slash material may also be used as a natural barrier, where appropriate based on fuels and other factors. \

Appendices to the Aquatic Restoration EA Implementation Description

Project Title: Summit and Bosenberg subwatersheds aquatic restoration
Project Number: 0301-2017

Category 2 – Large Wood, Boulder, and Gravel
Category 13 – Riparian Vegetation Treatment restoration
Category 14 – Riparian Vegetation Planting

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

Program Administration

1. Integration of project design criteria and conservation measures and terms and conditions into project design and contract language
    a. This document is to outline the conservation measures and PDCs that will be used during project implementation to remain compliant with the aquatic restoration BA as well as ARBO II.
2. Project notification: The following information will be provided to the NMFS Level 1 Aquatics members 30 days prior to implementation as a Project Notification Form 7.
    a. Action identifier- 03012017
    b. Project name- Summit and Bosenberg subwatersheds aquatic restoration
    c. Location-

Project	Summit and Bosenberg subwatershed Restoration projects 2017 Malheur River and aspen restoration
Stream Name	Malheur River, Bosenberg tributaries, and Summit Tributaries
6th field HUC	170501160104 & 170501160103
Latitude (Decimal Degrees)	Varies widely, see maps and information above
Longitude (Decimal Degrees)	Varies widely, see maps and information above

    d. Agency contact- PCRD Aquatics
    e. Timing- Work is expected to occur from 2017-2019, with in-stream work happening on perennial streams between July 1 to August 30

f. Activity category-
   Category 2 – Large Wood, Boulder, and Gravel
   Category 13 – Riparian Vegetation Treatment restoration
   Category 14 – Riparian Vegetation Planting
g. Project description- Project description is available in the Implementation Description under the section "Implementation Plan" above.
h. Extent- Work will occur throughout multiple creeks and riparian areas in the Upper Headwaters Malheur River watershed in the Middle Snake-Boise basin.
i. Species affected-
   i. Listed species: bull trout
   ii. Critical Habitat: within critical habitat for bull trout
   iii. MIS Species: redband trout, Columbia spotted frog
j. Date of submittal- To be completed in 2017-2019, at least 30 day prior to implementation
k. Site assessments- Assessment for contaminants will be considered on a case-by-case basis if more than 20 yards of road fill is moved
l. Review- NMFS fish passage review and Restoration Review Team review are not required.
m. Verification- _____
n. SOD project notification- _____

3. Minor Variance: No variances from the criteria specified in the aquatic restoration document are being considered.
4. NMFS Fish Passage Review and Approval: This will occur on a project by project basis as required.
5. Restoration Review Team: This work does not require review by the restoration review team.
6. Project Completion Report: To be completed after implementation. This project will be completed within three years of implementation initiation.
7. Annual Program Report: annual reporting will occur in the winter of the fiscal year after work was done before February 15th and occur annually until project completion.

Project Design Criteria

General Aquatic Conservation Measures

8. Technical Skill and Planning Requirements:
    a. An appropriately qualified fisheries biologist or hydrologist will be involved in the design of this project.
    b. The scope of this project is limited in both space and context. Field evaluations and site-specific surveys will require little work. Appropriate time will be allotted for these actions, prior to implementation. Planning and design will involve appropriate expertise.
    c. The assigned fisheries biologist or hydrologist will make sure that any applicable conservation measures and project design criteria are met through the contracting process.
9. Climate Change: Although individual activities only affect small areas of the watershed, the impacts of this work as a whole will improve restistance and resilience of the system and biota to climate change through cold-water storage, enhanced biodiversity and improved habitat.
10. In-Water Work Period: In-stream activities will occur between July 1 and August 30, and work occurring outside the high flow elevation can occur outside of this window.
11. Fish passage: Fish passage will be addressed on a case-by-case basis depending on the actions within a specific checklist.
12. Site Assessment For Contaminants: In developed or previously developed sites, such as areas with past dredge mines, or sites with known or suspected contamination, a site assessment for contaminants will be conducted on projects that involve excavation of >20 cubic yards of material. The action agencies will complete a site assessment to identify the type, quantity, and extent of any potential contamination. The level of detail and resources committed to such an assessment will be commensurate with the level and type of past or current development at the site. The assessment may include the following:
    a. Review of readily available records, such as former site use, building plans, records of any prior contamination events.
    b. Site visit to observe the areas used for various industrial processes and the condition of the property.
    c. Interviews with knowledgeable people, such as site owners, operators, occupants, neighbors, local government officials, etc.
    d. Report that
13. Pollution and Erosion Control Measures: Implement the following pollution and erosion control measures:
    a. Project Contact: Identify a project contact (name, phone number, an address) that will be responsible for implementing pollution and erosion control measures.
    b. List and describe any hazardous material that would be used at the project site, including procedures for inventory, storage, handling, and monitoring; notification procedures; specific clean-up and disposal instructions for different products available on the site; proposed methods

for disposal of spilled material; and employee training for spill containment.

c. Temporarily store any waste liquids generated at the staging areas under cover on an impervious surface, such as tarpaulins, until such time they can be properly transported to and treated at an approved facility for treatment of hazardous materials.
d. Procedures based on best management practices to confine, remove, and dispose of construction waste, including every type of debris, discharge water, concrete, cement, grout, washout facility, welding slag, petroleum product, or other hazardous materials generated, used, or stored on-site.
e. Procedures to contain and control a spill of any hazardous material generated, used or stored on-site, including notification of proper authorities. Ensure that materials for emergency erosion and hazardous materials control are onsite (e.g., silt fence, straw bales, oil-absorbing floating boom whenever surface water is present).
f. Best management practices to confine vegetation and soil disturbance to the minimum area, and minimum length of time, as necessary to complete the action, and otherwise prevent or minimize erosion associated with the action area.
g. No uncured concrete or form materials will be allowed to enter the active stream channel.
h. Steps to cease work under high flows, except for efforts to avoid or minimize resource damage.

14. Site Preparation
    a. Flagging sensitive areas –Prior to construction, clearly mark critical riparian vegetation areas, wetlands, and other sensitive sites to minimize ground disturbance.
    b. Staging area –Establish staging areas for storage of vehicles, equipment, and fuels to minimize erosion into or contamination of streams and floodplains.
        i. No Topographical Restrictions –place staging area 150 feet or more from any natural water body or wetland in areas where topography does not restrict such a distance.
        ii. Topographical Restrictions –place staging area away from any natural water body or wetland to the greatest extent possible in areas with high topographical restriction, such as constricted valley types.
    c. Temporary erosion controls –Place sediment barriers prior to construction around sites where significant levels of erosion may enter the stream directly or through road ditches. Temporary erosion controls will be in place before any significant alteration of the action site and will be removed once the site has been stabilized following construction activities.
    d. Stockpile materials –Minimize clearing and grubbing activities when preparing staging, project, and or stockpile areas. Any large wood, topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration. Materials used for implementation of

aquatic restoration categories (e.g., large wood, boulders, fencing material) may be staged within the 100-year floodplain.

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

15. Heavy Equipment Use
    a. Choice of equipment – Heavy equipment will be commensurate with the project and operated in a manner that minimizes adverse effects to the environment (e.g., minimally-sized, low pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).
    b. Fueling and cleaning and inspection for petroleum products and invasive weeds
        i. All equipment used for instream work will be cleaned for petroleum accumulations, dirt, plant material (to prevent the spread of noxious weeds), and leaks repaired prior to entering the project area. Such equipment includes large machinery, stationary power equipment (e.g., generators, canes), and gas-powered equipment with tanks larger than five gallons.
        ii. Store and fuel equipment in staging areas after daily use.
        iii. Inspect daily for fluid leaks before leaving the vehicle staging area for operation.
        iv. Thoroughly clean equipment before operation below ordinary high water or within 50 feet of any natural water body or areas that drain directly to streams or wetlands and as often as necessary during operation to remain grease free.
    c. Temporary access roads – Existing roadways will be used whenever possible. Minimize the number of temporary access roads and travel paths to lessen soil disturbance and compaction and impacts to vegetation. Temporary access roads will not be built on slopes where grade, soil, or other features suggest a likelihood of excessive erosion or failure. When necessary, temporary access roads will be obliterated or revegetated. Temporary roads in wet or flooded areas will be restored by the end of the applicable in-water work period. Construction of new permanent roads is not permitted.
    d. Stream crossings – Minimize number and length of stream crossings. Such crossings will be at right angles and avoid potential spawning areas to the greatest extent possible. Stream crossings shall not increase the risk of channel re-routing at low and high water conditions. After project completion, temporary stream
    e. Work from top of bank – To the extent feasible, heavy equipment will work from the top of the bank, unless work instream would result in less damage to the aquatic ecosystem.
    f. Timely completion – Minimize time in which heavy equipment is in stream channels, riparian areas, and wetlands. Complete earthwork

(including drilling, excavation, dredging, filling and compacting) as quickly as possible. During excavation, stockpile native streambed materials above the bankfull elevation, where it cannot reenter the stream, for later use.

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

17. Monitoring

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

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

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

c. Post project – A post-project review shall be conducted after winter and spring high flows.
    i. For each project, conduct a walk through/visual observation to determine if there are post-project affects that were not considered during consultation. For fish passage and revegetation projects, monitor in the following manner:
    ii. Fish Passage Projects – Note any problems with channel scour or bedload deposition, substrate, discontinuous flow, vegetation establishment, or invasive plant infestation.
    iii. Revegetation – For all plant treatment projects, including site restoration, monitor for and remove invasive plants until native plants become established.
    iv. In cases where remedial action is required, such actions are permitted without additional consultation if they use relevant PDC and aquatic conservation measures and the effects of the action categories are not exceeded.

18. Work Area Isolation, Surface Water Withdrawals, and Fish Capture and Release – Isolate the construction area and remove fish from a project site for projects that include concentrated and major excavation at a single location within the stream channel. This condition will typically apply to the following aquatic restoration categories: Fish Passage Restoration; Dam, Tidegate, and Legacy Structure Removal; Channel Reconstruction/Relocation.
    a. Isolate capture area – Install block nets at up and downstream locations outside of the construction zone to exclude fish from entering the project area. Leave nets secured to the stream channel bed and banks until construction activities within the stream channel are complete. If block nets or traps remain in place more than one day, monitor the nets and or traps at least on a daily basis to ensure they are secured to the banks and free of organic accumulation and to minimize fish predation in the trap.
    b. Capture and release – Fish trapped within the isolated work area will be captured and released as prudent to minimize the risk of injury, then released at a safe release site, preferably upstream of the isolated reach in a pool or other area that provides cover and flow refuge. Collect fish in the best manner to minimize potential stranding and stress by seine or dip nets as the area is slowly dewatered, baited minnow traps placed overnight, or electrofishing (if other options are ineffective). Fish must be handled with extreme care and kept in water the maximum extent possible during transfer procedures. A healthy environment for the stressed fish shall be

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

c. Electrofishing – Use electrofishing only where other means of fish capture may not be feasible or effective. If electrofishing will be used to capture fish for salvage, NMFS's electrofishing guidelines will be followed (NMFS 2000).
    i. Reasonable effort should be made to avoid handling fish in warm water temperatures, such as conducting fish evacuation first thing in the morning, when the water temperature would likely be coolest. No electrofishing should occur when water temperatures are above 18ºC or are expected to rise above this temperature prior to concluding the fish capture.
    ii. If fish are observed spawning during the in-water work period, electrofishing shall not be conducted in the vicinity of spawning fish or active redds.
    iii. Only Direct Current (DC) or Pulsed Direct Current shall be used.
    iv. Conductivity <100, use voltage ranges from 900 to 1100. Conductivity from 100 to 300, use voltage ranges from 500 to 800. Conductivity greater than 300, use voltage to 400.
    v. Begin electrofishing with minimum pulse width and recommended voltage and then gradually increase to the point where fish are immobilized and captured. Turn off current once fish are immobilized. vi. Do not allow fish to come into contact with anode. Do not electrofish an area for an extended period of time. Remove fish immediately from water and handle as described above (PDC 20b). Dark bands on the fish indicate injury, suggesting a reduction in voltage and pulse width and longer recovery time.
    vi. If mortality is occurring during salvage, immediately discontinue salvage operations (unless this would result in additional fish mortality), reevaluate the current procedures, and adjust or postpone procedures to reduce mortality.

d. Dewater construction site –When dewatering is necessary to protect species or critical habitat, divert flow around the construction site with a coffer dam (built with non-erosive materials), taking care to not dewater downstream channels during dewatering. Pass flow and fish downstream with a by-pass culvert or a water-proof lined diversion ditch. Diversion sandbags can be filled with material mined from the floodplain as long as

such material is replaced at end of project. Small amounts of instream material can be moved to help seal and secure diversion structures. If ESA listed-fish may be present and pumps are required to dewater, the intake must have a fish screen(s) and be operated in accordance with NMFS fish screen criteria described below (in part e.iv) of this section. Dissipate flow energy at the bypass outflow to prevent damage to riparian vegetation or stream channel. If diversion allows for downstream fish passage, place diversion outlet in a location to promote safe reentry of fish into the stream channel, preferably into pool habitat with cover. Pump seepage water from the de-watered work area to a temporary storage and treatment site or into upland areas and allow water to filter through vegetation prior to reentering the stream channel.

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

Project Design Criteria for Aquatic Restoration Activity Categories

Category 2. Large Wood, Boulder, and Gravel Placement includes large wood and boulder placement, engineered log jams, porous boulder structures and vanes, gravel placement, and tree removal for large wood projects. Such activities will occur in areas where channel structure is lacking due to past stream cleaning (large wood removal), riparian timber harvest, and in areas where natural gravel supplies are low due to anthropogenic disruptions. These projects will occur 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. Equipment such as helicopters, excavators, dump trucks, front-end loaders, full-suspension yarders, and similar equipment may be used to implement projects.

a. **Large Wood and Boulder Projects**

i. Place large wood and boulders in areas where they would naturally occur and in a manner that closely mimic natural accumulations for that particular stream type. For example, boulder placement may not be appropriate in low gradient meadow streams.

ii. Structure types shall simulate disturbance events to the greatest degree possible and include, but are not limited to, log jams, debris flows, windthrow, and tree breakage.

iii. No limits are to be placed on the size or shape of structures as long as such structures are within the range of natural variability of a given location and do not block fish passage.

iv. Projects can include grade control and bank stabilization structures, while size and configuration of such structures will be commensurate with scale of project site and hydraulic forces.

v. The partial burial of large wood and boulders is permitted and may constitute the dominant means of placement. This applies to all stream systems but more so for larger stream systems where use of adjacent riparian trees or channel features is not feasible or does not provide the full stability desired.

vi. large wood includes whole conifer and hardwood trees, logs, and rootwads. large wood 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 2.0x bankfull width.

vii. Structures may partially or completely span stream channels or be positioned along stream banks.

viii. Stabilizing or key pieces of large wood must be intact, hard, with little decay, and if possible have root wads (untrimmed) to provide functional refugia habitat for fish. Consider orienting key pieces such that the hydraulic forces upon the large wood increases stability

ix. Anchoring large wood – Anchoring alternatives may be used in preferential order:

1. Use of adequate sized wood sufficient for stability
2. Orient and place wood in such a way that movement is limited

3. Ballast (gravel or rock) to increase the mass of the structure to resist movement
4. Use of large boulders as anchor points for the large wood
5. Pin large wood with rebar to large rock to increase its weight. For streams that are entrenched (Rosgen F, G, A, and potentially B) or for other streams with very low width to depth ratios (<12) an additional
60% ballast weight may be necessary due to greater flow depths and higher velocities.

b. **Engineered Logjams** are structures designed to redirect flow and change scour and deposition patterns. To the extent practical, they are patterned after stable natural log jams and can be either unanchored or anchored in place using rebar, rock, or piles (driven into a dewatered area or the streambank, but not in water). Engineered log jams create a hydraulic shadow, a low-velocity zone downstream that allows sediment to settle out. Scour holes develop adjacent to the log jam. While providing valuable fish and wildlife habitat they also redirect flow and can provide stability to a streambank or downstream gravel bar.

i. **NMFS fish passage review and approve** – For engineered log jams that occupy >25% of the bankfull area, the Action Agencies will ensure that the action is individually reviewed and approved by NMFS for consistency with criteria in Anadromous Salmonid Passage Facility Design (NMFS 2011e).
ii. Engineered log jams will be patterned, to the greatest degree possible, after stable natural log jams.
iii. Grade control engineered log jams are designed to arrest channel down-cutting or incision by providing a grade control that retains sediment, lowers stream energy, and increases water elevations to reconnect floodplain habitat and diffuse downstream flood peaks.
iv. Stabilizing or key pieces of large wood that will be relied on to provide streambank stability or redirect flows must be intact, solid (little decay). If possible, acquire large wood with untrimmed rootwads to provide functional refugia habitat for fish.
v. When available, trees with rootwads attached should be a minimum length of 1.5 times the bankfull channel width, while logs without rootwads should be a minimum of 2.0 times the bankfull width.
vi. The partial burial of large wood and boulders may constitute the dominant means of placement, and key boulders (footings) or large wood can be buried into the stream bank or channel
vii. Angle and Offset – The large wood portions of engineered log jam structures should be oriented such that the force of water upon the large wood increases stability. If a rootwad is left exposed to the flow, the bole placed into the streambank should be oriented downstream parallel to the flow direction so the pressure on the rootwad pushes the bole into the streambank and bed. Wood members that are oriented parallel to flow are more stable than members oriented at 45 or 90 degrees to the flow.
viii. If large wood anchoring is required, a variety of methods may be used. These include buttressing the wood between riparian trees, the use of manila, sisal or other biodegradable ropes for lashing connections. If hydraulic conditions warrant

use of structural connections, such as rebar pinning or bolted connections, may be used. Rock may be used for ballast but is limited to that needed to anchor the large wood.

c. Porous Boulder Structures and Vanes

i. Full channel spanning boulder structures 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.

ii. Install boulder structures low in relation to channel dimensions so that they are completely overtopped during channel-forming flow events (approximately a 1.5-year flow event).

iii. Boulder step structures are to be placed diagonally across the channel or in more traditional upstream pointing “V” or “U” configurations with the apex oriented upstream.

iv. Boulder step structures are to be constructed to allow upstream and downstream passage of all native fish species and life stages that occur in the stream. Plunges shall be kept less than 6 inches in height.

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

vi. Rock for boulder step structures shall be durable and of suitable quality to assure long-term stability in the climate in which it is to be used. Rock sizing depends on the size of the stream, maximum depth of flow, planform, entrenchment, and ice and debris loading.

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

viii. Full spanning boulder step structure placement should be coupled with measures to improve habitat complexity and protection of riparian areas to provide long-term inputs of large wood.

d. Gravel Augmentation

i. Gravel can be placed directly into the stream channel, at tributary junctions, or other areas in a manner that mimics natural debris flows and erosion.

ii. Augmentation will only occur in areas where the natural supply has been eliminated, significantly reduced through anthropogenic disruptions, or used to initiate gravel accumulations in conjunction with other projects, such as simulated log jams and debris flows.

iii. Gravel to be placed in streams shall be a properly sized gradation for that stream, clean, and non-angular. When possible use gravel of the same lithology as found in the watershed. Reference the Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings (USDA-Forest Service 2008) to determine gravel sizes appropriate for the stream.

iv. Gravel can be mined from the floodplain at elevations above bankfull, but not in a manner that would cause stranding during future flood events. Crushed rock is not permitted.
v. After gravel placement in areas accessible to higher stream flow, allow the stream to naturally sort and distribute the material.
vi. Do not place gravel directly on bars and riffles that are known spawning areas, which may cause fish to spawn on the unsorted and unstable gravel, thus potentially resulting in redd destruction
vii. Imported gravel must be free of invasive species and non-native seeds. If necessary, wash gravel prior to placement.

e. Tree Removal for Large Wood Projects

i. Live conifers and other trees can be felled or pulled/pushed over in a Northwest Forest Plan (USDA and USDI 1994a) Riparian Reserve or PACFISH/INFISH (USDA-Forest Service 1995 ; USDA and USDI 1994b) riparian habitat conservation areas (RHCA), and upland areas (e.g., late successional reserves or adaptive management areas for northern spotted owl and marbled murrelet critical habitat) for in-channel large wood placement only when conifers and trees are fully stocked. Tree felling shall not create excessive stream bank erosion or increase the likelihood of channel avulsion during high flows.
ii. Danger trees and trees killed through fire, insects, disease, blow-down and other means can be felled and used for in-channel placement regardless of live-tree stocking levels.
iii. Trees may be removed by cable, ground-based equipment, horses or helicopters.
iv. Trees may be felled or pushed/pulled directly into a stream or floodplain.
v. Trees may be stock piled for future instream restoration projects.
vi. The project manager for an aquatic restoration action will coordinate with an action-agency wildlife biologist in tree-removal planning efforts.

Category 13. Riparian Vegetation Treatment includes reintroduction of low and moderate-severity fire into riparian areas to help restore plant species composition and structure that would occur under natural fire regimes in dry forest types east of the Cascade mountains and in southwestern Oregon. Additionally, controlled burns may be implemented in localized lowland areas in western Oregon, i.e., oak woodlands. Conifer thinning may be required to adjust fuel loads for moderate-severity burns to regenerate deciduous trees and shrubs. Equipment would include drip torches and chainsaws, along with fire suppression vehicles and equipment.

a. Low and Moderate Severity Burns

i. Experienced fuels specialists, silviculturists, fisheries biologist, and hydrologists shall be involved in designing prescribed burn treatments.

ii. Prescriptions will focus on restoring the plant species composition and structure that would occur under natural fire regimes.

iii. Burn plans are required for each action and shall include, but not be limited to the following: a description of existing and desired future fire classifications, existing and target stand structure and species composition (including basis for target conditions); other ecological objectives, type, severity, area, and timing of proposed burn; and measures to prevent destruction of vegetation providing shade and other ecological functions important to fish habitat.

iv. Low-severity burns will be used except where the objective is to restore deciduous trees, as describe below under part "v.", with a goal of creating a mosaic pattern of burned and unburned landscape. Low severity burns are characterized by the following: Low soil heating or light ground char occurs where litter is scorched, charred, or consumed, but the duff is left largely intact. large wood accumulation is partially consumed or charred. Mineral soil is not changed. Minimal numbers of trees, typically pole/saplings, will be killed.

v. Moderate-severity burns are permitted only where needed to invigorate decadent aspen stands, willows, and other native deciduous species and may be targeted in no more than 20% of the area within RHCAs or Riparian Reserves/6th field HUC/year. Such burns shall be contained within the observable historical boundaries of the aspen stand, willow site, other deciduous species, and associated meadows; additional area outside of the "historical boundaries" may be added to create controllable burn boundaries. Moderate severity are characterized by the following: Moderate soil heating or moderate ground char occurs where the litter on forest sites is consumed and the duff is deeply charred or consumed, but the underlying mineral soil surface is not visibly altered. Light colored ash is present. large wood is mostly consumed, except for logs, which are deeply charred.

vi. Fire lines will be limited to five feet in width, constructed with erosion control structures, such as water bars, and restored to pre-project conditions before the winter following the controlled fire. To the extent possible, do not remove vegetation providing stream shade or other ecological functions that are important to streams.

vii. Ignition can occur anywhere within the Riparian Reserve and RHCAs area as long as project design criteria are met.

viii. Avoid water withdrawals from fish bearing streams whenever possible. Water drafting must take no more than 10% of the stream flow and must not dewater the channel to the point of isolating fish. Pump intakes shall have fish screens consistent with NMFS fish screening criteria (NMFS 2011e).

b. Non-commercial Thinning Associated with Moderate-severity Burns

i. Non-commercial tree thinning and slash removal is allowed only as required to adjust fuel loads to implement a moderate-severity burn to promote growth of deciduous trees and shrubs, such as aspen, cottonwood, willow, other deciduous species, and associated meadows.

ii. Thinning is allowed only in dry forest types, i.e., east of the Cascade mountains and southwestern Oregon, and in localized lowland areas in western Oregon, i.e., oak woodlands.

iii. To protect legacy trees, thinning from below is allowed. If conifers are even-aged pole, sapling, or mid-seral with no legacy trees, thin existing trees to the degree necessary to promote a moderate-severity burn.

iv. No slash burning is allowed within 30-feet of any stream. To the extent possible, avoid creating hydrophobic soils when burning slash. Slash piles should be far enough away from the stream channel so any sediment resulting from this action will be unlikely to reach any stream.

v. Apply PDC in National Fire Plan salmonid criteria (USDI-Bureau of Land Management 2005) for limits on mortality to residual overstory vegetation.

vi. Only hand equipment—chain saws, axes, Pulaski's, etc.—may be used for felling.

vii. Where livestock or wildlife grazing could be a threat to restoration of aspen, cottonwood, willow, alder, and other deciduous vegetation and an immediate moderate-severity burn would consume large amounts of felled trees, consider delaying the burn and leaving felled trees in place to create grazing barriers to help assure plant growth.

viii. If in an existing grazing allotment, projects in this category shall be accompanied by livestock grazing practices that promote the attainment of moderate-severity burn objectives

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

a. Experienced silviculturists, botanists, ecologists, or associated technicians shall be involved in designing vegetation treatments.

b. Species to be planted will be of the same species that naturally occur in the project area. Acquire native seed or plant sources as close to the watershed as possible.

c. Tree and shrub species, willow cuttings, as well as sedge and rush mats to be used as transplant material shall come from outside the bankfull width, typically in terraces (abandoned flood plains), or where such plants are abundant.

d. Sedge and rush mats should be sized to prevent their movement during high flow events.

e. Concentrate plantings above the bankfull elevation.

f. Removal of native and non-native vegetation that will compete with plantings is permitted.

g. Exclosure fencing to prevent utilization of plantings by deer, elk, and livestock is permitted.

Project Design Criteria by Resource

Fisheries and Hydrology

Fisheries and Hydrology resources will follow all mitigation measures and project design criteria for aquatic restoration activities as shown in the 'Aquatic Restoration Project Categories, Program Administration, General Aquatic Conservation Measures, and Project Design Criteria for Aquatic Restoration Activity Categories on the Malheur National Forest.'
Additional Aquatic project design criteria were developed for the following elements: Tree Tipping and Felling, Juniper Treatments, Tree Hauling, and Prescribed Burning.

General For Inside Riparian Habitat Conservation Areas

All snags will be maintained within the RHCA unless deemed a hazard to the restoration activity.

Tree Tipping and Tree Felling for Large Wood Projects

Source trees being extracted (either by tipping and or falling) as part of this project for instream restoration will not be harvested from within the primary shade zone.

Table 4 Primary shade zone width, based on adjacent hill slope.

	Hill Slope less than 30%	Hill Slope 30% to 60%	Hill Slope greater than 30%
Primary Shade Zone Width (slope distance	50 ft.	55 ft.	60 ft.

The Temperature Implementation Strategies allow the distances in the above table to be less (but not less than 25 ft.) if any of the following conditions applies:
The trees are located on a south facing slope (175-185 degree azimuth) and therefore do not provide stream shade;
An appropriate level of analysis is completed and documented, such as shade modeling, using site-specific characteristics to determine the primary shade tree width; and or
Field monitoring or measurements are completed to determine the width where optimum Angular Canopy Density (65% or greater) is achieved (see TMDL Implementation Strategies).
If trees are being felled for safety reasons they can be felled towards the stream.
Source trees should come from but are not limited to: over or fully stocked upland and riparian stands, hazard trees, trees generated from administrative sites (maintenance, expansion, or new construction), and hardwood restoration.

There is no DBH (diameter at breast height) restriction for large wood, but consider the following before removing and placing trees:
Diameter
The key to establishing a logjam is utilizing larger diameter wood that resists decay. These pieces of wood are often called "key pieces," and serve as the anchors for the logjam structure. Wood can improve fish habitat only if the wood is large enough to stay, influence flow patterns, and sediment sorting. Larger diameter wood retains its size longer as abrasion and decay occurs over the years. Larger diameter wood is more effective in creating pools and complex channels that improve fish populations. The minimum diameter required for a key piece of wood depends on the bankfull width of the stream is found in the following table.

Table 5 Bankfull widths and minimum diameter of logs to be considered key pieces.

Bankfull Width* - Feet	Minimum Diameter* - Inches
0 to 10	10
10 to 20	16
20 to 30	18
Over 30	22

*This table was taken from '1995 A Guide to Placement of Large Wood in Streams.

Length

The length of the wood is also important to stability. To be considered a key piece a log with a rootwad still attached should be at least one and one-half times (1.5X) the bankfull or a log without a rootwad should be twice (2X) the length of the stream's bankfull width. As the best fish habitat is formed around jams composed of 3 to7 logs, at least 2 key pieces should be used at each structure.

Mimic natural accumulations of large woody debris based on stream type, valley setting, and community type and ensure future large woody debris recruitment

Tailholds as part of tree tipping operations are permitted across perennial, intermittent and ephemeral streams but the use of protective straps will be required to prevent tree damage.

Juniper Treatments

The majority of the juniper treatment areas would be within the riparian habitat conservation areas and adjoining uplands. For each area evaluated for juniper treatments, interdisciplinary teams would discuss the following questions in order to identify the attributes of an area and select the appropriate treatments:

What kind of site (potential natural vegetation, soils)?

Successional state of site?

Components that need to be restored?

How units may fit into the overall landscape mosaic?

Long-term goals and objectives?

Utilize the "Western Juniper Field Guide: Asking the Right Questions to Select the Appropriate Management Actions. (Bates et al. 2007, Circular 1321) http://pubs.usgs.gov/circ/1321/pdf/circ1321.pdf

Tree and Boulder Hauling

Apply mitigation and best management practices for dust abatement (water, lignosulfonate, Calcium and Magnesium Chlorides) dry conditions, and erosion control as directed by physical scientist or road engineer (See Road Maintenance project design criteria #6 for application).

Haul on gravel and native-surface roads will be limited to dry conditions.

Haul Restrictions to Prevent Fine Sediment Delivery to Streams

Haul or maintenance is permitted on roads under the following conditions:

During haul, weather conditions are monitored daily for the chance of precipitation by the Hydrologist or Fish Biologist.

No rutting of the road surface is occurring, indicating the subsurface is wet.

Frozen ground conditions.

Haul will cease at any time when the travelway of the road is wet and turbid water or fines are observed moving off the road surface to ditchlines that deliver to stream channels regardless of time of year.

Roads Exempt from Haul Restrictions include (Do to no mechanism for sediment delivery):

Paved roads
Surfaced Ridge top roads
Surfaced outsloped roads with no ditch or stream crossings

Prescribed Burning and Related Activities

Mechanical piling and burning of large piles will be restricted to existing roads and landings.

Include all relevant PDC in Silviculture prescriptions and burn plan objectives for all fuel treatment activities within RHCA's.

Use all available fuel treatments and preparation activities as necessary (e.g. multiple entries, slash pull-back; modified ignition methods, locations, timing, and sequence; thinning of small green trees; pruning of green trees and snags, prescribed fire, fire suppression, jack pot burning, etc.) to achieve the specific PDC. Suppression should be used only as a last resort to achieve other PDC.

For perennial and fish-bearing stream channels:

Avoid removing trees along stream banks (e.g. don't cause bank instability or increase erosion)

Within 100' of the stream channel backing fire is preferred.

Within primary shade zone retain 100% of the over-story canopy closure with the exception of hardwood treatment.

For intermittent, non-fish-bearing stream channels:

Within 50' of the stream channel backing fire is preferred.

For the maintenance and use of water sources and draft sites:

Minimize disturbance of existing riparian vegetation to the greatest extent practical; in particular, maintain shade, bank stability, and large woody material recruitment potential.

Use sediment control measures such as straw bales, filter cloth, or sediment fences when conditions warrant.

Maximize maintenance activities during late summer and early fall to best avoid wet conditions.

Do not pump from streams that do not have continuous surface flow. When pumping water in all situations from streams, ensure that at least one-half of the original streamflow remains below the pump site.

Refuel power equipment, or use absorbent pads for immobile equipment, and prepare concrete at least 150 feet (or as far as possible from the water body where local site conditions do not allow a 150 foot setback) from water bodies to prevent direct delivery of contaminants into associated water bodies.

Fisheries, hydrology or other qualified personnel must work with engineering/fire personnel to review proposed activities to minimize potential effects to fish, stream channel conditions, and water quality.

Use and develop off-channel ponds outside of stream channels were feasible and appropriate. Work with fire folks to prioritize and decommission unnecessary in-stream drafting sites.

Water withdrawal equipment must have a fish screen installed, operated and maintained in accordance to NOAA Fisheries guidelines.

Wildlife

Threatened, Endangered or Sensitive Species

If wolves become established (denning) while project implementation is occurring, measures will be taken to avoid activity in that vicinity

If any evidence of wolverines is discovered during project implementation, measures will be taken to provide protection. If a den is found we would protect it from human disturbance.

Raptors

No activities will occur within currently known goshawk or other raptor nest stands. To conserve nesting habitat and to minimize disturbance to nesting individuals, restrictions would be executed according to the requirements of the species involved.

With all newly discovered raptor nests, a buffer zone would be established by the wildlife biologist to restrict activities near the nest area during occupancy.

Where possible, retain trees with inactive nests that may be important to secondary nesters (e.g. Great Gray Owl).

Any snags in riparian areas or uplands will be protected from disturbance, removal, or use in stream restoration activities unless deemed a safety hazard at a specific work site.

Big Game

Within big game winter range a wildlife biologist will be consulted between December 1 and April 1 to determine if activities should be restricted for big game needs.

Botany

Note: Pre-implementation planning project design criteria are identified.

Rare and Sensitive Plants and Habitats

Pre-Implementation: Proposed restoration projects shall be completely surveyed early in the implementation planning process by a qualified botanist or rare plant technician, to identify and assess any sensitive or rare plant populations or habitats.

Pre-Implementation: Proposed restoration projects shall develop restoration plans for degraded sensitive species habitats and/or mitigation plans in areas where sensitive plant populations are documented. This shall be accomplished by a journey-level Forest Service botanist in collaboration with the interdisciplinary team and other stakeholders.

Heavy equipment, vehicle operation, road construction, staging areas, stockpile areas, piling of slash, fence construction, recreation sites, prescribed fires, fire lines, and other operational activities shall not be allowed in any documented sensitive plant sites unless it is for the demonstrated benefit or protection of the site. All sensitive plant populations should be buffered 100 ft. from all operational activities where topography does not restrict such a distance. Sensitive plant sites and associated buffers shall be identified as Areas to Protect (ATPs).

Sensitive and Unique Habitats

The integrity of unique habitats shall be maintained. Unique habitats [may] include meadows, rimrock, talus slopes, cliffs, animal dens, wallows, bogs [fens], seeps and springs. This shall be accomplished by incorporating cover buffers approximately 100 feet in width.

Heavy equipment, vehicle operation, road construction, staging areas, stockpile areas, piling of slash, fence construction, recreation sites, prescribed fires, fire lines, and other operational activities shall not occur within, or at the interface of lithosols (scablands).

Cutting of old-growth juniper shall be prohibited. Old-growth characteristics include: 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.

Groundwater-Dependent Ecosystems

The integrity of groundwater-dependent ecosystems (GDE) shall be maintained. Spring developments shall not dewater GDEs. Spring developments shall not be allowed if the spring is occupied by rare or sensitive plant species, or in peatlands, fens, or where histic soils are present. These sites should be buffered 100 ft. from all operational activities where topography does not restrict such a distance, and be identified as Areas to Protect (ATPs).

Heavy equipment, vehicle operation, road construction, staging areas, stockpile areas, piling of slash, fence construction, fire lines, and other operational activities shall not be allowed in springs, seeps, or any other GDE, unless it is for the benefit or protection of the GDE or development of the spring.

Spring developments should not disturb the spring orifice (point where water emerges). Spring head boxes should be placed in a location that will cause the least amount of disturbance to the soils and vegetation of the GDE. Preferable locations for spring head boxes should be in an established channel downstream from the orifice or a location where flowing water becomes subsurface.

When necessary, construct fenced exclosures around spring developments to prevent damage from wild ungulates and livestock.

Spring developments shall have a return flow system to minimize the diversion of surface and subsurface water from the catchment area. Consider using a float valve or similar device to reduce the amount of water withdrawn from the GDE.

When developing springs, place troughs far enough away from GDEs, wetlands, and other sensitive or unique habitats to prevent erosion, compaction, or degradation to sensitive soils and vegetation due to livestock congregation.

Invasive Plant Species

Pre-Implementation: Proposed restoration projects shall be surveyed for invasive plants early in the implementation planning process by a qualified invasive plant specialist /technician, to identify and assess any undocumented invasive plant infestation.

Pre-Implementation: For project areas that overlap or are adjacent to invasive plant infestations, assure that there is sufficient time prior to develop a long-term site strategy for control, eradication, and revegetation of the site. This shall be accomplished by a qualified invasive plant specialist in collaboration with the interdisciplinary team and other stakeholders.

All activities shall be conducted in a manner as to minimize or prevent the potential spread or establishment of invasive species.

Actions conducted on National Forest System Lands that will operate outside the limits of the road prism, require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering the National Forest. Cleaning will be inspected and approved by the forest officer in charge of administering the project.

Assure that all materials are weed-free. Use weed-free straw and mulch for all projects conducted or authorized by the Forest Service on National Forest System Lands. If State certified straw and/or mulch is not available, individual Forests should require sources certified to be weed-free using the North American Weed Free Forage Program standards or a similar certification process.

Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and/or rock that are judged to be weed free by District or Forest weed specialists.

Prohibit heavy equipment operation, vehicle travel, staging areas, fire-control lines, and any other operational activities in invasive plant infestations, unless the activities are for the express purpose of eradicating the infestation or INV1 and INV2 have been completed.

Conduct post-implementation monitoring for invasive plants. Continue monitoring, treating, and removing invasive plants until all infestations are eradicated and native plant species are well established.

Native Plant Materials and Revegetation

Pre-Implementation: Where the need for native plant materials is anticipated, assure that there is sufficient time for the plant materials specialist to develop a native plant materials plan and/or prescription prior to implementation of planned revegetation, rehabilitation, and restoration projects. This may include allowing for enough time to harvest and store hardwood cuttings, produce suitable quantities of native seed, and/or grow-out container stock.

Locally adapted, genetically appropriate native plant materials are the first choice for use in revegetation, restoration and rehabilitation, where timely natural regeneration of the native plant community is not likely to occur. Use a diverse assemblage of species that have the potential to naturally occur in the project area. Acquire native seed or plant sources as close to the watershed as possible. Examples of areas that may need treatment include: habitat restoration efforts, log decks, staging areas, landing zones, temporary roads, slash piles, culvert replacements, severely burned areas, skid trails, decommissioned roads, invasive species treatments, and other disturbances.

Non-native, non-invasive plant species may be used in the following situations: (1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality, and to help prevent the establishment of invasive species), (2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants, (3) if native plant materials are not available and/or are not economically feasible, and (4) in permanently altered plant communities.

Under no circumstances shall non-native invasive plant species and/or noxious weeds be used for revegetation.

Development, review and/or approval of revegetation, rehabilitation, and restoration prescriptions, including species selection, genetic heritage, growth stage, seed mixes, sowing guidelines, and any needed site preparation, shall be accomplished by a plant materials specialist who is knowledgeable and trained or certified in the plant community type where the revegetation will occur.

Concentrate plantings above the bank-full elevation. Sedge and rush mats should be placed and sized to prevent their movement during high flow events.

Newly planted and/or seeded areas should be protected from animals and activities that may prevent, retard, or slow the establishment and recovery of native vegetation. Site-specific measures may include building fences, piling slash, jackstrawing, closing areas to vehicles, and/or temporarily changing grazing regimes until the desired condition is sufficiently achieved.

Soils

For projects involving heavy machinery off roads, the project proponents shall inspect the site for existing impacts to the soil. If existing impacts appear to be heavy on the Malheur or moderate on the Ochoco, they shall contact a soil scientist, who shall determine what site specific project design criteria are necessary to meet Forest Plan and Forest Service Manual standards and guidelines. (If a soil scientist is not available, a silviculturist or hydrologist can do the work.) If standards and guidelines cannot be met, heavy machinery shall not be used.

Erosion would be minimized by following General Aquatic Conservation Measures and by implementing the appropriate project design criteria based on the type of activity (see appendix A).

Erosion from heavy machinery use would be minimized; by minimizing compaction and puddling, rutting would be minimized.

For Livestock Stream Crossings and Off-Channel Watering Facilities, out-of-channel erosion would be minimized.

For Road Erosion Control, erosion would be minimized.

For Juniper Removal, erosion would be minimized. It is possible that Juniper Removal would increase ground cover within a few years, and thereby reduce erosion.

Prescribed Fire (including for disposal of slash after Juniper removal) can involve only low and moderate severity fire, and erosion from fire lines would be minimized, so erosion from prescribed fire would not be significant.

Fire and Fuels

Mechanical tools may be necessary to prepare fire control lines for these burns, but would be limited, and typically no heavy equipment would be used. Prescribed burns or wildfires could temporarily affect air quality.

The project design criteria for both Juniper Removal and Riparian Vegetation Treatment (controlled burning) would be followed. National, state, and local policies regarding prescribed fire implementation will be met.

Activities that are expected to create smoke emissions would follow the State of Oregon Smoke Management Plan. Prior to burning, approval will be obtained from the Oregon Department of Forestry, who determines compliance with the Clean Air Act. State smoke forecasts, which predict wind direction and smoke mixing height, will be obtained prior to all burning to ensure smoke intrusions will not occur in the local smoke sensitive receptor areas.

Burning will follow the guidance provided by the Oregon Smoke Management Plan (Directive 1-4-1-601, Operational Guidance for the Oregon Smoke Management Program), which is an agreement between federal land management agencies in northeast Oregon and Oregon Department of Forestry limiting smoke emission amounts. Oregon Department of Forestry monitors activity, and if a limit is reached it will shut down prescribed fire activity.

Heritage Resources

Compliance with Section 106 of the National Historic Preservation Act for activities authorized under this analysis will be completed and concurred with by the Oregon State Historic Preservation Office before any ground disturbing action takes place. For each potential activity the District or Zone archaeologist will determine which of the criteria in the 2004 Programmatic Agreement with the Oregon State Historic Preservation Office best fit the particular project. This will vary somewhat project to project based on the scale of the particular activity, the location on the landscape, and the nature of associated cultural resources, if any.

The District or Zone archaeologist will document their findings on a Programmatic Agreement form with a project description, rationale and location map which will be attached to the Forest Service Heritage Event database. The Forest archaeologist will review and sign off on the Programmatic Review form if concurred with. For appendices A, B and C projects as defined in the 2004 Programmatic Agreement, the Forest will retain the documentation and provide the Oregon State Historic Preservation Office with the annual summary of projects as described in the Preservation Act.

For full inventories the District or Zone archaeologist will complete an inventory report meeting current Oregon State Historic Preservation Office standards which will be reviewed by the Forest archaeologist. The Forest archaeologist will forward the completed inventory report to the Oregon State Historic Preservation Office for review and concurrence signature or further discussion as appropriate.

Consultation with Native American tribes is conducted under the terms of the Memorandums of Understanding the Forest has with each individual tribe. The Forest regularly consults with the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation and the Confederated Tribes of Warm Springs Reservation.

For work requiring a full inventory under the terms of the 2004 Programmatic Agreement any identified cultural resources sites will generally be avoided. For cases where site avoidance is impractical mitigation procedures will be developed in consultation with the Oregon SHPO before project work begins.

If any previously unidentified cultural resources are located during project implementation, ground disturbing work will be halted until the resources are evaluated by the District or Zone archaeologist. If the cultural resources are determined to be potentially eligible for listing on the National Register of Historic Places work will either be permanently halted or a mitigation plan will be developed in consultation with the Oregon SHPO before work continues.

Recreation

Motorized aquatic restoration methods would not be used within Wilderness, Wild portions of Wild and Scenic Rivers, and Inventoried Roadless Areas.

Mechanized aquatic restoration methods would not be used within Wilderness or Wild portions of Wild and Scenic Rivers.

Grazing

General

Range and Fire Specialists and permittees would coordinate activities including scheduling of burning activities in grazing units.

Utilize the Forest Post-Fire Interim Grazing Guidelines to aid in determining when to resume grazing activities.

Whenever possible, units to be rested would be burned in the spring of the year to be rested or in the fall prior to the rest year.

If a rest period is required following a burn the permittee has the option to exclude cattle grazing from those portions of a pasture that were burned through the use of fencing and could continue to graze the unburned areas of a unit.

Protection of Government and Permittee Investments

All existing structural range improvements (fences, gates, spring developments, etc) and permanent ecological plots would be contractually protected.

Maintain structural integrity of range improvements.

If structural improvements are damaged during project operations they would be repaired to Forest Service standards prior to livestock scheduled use by the party responsible for causing the damage. Repairs would be required of the purchaser if damage were done during thinning or fuel treatment contractors or by force account where appropriate.

Three or more splices to a single wire within a distance of 20 feet will be replaced with a single splice.

Fence right of ways (6ft either side of fence), trails, other developments and access to them would be cleared of slash produced by project activities.

Aspen Restoration

New aspen exclosure fences would have gates installed in proper locations to allow for removal of stray livestock. Aspen fences would be maintained each year and repaired whenever necessary. Plans for aspen exclosures will define when restoration of the protected stand has been achieved and who has responsibility for maintenance of the structure. When fences are no longer needed, aspen fences should be removed.

Alternate livestock water sources to those being used in aspen stands would be developed off-site before fencing aspen or re-evaluate fencing of the aspen site. Coordinate with range specialist and permittee.

Notification

During planning stage of each individual project all potentially impacted grazing permittees will have notice of action and opportunity to provide input that may lessen impacts to their livestock operation well in advance of implementation.

Prior to implementation all potentially impacted grazing permittees will be given notice of dates when work will start.