# Klamath River Gravel Placement and Bypass Barrier Removal
# Environmental Assessment

## Klamath Falls Resource Area
## Lakeview District
## Bureau of Land Management

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## 1.0 INTRODUCTION

The proposed actions discussed in this Environmental Assessment (EA) are directly attributable to the requirements set forth in Interim Measures 7 and 8 (IM-7, IM-8; see Proposed Action) of the February 18, 2010 Klamath Hydroelectric Settlement Agreement (KHSA). Implementation of the proposed action would conform to impacts analyzed in the November 2007 Federal Energy Regulatory Commission (FERC) *Final Environmental Impact Statement for Hydropower License: Klamath Hydroelectric Project FERC Project No. 2082-027* (FEIS) (FERC 2007). In December 2008 the Klamath Falls Record of Decision and Resource Management Plan (ROD/RMP) was approved. In July 2009 the Secretary of Interior withdrew the ROD/RMP and determined that the previous 1995 ROD/RMP were in effect. The proposed action was initially planned and in conformance with that 1995 Klamath Falls Resource Area (BLM 1995) and the nine Aquatic Conservation Strategy (ACS) objectives set forth in the Northwest Forest Plan, as outlined in the FEIS (FERC 2007). On March 31, 2011, the United States District Court for the District of Columbia vacated and remanded the administrative withdrawal of the Klamath Falls 2008 Record of Decision and Resource Management Plan (Douglas Timber Operators et al. v. Salazar).

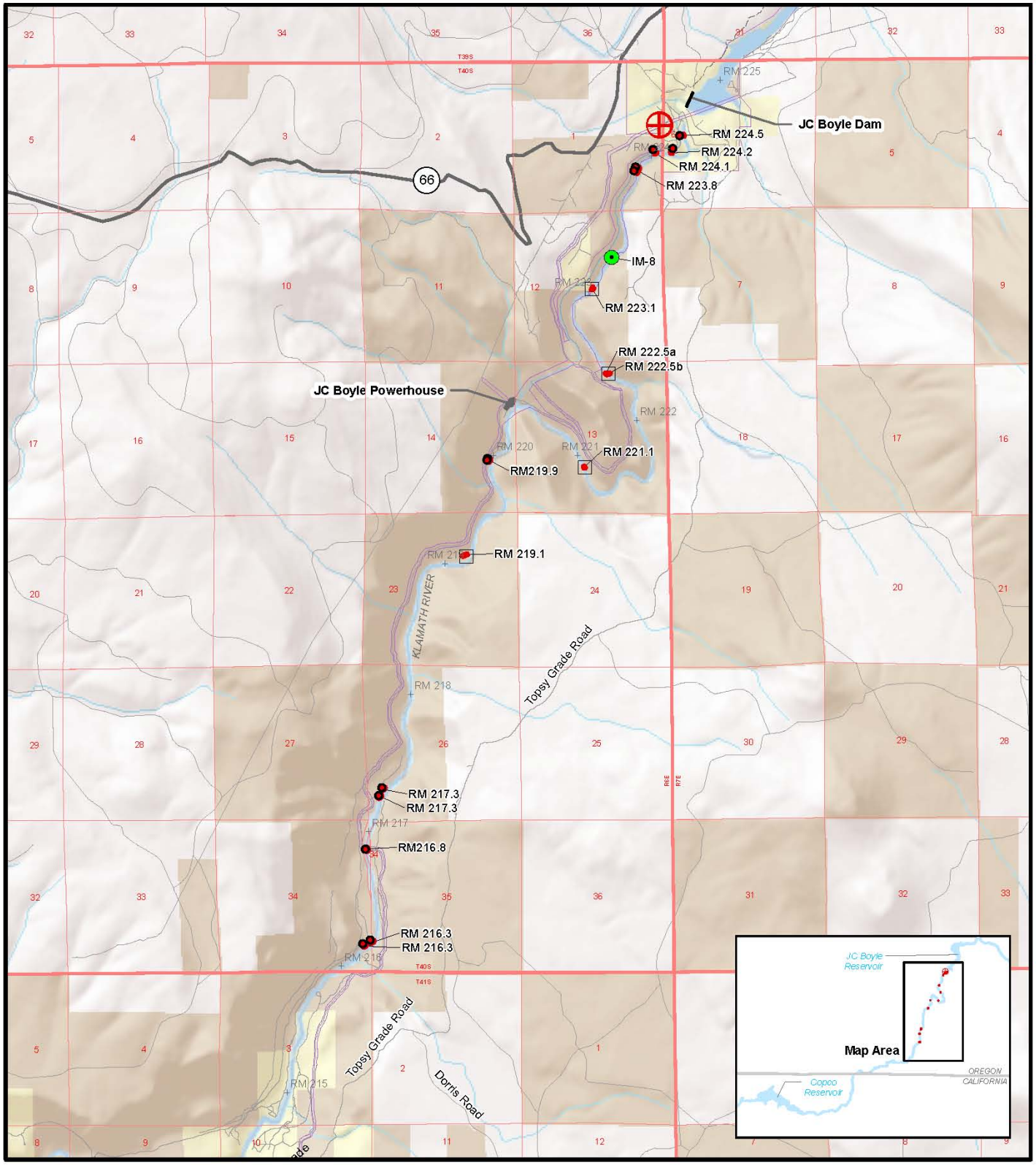
Following the March 31, 2011 decision the BLM evaluated this project for consistency with both the 1995 RMP and the 2008 ROD and RMP. Based upon this review, we have determined that the selected project is consistent with the Klamath Falls 1995 ROD/RMP and the 2008 ROD/RMP.

The KHSA is a negotiated settlement agreement that resolves the relicensing of PacifiCorp's KHP and provides a framework for the possible removal of four PacifiCorp dams on the Klamath River within the KHP. The potential decommissioning and removal of these dams is subject to certain contingencies, including funding, the passage of federal legislation, and a determination by the U.S. Secretary of the Interior that removal of the dams should proceed. The Secretarial Determination process is now underway and is scheduled to be completed by March 31, 2012. The KHSA includes provisions and detailed actions for the interim operation of the dams and mitigation activities, known as interim measures, prior to potential removal of the dams or the termination of the KHSA. Interim Measures 7 and 8 are included in the KHSA.

The objective of Interim Measure 7, J.C. Boyle Gravel Placement and/or Habitat Enhancement, is to place suitable size gravel in the J.C. Boyle bypass and peaking reaches to provide fishery benefits in the Klamath River above Copco reservoir. The objective of Interim Measure 8, J.C. Boyle Bypass Barrier Removal, is to remove a sidecast rock barrier to improve fish passage. The potential barrier is located approximately three miles upstream of the J.C. Boyle powerhouse. Both Interim Measures 7 and 8 would be implemented by PacifiCorp in collaboration with state and federal resource agencies. Project implementation would require access to the Klamath River via Bureau of Land Management (BLM) managed lands and roads.

### 1.1 Project Location

The proposed project is located within the Klamath Hydroelectric Project (KHP) area along the J.C. Boyle reach of the upper Klamath River in Klamath County, Oregon (Figure 1). Twelve




***Klamath Hydroelectric Project***

Interim Measures 7 and 8

IM-8
Truck Sites
Helicopter Site
Gravel Placement Area
Gravel Stockpile
TOWNSHIP/RANGE
SECTION
HIGHWAY
ROAD
TRAIL
FERC Boundary
STREAM
LAKE, RESERVOIR, OR RIVER
PACIFICORP PROPERTY
BLM
PRIVATE PROPERTY

N

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PACIFICORP ENERGY © July 2011 PacifiCorp

G:\work\klamath\mike_wrk\Hillshade_Gravel Placement Site Map072711_8x11.MXD 07/27/2011

gravel placement sites are proposed to enhance aquatic habitat throughout the reach. Seven of these sites are proposed within the 3.8-mile-long bypass reach between the J.C. Boyle Dam (River Mile [RM] 224.7) and the powerhouse (RM 220.4). The remaining five placement sites are proposed within the upper five miles of the approximately 17-mile-long peaking reach between the powerhouse (RM 220.4) and Copco Reservoir (approximately RM 204). In addition, the proposed project would remove a potential upstream fish passage barrier identified within the bypass reach at RM 223.3.

### 1.2 Purpose and Need

The purpose of the proposed action is to implement Interim Measures 7 and 8 of the KHSA and thereby enhance fish passage and improve the following habitat elements in the Klamath River between J.C. Boyle Dam and Copco Reservoir (the J.C. Boyle reach):

- Current (resident) and potential future (anadromous) fish spawning habitat
- Macroinvertebrate habitat
- Channel geomorphorphic processes (e.g., gravel bar formation for aquatic and riparian species).

Theoretical calculations show that in most reaches of the KHP, sediment transport capacity far exceeds supply on a long-term basis. This indicates that the river is sediment supply-limited through much of the KHP area (FERC 2007). The J.C. Boyle reach experiences a deficit of approximately 6,000 cubic yards of sediment per year (PacifiCorp 2004a). Existing substrate in the majority of the J.C. Boyle reach consists primarily of boulder and cobbles (PacifiCorp 2011). The preferred ranges in particle size of spawning gravels are as follows: for Klamath River redband trout (0.2-2 inches), Chinook salmon (2-3 inches), coho salmon (1-3 inches), and steelhead (1-3 inches) (PacifiCorp 2011). A diverse particle size distribution would be conducive to more natural geomorphic processes in the Klamath River (PacifiCorp 2011).

## 2.0 DESCRIPTION OF ALTERNATIVES

### 2.1 No Action

Environmental conditions that would exist under the No Action alternative provide the basis of comparison for the environmental impacts of the proposed action presented in this analysis, per the BLM National Environmental Policy Act (NEPA) Handbook. Under the No Action alternative, the proposed action considered in this analysis would not occur. Activities proposed in and adjacent to the proposed project area that have been analyzed and approved in other NEPA documents would still occur. Selection of the No Action alternative would not affect previous decisions made by the BLM.

### 2.2 Proposed Action

The proposed action alternative is being considered to satisfy the habitat and river restoration requirements of Interim Measures 7 and 8, which are to be implemented prior to the potential removal of J.C. Boyle Dam.

### 2.2.1 Interim Measure 7

Selective gravel placement within the J.C. Boyle reach of the Klamath River is proposed at 12 locations to enhance fish spawning habitat, macroinvertebrate habitat, and channel geomorphic processes throughout the reach. Seven gravel placement sites are proposed within the 3.8-mile-long bypass reach between the J.C. Boyle Dam and the powerhouse. Five additional gravel placement sites are proposed within the 16.9-mile-long peaking reach between the powerhouse and Copco Reservoir; these sites are all located in Oregon. Proposed sites were selected based on their accessibility for gravel placement and aquatic habitat type (e.g., riffle, run, or pool tailout locations). Preference was also given to upstream locations that would facilitate gravel seeding to downstream habitat types during peak flows. Based on the preferred particle sizes for resident and anadromous fish spawning habitat, and the existing channel substrate, a mix of 0.5 to 3-inch clean, round, gravel is proposed for placement. Gravel would be placed approximately 1-foot deep across the proposed placement areas. This is intended to minimize hydraulic changes at the placement sites while still providing suitable gravel depths for spawning.

The proposed methods of gravel placement include the use of a truck equipped with a gravel "shooter", and helicopter placement. The gravel shooter consists of a 16-foot-long conveyor belt mounted on the back of a dump truck. The gravel shooter can distribute gravel up to 3 inches in diameter approximately 100 feet horizontally beyond the end of the boom, and up to 120 feet when applied from locations that are vertically elevated above the river. Applying gravel from a truck outfitted with a gravel shooter is proposed in locations within 100± feet of a road. Gravel trucks would only utilize existing roadways and pull-outs for access. In locations where this strategy is not feasible, helicopter placement of gravel would be employed. Helicopter placement involves transporting gravel from a stockpile location to the proposed in-stream placement locations using a specialized bucket carried below the helicopter. Channel characteristics and details of proposed gravel placement at each proposed site are shown below (Table 1).

**Table 1. Proposed Interim Measure 7 gravel placement sites.**

| Location | Habitat Description | Estimated Wetted Width | Average Local Gradient | Approximate Volume per Application | Total Placement Volume | Type of Placement |
|---|---|---|---|---|---|---|
| RM 224.5 – Upper bypass | Boulder riffle and run | 70 feet | 0.013 | 150 cy | 470 cy | Truck |
| RM 224.2 – Upper bypass | Boulder riffle | 30feet | 0.013 | 50 cy | 149 cy | Truck, Helicopter if needed |
| RM 224.1 – Upper bypass | Pool tailout, boulder riffle & run | 50 feet | 0.013 | 60 cy | 184 cy | Truck, Helicopter if needed |
| RM 223.8 – Upper bypass | Boulder pool tailout and riffle | 60 feet | 0.013 | 265 cy | 750 cy | Truck |
| RM 223.1 – Middle bypass | Boulder pool tailout and riffle | 70 feet | 0.022 | 200 cy | 415 cy | Helicopter |
| RM 222.5 – Bypass reach | Split channel; boulder riffle & run | 90 feet | 0.023 | 150 cy (two channels) | 455 cy | Helicopter |

**Table 1. Proposed Interim Measure 7 gravel placement sites (continued).**

| Location | Habitat Description | Estimated Wetted Width | Average Local Gradient | Approximate Volume per Application | Total Placement Volume | Type of Placement |
|---|---|---|---|---|---|---|
| RM 221.1 – Bypass reach | Boulder run | 95 feet | 0.023 | 170 cy | 459 cy | Helicopter |
| RM 219.9 – Peaking reach | Boulder riffle and run | 85 feet | 0.013 | 200 cy | 801 cy | Truck |
| RM 219.1 – Peaking reach | Side channel of cobble riffle & run | 100 feet | 0.017 | 225 cy | 911 cy | Helicopter |
| RM 217.3 – Peaking reach | Boulder/cobble pool tailout and glide | 175 feet | 0.003 | 475 cy (two locations) | 1,241 cy | Truck |
| RM 216.8 – Peaking Reach | Cobble/boulder riffle/run | 85 feet | 0.004 | 350 cy | 688 cy | Truck |
| RM 216.3 – Peaking reach | Cobble pool tailout and riffle run | 160 feet | 0.005 | 450 cy | 912 cy | Truck |

As described in PacifiCorp's Gravel Placement and Monitoring Plan (PacifiCorp 2011), the proposed gravel placement would be conducted over an eight-year period, beginning in the fall of 2011 and concluding in 2019. Gravel would be placed in both bypass and peaking reaches each year; however, placement sites would alternate from year to year without consecutive year applications at any one site. On average, gravel would be placed at each site during three of the eight years. Proposed timing for gravel placement is based on fish, wildlife, and recreational use of the Klamath River. November gravel placement is proposed to minimize conflicts with rafters and fishermen, and to avoid impacts to nesting raptors. The Oregon Department of Fish and Wildlife (ODFW) preferred in-water work window (IWWW) for the project reach is July 1 – September 30 (ODFW 2008), and ODFW has been consulted regarding an extension of the IWWW through December.

Rounded gravel of the desired range of particle sizes would be sourced from a commercial gravel pit located in Fort Klamath, Klamath County, Oregon. Gravel transport and placement would involve transporting gravel from the Fort Klamath gravel pit to the stockpile location near the project reach, and from there to the gravel placement location. Ten-wheel trucks with transfer trailers having load capacities of approximately 24 cubic yards would likely transport gravel from the commercial gravel pit to the stockpile location.

A single gravel stockpile site is proposed on the north side of the Klamath River on an access road near the J.C. Boyle dam. Transport from the stockpile site to the gravel placement locations would be by helicopter or by ten-wheel trucks, depending on 1) the preferred application method at the destination site, and 2) road condition and antecedent precipitation. If trucks are deemed likely to cause damage to the access road, gravel would be delivered by helicopter. The existing road surface between the stockpile location and most of the gravel sites (to approximately RM 217) is rough, but primarily gravel, turning to dirt beyond this point. Best management practices described in Section 7.2.3 will minimize the impact of stormwater runoff and truck traffic on the

road surface. Further, delivery of sediment in runoff from the road surface is limited by the lack of tributaries and by distance of the road to the river. Only two mapped tributaries occur along the roadway, one at RM 219.8 and another at RM 218.5

Monitoring of the effectiveness of gravel augmentation is an important element of the proposed action. PacifiCorp's monitoring plan would provide annual feedback on placement methods and gravel movement. Based on the outcome of the monitoring, placement methods and schedule could be adjusted in future years to ensure that habitat and geomorphic objectives are being met. Implementation monitoring would consist of tracking the amount of gravel placed and any issues that arise related to methods or safety. Effectiveness monitoring would involve measuring scour, flow, and substrate composition changes at the gravel placement sites, as well as selected cross-sections downstream of the sites. Three permanent transects would be established for monitoring effectiveness of gravel placement for each site. One transect would cross the area where gravel is placed; a second transect would be located within an appropriate habitat type approximately 50-100 feet downstream of the placement site; and the third transect would be located within the next appropriate habitat type downstream. At each permanent transect, effectiveness monitors would characterize channel morphology via cross-section survey and assess the particle size distribution using the Wolman pebble count method. Each transect established across the placement site would be measured following gravel placement. Cross section and particle size data would be collected at each transect prior to the gravel placement to establish baseline conditions; measurements would also be conducted during the summer following placement to track how gravel moves within and downstream of the sites.

### 2.2.2 Interim Measure 8

A high gradient riffle in the J.C. Boyle bypass reach at RM 223.3 has been identified as a potential barrier for migrating adult fish. The riffle has large, side-cast boulders in the river channel that effectively cover all surface flow at low flow levels; removal of some of these boulders to improve passage for resident redband trout and future migrating adult anadromous salmonids is proposed.

Since there is no direct vehicle access to this site, a rock expansion technique, using a commercially available and non-hazardous material such as Bustar®, would be used to fracture the boulders to manageable sized pieces. This would eliminate the need for constructing a road and disturbing the hillside for equipment access. A standard battery powered rock drill would be used to bore holes into the boulders selected for removal. The proposed rock expansion compound is comprised primarily (97 percent) of limestone and dolomite, and becomes an inert material when cured (see Appendix B). To ensure that the compound does not come into contact with the river during placement into the drilled holes, a PVC funnel and temporary plastic liner would be used to cover the immediate area. As the inert product sets and expands it causes the rock to fracture. Once reduced to proper size, the liner would be removed and the fractured rock would be repositioned within the channel. No rock would be removed from the site, and with the possible exception of hand operated winches, no heavy equipment or machinery would be used. All proposed work would be done during agency-approved in-water work periods.

In combination with the approach described above, placement of smaller diameter rock upstream of the obstruction would be used to fill in the spaces between any remaining side-cast boulders. The objective of this work is to provide an effective migration corridor while maintaining the upstream pool feature. A mix of gravel and cobble sized river rock would be placed on the upper end of the obstruction using a helicopter. The amount of rock needed to push the water up and over the obstruction is unknown but is estimated to be less than 150 cubic yards. This treatment would be implemented using methods similar to those described for gravel augmentation for IM-7; the gravel material would be delivered by helicopter.

### 2.3 Conservation Measures/ Project Design Features

Appropriate conservation measures or project design features have been incorporated into the project study plan to minimize or avoid adverse effects to sensitive resources including Special Status and their habitats. These measures, as outlined in the project study plan and implemented per the construction contract, address in-water work, erosion and sediment control, containment of construction materials, dust control, vegetation disturbance, and site restoration. Conservation measures would include the following:

- Gravel Placement work would be performed during the period from November 1 to November 30, in the years of 2011 – 2019. Work would be performed during the hours of 8 a.m. to 4 p.m., Monday through Friday.
- All in-water work would be performed during an ODFW-approved in-water work window.
- Only the access and staging areas specified in the project study plan would be used. No other areas shall be used for staging equipment or materials.
- Work is anticipated to occur in the fall to minimize dust, impacts to recreationists and wildlife.
- Land disturbance would be minimized by using existing roads, a truck with a gravel shooter, and at some sites, a helicopter.
- As described in Section 2.2.1, if trucks are deemed likely to cause damage to the access road, gravel would be delivered by helicopter.
- Runoff control (see Section 7) would be used to ensure that turbid water and sediment are not discharged from the work area into the river channel.
- Contractors shall prevent the pollution of drains and watercourses by oil, sediment, debris, and other substances resulting from construction activities. Reasonable measures shall be taken to prevent oil, sediment, debris, or other substances from entering any watercourse.
- Following completion of the work, any disturbed areas would be re-vegetated with a native, certified noxious weed-free seed mix.
- A helicopter flight plan would be developed in coordination with BLM to avoid impacts to existing raptor nest sites and public recreation areas.

## 3.0 AFFECTED ENVIRONMENT

The affected environment for each resource presented in this section is based on a potentially affected area appropriate for that resource.

## 3.1 Special Status and Survey & Manage Species

BLM policy ensures that proposed actions requiring authorization or approval by the BLM are consistent with the conservation needs of all federally proposed, endangered, threatened and BLM sensitive species; collectively referred to as Special Status Species. In addition, based on the December 17, 2009 U.S. District Court decision, which upheld the 2001 Record of Decision (ROD) amending the Northwest Forest Plan (USDI 2001), such actions that are within the range of the northern spotted owl and are subject to the Survey and Manage direction of the ROD, must 1) fit one of the four "Pechman exemptions", or 2) comply with the 2001 ROD without Annual Species Reviews (USDI 2010). Based on an assessment of the proposed actions, the actions discussed in this EA qualify under Pechman exemption (c) "*Riparian and stream improvement projects where the riparian work is…obtaining material for placing in-stream…; and where the stream improvement work is channel and floodplain reconstruction or, removal of channel diversions…*"

## 3.2 Botanical Species

Review of the KHP Terrestrial Resources Report (PacifiCorp 2004b) and the Terrestrial Resources section of the FEIS (FERC 2007) indicates that the following Special Status and Survey & Manage plant species are known or suspected to occur within the vicinity of J.C. Boyle reach of the Klamath River (Table 2).

**Table 2. Special Status and Survey & Manage botanical species known or suspected to occur within the vicinity of the JC Boyle reach.**

| Species | Status[1] | Habitat[2] | Presence within Project Area[2] |
|---|---|---|---|
| Green's mariposa lily *Calochortus greenei* | BLM Sensitive | Occurs primarily in annual grassland, wedgeleaf ceanothus chaparral, and oak and oak-juniper woodlands. | Known to occur along J.C. Boyle peaking reach and at Copco Reservoir. However, was only documented at Iron Gate Reservoir during PacifiCorp's field surveys. |
| Mountain lady's slipper *Cypripedium montanum* | Survey & Manage (Category C) | Occurs in dry, open conifer forests, but more often in moist riparian habitats. | Documented during PacifiCorp's field surveys on a shaded and mesic, forested slope above Frain Creek, a small tributary to the Klamath River at Frain Ranch along J.C. Boyle peaking reach. |
| Bellinger's meadow foam *Limnanthes floccosa* ssp. *bellingeriana* | BLM Sensitive | Occurs in rocky, seasonally wet meadows, or along the margins of damp rocky meadows often partially shaded by adjacent trees and shrubs. | Known to occur along J.C. Boyle peaking reach. However, was not documented during PacifiCorp's field surveys. |
| Red root yampah *Perideridia erythrorhiza* | BLM Sensitive | Occurs in moist prairies, pastureland, seasonally wet meadows, and oak or pine woodlands, often in dark wetland soils and clay depressions. | Known to occur along Keno reach, at J.C. Boyle reservoir, and along J.C. Boyle peaking reach. However, was not confirmed during PacifiCorp's field surveys. |
| Rufous bulrush *Scirpus pendulus* | BLM Sensitive | Occurs along streambanks and in wet meadows. | Documented during PacifiCorp's field surveys along Fall Creek and J.C. Boyle peaking reach. |

[1]USDI 2008; USDI 2001
[2]FERC 2007; PacifiCorp 2004b

The following sections provide further discussion of the potential for Special Status and Survey & Manage botanical species to occur within or near the proposed project area based on information provided in the KHP Terrestrial Resources Report (PacifiCorp 2004b).

### 3.2.1 Green's Mariposa Lily

Greene's mariposa lily is endemic to Siskiyou County in California and Josephine and Klamath Counties in Oregon. It occurs in habitats that tend to have a high incidence of non-native and exotic/invasive plant species. Five new occurrences of Greene's mariposa lily were documented during PacifiCorp's relicensing surveys in the general vicinity of known occurrences around Iron Gate Reservoir in northern California. Yellow starthistle (*Centaurea solstitialis*), medusahead (*Taeniatherum caput-medusae*), and annual bromes form the dominant herb layer at nearly all of the sites where Greene's mariposa lily was observed growing. The deep-seated bulb of these plants appeared to be highly resistant to trampling. Deer and cattle were observed grazing on the new leaves of this species early in the season, and all occurrences found had chewed leaves. At these five new locations, flowers and fruit were observed on four plants; the leaves on the other plants had either withered or had been grazed, and only the inflorescence stem remained (PacifiCorp 2004b).

### 3.2.2 Mountain Lady's Slipper

Mountain lady's slipper is fairly widespread in western North America, but typically not abundant where it is found. The BLM and Oregon Natural Heritage Program (ONHP) records document the only occurrence of mountain lady's slipper orchid near the project area. Mountain lady's slipper was observed growing on a shaded, mesic, forested slope above Frain Creek, a small tributary to the Klamath River at Frain Ranch. Twenty to 30 plants in flower were observed during July surveys. Currently, this population is in a protected location away from river access at Frain Ranch. No additional occurrences were found during PacifiCorp's field surveys (PacifiCorp 2004b).

### 3.2.3 Bellinger's Meadow Foam

The ONHP database revealed one known population of Bellinger's meadow foam just northeast of Grizzly Butte in northern California. No new sites were found during PacifiCorp field surveys. The seasonally wet or moist habitat where meadow foam grows is not common below the canyon rim except in a few locations around J.C. Boyle reservoir (PacifiCorp 2004b).

### 3.2.4 Red Root Yampah

Red root yampah is reported to grow in seasonally wet meadows and clay depressions. These types of habitats are common above the Klamath canyon rim, but are relatively uncommon below the rim. The PacifiCorp surveys and BLM data documented 16 streamside areas and isolated meadows that support species of *Perideridia*. Ten of these 16 sites were reported to support unconfirmed occurrences of red root yampah by the BLM. A *Perideridia* species was documented in seven additional wet sites as a result of the surveys (PacifiCorp 2004b).

### 3.2.5 Rufous bulrush

Rufous bulrush was found along streambanks and in wet meadows at three locations: along Fall Creek, in the J.C. Boyle peaking reach, and in the meadows along Way Creek. There were no

rufous bulrush occurrences previously known from the area. Cattle grazing was observed at the other rufous bulrush locations, but the bulrush appeared unaffected and stood out among the surrounding cropped vegetation (PacifiCorp 2004b).

### 3.3 Noxious Weeds/Invasive Plants

PacifiCorp conducted invasive plant surveys in areas of the Klamath Basin associated with the KHP (PacifiCorp 2004b). The results of the surveys, included in the project's FEIS, found noxious weeds and non-native invasive plant species to be well-established in the study area. Many of the weed species occur in uplands or near the riparian/upland interface; however, there are no aquatic weed infestations. Target invasive species identified and mapped within the KHP during 2002-2003 inventories included the following:

Bull thistle (*Cirsium vulgare*)
Cheatgrass (*Bromus tectorum*)
Dalmatiantoadflax (*Linaria dalmatica*)
Hoary Cress (*Cardaria draba*)
Medusahead (*Taeniatherum caput-medusae*)
Puncture vine (*Tribulus terrestris*)
Scotch thistle (*Onopordum acanthium*)
Spiny cocklebur (*Xanthium spinosum*)
Yellow starthistle (*Centaurea solstitialis*)
Canada thistle (*Cirsium arvense*)
Diffuse knapweed (*Centaurea diffusa*)
Dyer's woad (*Isatis tinctoria*)
Mediterranean sage (*Salvia aethiopsis*)
Perennial pepperweed (*Lepidium latifolium*)
Russian knapweed (*Acroptilon repens*)
Scotch broom (*Cytisus scoparius*)
St. Johnswort (*Hypericum perforatum*)

The majority of the above species are concentrated near KHP facilities, including dams, canals, penstocks, powerhouses, transmission lines, roads, construction sites, and project buildings, and near the proposed stockpile site.Due to the low number of project facilities associated with the J.C. Boyle bypass and peaking reaches; invasive species occurrences within the proposed project area are relatively low. The following occurrence data for the peaking and bypass reaches are from PacifiCorp's 2002-2003 field inventories and the Klamath Falls BLM GIS database (Tables 3 and 4).

**Table 3. Invasive plant species within the J.C. Boyle peaking reach.**

| Species | Infestations | Acres |
|---|---|---|
| Hoary cress | 3 | 12 |
| Puncture vine | 1 | 0.7 |
| Russian knapweed | 1 | 0.2 |
| Spiny cocklebur | 1 | 0.2 |
| St. Johnswort | 17 | 12.1 |
| Yellow starthistle | 31 | 198.5 |
| **Total** | **54** | **223.7** |

**Table 4. Invasive plant species within the J.C. Boyle bypass reach.**

| Species | Infestations | Acres |
|---|---|---|
| Scotch broom | 1 | 0.02 |
| St. Johnswort | 3 | 2 |
| Yellow starthistle | 3 | 79.7 |
| **Total** | **7** | **81.7** |

In addition, reed canarygrass (*Phalaris arundinacea*) was present in 78 (48 percent) of the riparian vegetation plots sampled in the J.C. Boyle peaking reach. Reed canary grass is also the most abundant species in the varial zone (zone of periodic inundation) and is hypothesized to be particularly abundant because of the frequently fluctuating river flows. Vegetation surveys identified infestations of Himalayan blackberry (*Rubus armeniacus*) along the margins of irrigated wetland pastures, and cheatgrass was also common in upland areas and along roadsides associated with the peaking reach.

### 3.4 Wildlife Species

Based on a thorough review of the KHP Terrestrial Resources Report (PacifiCorp 2004b), the Terrestrial Resources section of the FEIS (FERC 2007), and discussions with BLM personnel, the following Special Status wildlife species are known or suspected to occur within the J.C. Boyle reach of the Klamath River (Table 5). No Survey & Manage wildlife species are documented or suspected within the vicinity of the proposed project area (FERC 2007; Broyles 2011).

**Table 5. Special Status wildlife species known or suspected to occur within the vicinity of the J.C. Boyle reach.**

| Species | Status[1] | Habitat[2] | Presence within Project Area[2] |
|---|---|---|---|
| Northwestern pond turtle *Actinemys m. marmorata* | BLM Sensitive | Prefers quiet water in small lakes, marshes, streams, and rivers; requires basking sites, such as logs, rocks, mud banks, or cattail mats; nests in open canopy sites with loose soil. | Documented during PacifiCorp's surveys along the J.C. Boyle bypass reach and peaking reach. |
| American peregrine falcon *Falco peregrines anatum* | BLM Sensitive | Breeds at suitable nest sites on cliffs and rocky outcroppings. Uses a variety of habitats, including open grassland areas, forest stands, and reservoirs throughout the project vicinity. | Known to occur along Keno reservoir and the J.C. Boyle bypass reach but not documented during PacifiCorp's surveys. |

**Table 5. Special Status wildlife species known or suspected to occur within the vicinity of the J.C. Boyle reach (continued).**

| Species | Status[1] | Habitat[2] | Presence within Project Area[2] |
|---|---|---|---|
| Bald eagle<br>*Haliaeetus leucocephalus* | State Threatened/ BLM Sensitive | Nests in large conifers within several miles of water; forages in rivers and lakes for fish and waterfowl; requires large snags for perching and conifers for night roosts. | Documented during PacifiCorp's surveys at all project reservoirs and in all project reaches throughout the KHP. |
| Lewis' woodpecker<br>*Melanerpes lewis* | BLM Sensitive | Associated with oak woodlands and mixed oak conifer habitat, but also can be found in a variety of open forest stands including ponderosa pine and cottonwood-dominated riparian areas. | Documented during PacifiCorp's surveys in upland habitats along J.C. Boyle peaking reach. |
| Osprey<br>*Pandion haliaetus* | Native Significant | Nests in all forested vegetation types with large trees near water, as well as on platforms erected in less optimal habitat. | Documented during PacifiCorp's surveys along the J.C. Boyle bypass and peaking reach. A minimum of 16 active osprey nests, both artificial nesting platforms and natural sites, are located along the shores of the KHP reservoirs and river reaches. |
| American white pelican<br>*Pelecanus erythrorhynchos* | BLM Sensitive | Nests along lakes and marshes and uses almost any lake outside of the breeding season; in southern Oregon, found to be associated with only a few, large, inland bodies of water. | Documented during PacifiCorp's surveys along the J.C. Boyle bypass reach. |
| White-headed woodpecker<br>*Picoides albolarvatus* | BLM Sensitive | Nests in cavities typically located in ponderosa pine at least 18 inches in diameter. Occurs in lodgepole pine, ponderosa pine, and<br>Klamath mixed conifer forests with trees greater than 11 inches in diameter. | Documented during PacifiCorp's surveys along J.C. Boyle bypass reach. |
| Foothill yellow-legged frog<br>*Rana boylii* | BLM Sensitive | Inhabits perennial slow-moving streams with rocky bottoms, large cobble bars or in-channel islands, coupled with slower backwater areas for larval rearing. | Known to occur along J.C. Boyle bypass reach near J.C. Boyle dam. However, was not documented during PacifiCorp's surveys. |

**Table 5. Special Status wildlife species known or suspected to occur within the vicinity of the J.C. Boyle reach (continued).**

| Species | Status[1] | Habitat[2] | Presence within Project Area[2] |
|---|---|---|---|
| Northern spotted owl *Strix occidentalis caurina* | Federally Threatened | Inhabits ponderosa pine forest and mixed conifer forest with trees greater than 11 inches in diameter. Prefers old-growth forests with multi-layered tree canopies. | Documented during PacifiCorp's surveys near J.C. Boyle reservoir and along J.C. Boyle peaking reach. |

[1]USDI 2008
[2]FERC 2007; PacifiCorp 2004b

The following sections provide further discussion of the potential for Special Status wildlife species to occur within or near the proposed project area based on information provided in the KHP Terrestrial Resources Report (PacifiCorp 2004b).

### 3.4.1 Northwestern Pond Turtle

A minimum of 600 northwestern pond turtle detections were recorded during PacifiCorp's relicensing field studies. In general, northwestern pond turtles have a potential for occurrence in suitable habitat throughout the project area. Suitable pond turtle habitat includes permanent and intermittent waters associated with marshes, streams, rivers, ponds, and lakes, and they tend to favor sites with emergent logs, boulders, and shoreline edges for basking. Pond turtles have been found in the project area in a variety of aquatic habitats and are common-to-abundant in many reservoirs and river reaches. In addition, suitable nesting habitat occurs throughout most of the reservoir and river reaches. The reservoirs, especially Keno reservoir, provide abundant pond turtle habitat. The daily fluctuation at J.C. Boyle reservoir and in the J.C. Boyle peaking reach may affect turtle access to riparian and wetland habitat and basking structures when water levels are low (PacifiCorp 2004b).

### 3.4.2 American Peregrine Falcon

No American peregrine falcons were detected during PacifiCorp's relicensing field studies. However, in the spring of 2011, one active nest site was found within the project vicinity on private land along the bypass reach. A historic nest site is suspected at Secret Springs Bluff south of Frain Ranch, and a historic nest was known to exist at Grizzly Butte through the mid-1970s. Migrating and over-wintering birds occasionally may be found in a variety of habitats, including open grassland areas, forest stands, and reservoirs throughout the vicinity. The 225-foot cliff above Salt Caves and the cliffs near the J.C. Boyle powerhouse were both rated as highly suitable for peregrine nesting (PacifiCorp 2004b).

### 3.4.3 Bald Eagle

A minimum of 39 bald eagle detections were recorded during relicensing field surveys. The largest number of bald eagle detections (11) was recorded along J.C. Boyle reservoir. Copco reservoir detections (8) accounted for the second highest amount of bald eagle detections. The majority (20) of the total bald eagle detections were associated with flying or general use of lacustrine reservoir habitat. Bald eagles also were detected during goshawk protocol surveys, reservoir surveys, Rapid Ornithological Inventories (ROI), and incidental to other KHP field

studies. Five bald eagle detections were recorded during northern goshawk protocol surveys, with four along the J.C. Boyle reservoir and one in the J.C. Boyle bypass. Eight bald eagles were recorded during reservoir surveys with four near Copco reservoir, one near J.C. Boyle reservoir, and three near Keno reservoir. Bald eagles also were detected during censuses associated with an ROI conducted in the J.C. Boyle peaking reach. During previous studies, the Grizzly Butte pair of bald eagles was documented perching and foraging along the Klamath River in the J.C. Boyle peaking reach most often during the winter when waterfowl were most common (PacifiCorp 2004b).

Bald eagle nest surveys were conducted by the Oregon Cooperative Fish and Wildlife Research Unit in the KHP study area on March 27, 2002, and May 29, 2002. Nineteen nests were checked near the KHP study area. In 2003, the Oregon Cooperative Fish and Wildlife Research Unit flew bald eagle aerial surveys over the same 19 nests on March 27 and May 28. The 2003 aerial bald eagle surveys found a "new" nest located approximately 540 feet southeast of Copco dam. Of the ten bald eagle nests closest to the KHP (including the newly discovered "Copco dam nest"), eight nests were occupied and three were found to fledge young in 2003. Only the new Copco dam, Moore Park East, and Topsy and Jenny Creek nests are within 1 mile of any KHP facility. However, the Pony Express nest is located immediately along the J.C. Boyle peaking reach. The nesting season for bald eagles in Oregon generally runs from February through mid-August (PacifiCorp 2004b).

The largest known wintering population of bald eagles in the contiguous United States occurs in the Klamath basin. A large communal roost is located south of Klamath Falls, Oregon, in the Bear Valley National Wildlife Refuge west of Worden, California. The current condition of KHP reservoirs may provide foraging opportunities for bald eagles in the study area, with nearby trees serving as perches. The reservoirs provide waterfowl habitat and have high fish production per river mile (relative to riverine reaches) across the study area. During periods when waterfowl were not abundant, most eagle use in the J.C. Boyle peaking reach occurred when flows were low (less than 1,000 cubic feet per second [cfs]) (PacifiCorp 2004b).

### 3.4.4 Lewis' Woodpecker

During general relicensing surveys in 2002, 13 Lewis' woodpecker detections were recorded adjacent to the Iron Gate reservoir, the J.C. Boyle peaking reach, and the Iron Gate-Shasta section of the Klamath River. Lewis' woodpeckers also were detected in the Iron Gate, Iron Gate-Shasta, J.C. Boyle peaking reach, and Copco bypass sections during ROI avian censuses, and incidental to other field studies. The detections were nearly equally divided among montane hardwood-oak and various riparian cover types. Data on Lewis' woodpecker relative abundance per survey show that the highest average abundance of Lewis' woodpeckers were recorded during plot surveys around the Iron Gate-Shasta section. Lewis' woodpeckers are largely associated with oak woodlands and mixed oak-conifer habitats, but also can be found in a variety of open forest stands including ponderosa pine and cottonwood-dominated riparian areas. Lewis' woodpeckers may occur throughout the project vicinity year-round (PacifiCorp 2004b).

### 3.4.5 Osprey

Sixty osprey detections were recorded during relicensing surveys, with more than half of these detections located around Copco (16) and Iron Gate (15) reservoirs. Typically, ospreys were detected flying, either foraging in association with open water habitat or transiting from a

reservoir to another habitat type. Ospreys were also noted during ROI censuses along the Iron Gate-Shasta section and in the J.C. Boyle peaking reach and during northern goshawk protocol surveys in July 2002, with four detections in the J.C. Boyle bypass and one along the J.C. Boyle reservoir. Overall, ospreys were commonly encountered during 2002 field studies. A minimum of 16 active osprey nests, both artificial nesting platforms and natural sites, are located along the shores of the Klamath River reservoirs and river reaches, including one nest site along the J.C. Boyle reservoir, and one in the J.C. Boyle peaking reach. This species is a summer breeder in the project vicinity and is likely to occur around active and historic nest sites (PacifiCorp 2004b).

### 3.4.6 American White Pelican

During PacifiCorp's general relicensing surveys, 837 American white pelican detections were recorded. Most pelicans were detected on reservoirs; the highest number of detections (331) for this species was associated with Keno reservoir. In addition to using reservoirs, this species also occurs along the J.C. Boyle bypass and Keno Canyon reaches. American white pelicans occur year-round in the vicinity of the project area. Although suitable breeding habitat for the species occurs near the project area, individuals occurring within the project area are likely either non-breeding birds or are associated with Upper Klamath Lake breeding populations, because American white pelicans are known to travel up to 60 miles to feed (PacifiCorp 2004b).

### 3.4.7 White Headed Woodpecker

One white-headed woodpecker was detected during relicensing field studies along the J.C. Boyle reservoir in June 2002. Although the plot was characterized as riparian/wetland scrub-shrub, the bird was noted in a ponderosa pine tree and likely was associated with ponderosa pine habitat located adjacent to the plot. White-headed woodpeckers are closely associated with ponderosa pine within their range in southern Oregon. The species requires nest cavities, which also typically are located in ponderosa pine. White-headed woodpeckers are likely to occur in the large stands of ponderosa pine with suitable snag densities located in the J.C. Boyle reservoir section and throughout the project vicinity (PacifiCorp 2004b).

### 3.4.8 Foothill yellow-legged frog

No foothill yellow-legged frogs were detected during PacifiCorp's relicensing field studies. Historic detections of foothill yellow-legged frogs reveal past occurrence in the mainstem Klamath River in the J.C. Boyle bypass. It is presumed that habitat along the mainstem Klamath River has been altered to the degree that the species no longer occupies historical sites (PacifiCorp 2004b).

### 3.4.9 Northern Spotted Owl

Northern spotted owl protocol surveys were conducted in suitable habitat located throughout the KHP vicinity during the 2002 and 2003 field seasons. In 2002, five northern spotted owl detections were recorded, including one male along the J.C. Boyle peaking reach, and one pair along the J.C. Boyle peaking reach in the same general area. None of the detections were within 5 miles of any KHP facilities. Five spotted owl detections also were recorded during 2003 protocol surveys. It is speculated that these 2003 records reflect the detection of three or four owls. A pair of owls was detected southwest of the Beswick Ranch in the J.C. Boyle peaking reach. The location of this pair is consistent with that of a historic pair of owls monitored by the USFS. A lone female owl was detected earlier in the season approximately 0.5 mile from the pair

described above. Although the National Council for Air and Stream Improvement (NCASI) monitors a breeding pair of owls in the upper J.C. Boyle peaking reach, the significant distance from the known breeding location to the area of detection near the J.C. Boyle reservoir may indicate the 2003 detections reflect a single, isolated, un-paired female (PacifiCorp 2004b).

Based on conversations with the BLM Biologist, Matt Broyles, northern spotted owls within the vicinity of the proposed project are likely single owls which only move down into the river valley during the winter months to forage (M. Broyles, BLM, personal communication March 22, 2011).

### 3.5 Aquatic Species

Review of the KHP Fish Resources Report (PacifiCorp 2004c), the KHP Terrestrial Resources Report, the Aquatic and Terrestrial Resources sections of the FEIS (FERC 2007), the recent assessment of dam removal alternatives on resident fish (Buchannan et. al. 2011), and discussions with BLM personnel indicates that the following Special Status and Survey & Manage aquatic species are known or suspected to occur within the J.C. Boyle reach of the Klamath River (Table 6).

**Table 6. Special Status and Survey & Manage aquatic species known or suspected to occur within the vicinity of the J.C. Boyle reach.**

| Species | Status[1] | Habitat[2] | Presence within Project Area[2] |
|---|---|---|---|
| Klamath smallscale sucker *Catostomus rimiculus* | Native Significant | Most abundant in deep, quite river pools, and slow moving stretches of tributaries. Can be found in fast flowing sections of rivers and streams when feeding or breeding. Spawning occurs in tributaries (March-April).[3] | Documented within the J.C. Boyle peaking reach. |
| Shortnose sucker *Chasmistes brevirostris* | Federally Endangered | Primarily found in shallow lakes and reservoirs; also occur in warm, sluggish rivers; majority of spawning occurs in tributaries.[3] | Documented within the J.C. Boyle peaking reach and bypass reach during 2001 relicensing surveys. |
| Lost River sucker *Deltistes luxatus* | Federally Endangered | Primarily found in shallow lakes and reservoirs; also occur in warm, sluggish rivers; majority of spawning occurs in tributaries.[3] | Unknown; no species were found within the J.C. Boyle reach during relicensing surveys. However, this species has been documented within the J.C. Boyle and Copco reservoirs. |
| Pacific giant salamander *Dicamptodon tenebrosus* | Native Significant | Inhabits cool, moist forests adjacent to streams and lakes and are also found in moist talus. May be found in low to moderate gradient tributaries with pool morphology and rocky bottoms. | During relicensing surveys, PacifiCorp found larval forms of Pacific giant salamanders in the J.C. Boyle bypass reach. |

**Table 6. Special Status and Survey & Manage aquatic species known or suspected to occur within the vicinity of the J.C. Boyle reach (continued)**

| Species | Status[1] | Habitat[2] | Presence within Project Area[2] |
|---|---|---|---|
| Klamath rim pebblesnail *Fluminicola* n. sp. 3 | BLM Sensitive / Survey & Manage (Category A) | Occurs in springs with unpolluted, cold, clear, flowing water. | Documented in spring habitat within the J.C. Boyle peaking reach. |
| Nerite pebblesnail *Flumincola* n. sp. 11 | BLM Sensitive / Survey & Manage (Category A) | Occurs in springs with unpolluted, cold, clear, flowing water. | Unknown; no species were found during relicensing surveys. |
| Scale lanx (limpet) *Lanx klamathensis* | BLM Sensitive | Occurs on cobbles and boulders in large, spring-fed lakes, rivers and streams with unpolluted, cold, clear, well-oxygenated flowing waters. | Documented in river habitat within the J.C. Boyle peaking reach. |
| Redband trout *Oncorhynchus mykiss ssp.* | BLM Sensitive | Lakes, rivers, and major tributaries. | Documented within the J.C. Boyle peaking reach and bypass reach. |

[1]USDI 2008; USDI 2001; [2]FERC 2007; PacifiCorp 2004b, 2004c; [3]Buchanan et. al. 2011

The following sections provide further discussion of the potential for Special Status and Survey & Manage aquatic species to occur within or near the proposed project area based on information provided in the KHP Fish and Terrestrial Resources reports, and the FEIS (FERC 2007).

### 3.5.1 Klamath smallscale sucker

Electrofishing surveys of three sections of the J.C. Boyle peaking reach conducted in 1984 by the City of Klamath Falls documented smallscale suckers throughout the peaking reach. Relicensing surveys conducted by PacifiCorp in 2001 and 2002 also confirmed presence of the Klamath smallscale suckers within the J.C. Boyle peaking reach. However, no smallscale suckers were collected either year within the bypass reach (PacifiCorp 2004c).

### 3.5.2 Shortnose and Lost River Suckers

The shortnose and Lost River suckers were listed as endangered on July 18, 1988 by the USFWS (53 FR 27130). A recovery plan was completed in 1993 (USFWS 1993). The two species are also on the protected species lists of the states of California and Oregon (CDFG 2004; ODFW 2004) The two listed sucker species are part of a group of suckers that are large, long-lived (Lost River suckers and shortnose suckers have been aged to 43 and 33 years, respectively), late-maturing, and live in lakes and reservoirs but spawn primarily in streams. Collectively, this group of suckers is commonly referred to as lake suckers (National Research Council 2004). Both suckers are endemic to the Upper Klamath River basin (including Upper Klamath Lake and some of its tributaries) and are limited in their distribution in the region. There are no self-sustaining populations of endangered suckers below Keno Dam, although individuals have been found in downstream reservoirs that represent a reserve population that could be available to supplement populations should there be a catastrophic event affecting these species.

Fisheries sampling conducted by PacifiCorp in 2001 and 2002 indicates that the fish population in the J.C. Boyle peaking reach and bypass reach is comprised primarily of speckled dace, marbled sculpin, and redband trout. Shortnose sucker was the least common of the four species that were collected in 2001, and none were identified in 2002 sampling, although some unidentified suckers were collected in 2002 (FEIS 2007). Sampling efforts in 2001 resulted in the collection of approximately eight shortnose suckers. No Lost River suckers were collected either year. It is likely that the presence of shortnose and Lost River suckers in the J.C. Boyle peaking reach is limited to downstream emigration of juveniles and adults from their preferred habitat (PacifiCorp 2004c). The project area is within the Proposed Critical Habitat Unit #3 for the shortnose sucker and Lost River sucker.

### 3.5.3 Pacific giant salamander

The Pacific giant salamander was documented during PacifiCorp's field surveys in only two areas: Fall Creek and the J.C. Boyle bypass reach. It is known to occur in other streams near the project area, but generally at higher elevations (PacifiCorp 2004b). BLM has confirmed Pacific giant salamander presence within the mainstem and one small spring fed tributary of the river, where the salamander retains its neotenic form (M. Broyles, BLM, personal communication March 22, 2010).

### 3.5.4 Aquatic mollusks

Distribution of aquatic mollusks in the Klamath River basin has been documented from sampling that occurred from 1995 through1998 by Frest and Johannes (1998) and from earlier work from Taylor (1981) in California. Frest and Johannes found *Fluminicola* sp. in spring habitat and *Lanx klamathensis* in river habitat within the J.C. Boyle peaking reach. Both species have been identified as "cold water biota" along with several other species that occur in riverine habitat. Distribution of cold water biota aquatic mollusk species in the Klamath River basin is limited to areas with unpolluted, cold, clear, flowing water. These species are intolerant of impoundments, turbid water, slack water, herbicides, pesticides, nitrates or phosphates, high turbidity, unstable substrates, and frequent water surface fluctuations (PacifiCorp 2004b).

This project meets the "Pechman Exemptions" (see discussion of Survey and Manage on pg. 10 above) so surveys for new sites are not required. Protection of known sites is still required. In July 2011, the BLM GEOBOB database was queried for known sites of special status aquatic mollusk species, in the river, in the project area. There are several known sites of special status aquatic mollusks in the river in the project area. However, none of the known sites are at or near the proposed gravel deposition sites. Consequently, special status aquatic mollusks are not discussed further in this document.

### 3.5.5 Redband trout

The ODFW classifies redband trout in the Klamath River and its tributaries as a unique indigenous population. Studies by the ODFW and City of Klamath Falls reported that spawning gravel in the J.C. Boyle reach was scarce and limited to small areas behind boulders. During PacifiCorp's relicensing studies, spawning trout and fry were observed in the J.C. Boyle bypass reach. Trout spawning has not been documented in the peaking reach, although potential spawning areas may exist at tributary confluences (PacifiCorp 2004c).

Gravel in the J.C. Boyle reach is limited due to a variety of factors, including gravel retention behind the KHP dams, few tributary gravel sources, and the steep gradient that counters gravel accumulation. Nonetheless, the redband trout population in the peaking reach has been characterized by the National Park Service as highly productive and self-sustaining. Adult trout population estimates made in August 1984 were 890 fish per mile and 1,911 fish per mile, respectively, in the upper six miles of the reach and the next five miles to the Oregon/California border. The J.C. Boyle bypass reach is within the ODFW Wild Trout Management Area. Based on angler survey data from 1978 to 1985 the average trout per hour catch rate in this reach is 0.62 (PacifiCorp 2004c).

## 3.6 Recreation

The J.C. Boyle reach of the Klamath River is an established recreation area. The J.C. Boyle bypass reach is used for fishing and general riverside recreation; the peaking reach is used for whitewater boating, fishing, and camping (PacifiCorp 2004d). Developed recreation sites in the Oregon portion of the J.C. Boyle reach include the Spring Island Boater Access (BLM) and the Klamath River Campground (BLM) (see Appendix A). There are also four identified dispersed camping sites along the Oregon portion of the J.C. Boyle reach, including a large area at Frain Ranch.

### 3.6.1 Fishing

The J.C. Boyle reach is known for its native trout fishery. Trout caught in the bypass reach are typically in the 5 to 14 inch range (PacifiCorp 2004d). The fishery in this reach is considered good, but the average fish size is smaller than those in the peaking reach (PacifiCorp 2004d). Access to the river for fishing in the J.C. Boyle bypass reach is primarily limited to areas near the powerhouse and dam, where there is approximately one half-mile of fisherman trail along the river. Steep informal trails on the right river bank provide access to the middle part of the bypass reach, but brush and boulders preclude heavy use (PacifiCorp 2004d). Most anglers fish from the bank, though some, particularly fly anglers, wade into the river to fish (PacifiCorp 2004d).

Described by the BLM Wild and Scenic River Study as “one of the better fly fishing rivers in Oregon” (BLM 1990), the native trout fishery in the peaking reach is considered excellent (PacifiCorp 2004d). The average fish is 12 to 14 inches and the reach is generally preferred by anglers over the bypass reach (PacifiCorp 2004d). Anglers gain access to the upper part of the reach by traveling the gravel roads on both sides of the river, and using informal trails (PacifiCorp 2004a). Anglers primarily wade and fish from the shore, though some fish the peaking reach by boat (PacifiCorp 2004d). The most popular fishing site in the Oregon portion is about 5 miles south of the powerhouse in the 2- to 3-mile stretch of river near Frain Ranch (PacifiCorp 2004d).

In a survey of visitors (n=694) conducted in 2001 and 2002, 49 percent of respondents who visited the J.C. Boyle peaking reach reported that bank fishing was an activity that they or a member of their party was engaged in during their visit, and 10 percent reported fishing from a boat (PacifiCorp 2004a). In the Oregon portion of the reach, trout fishing is allowed all year, with a bag limit of one trout per day, and catch and release only between June 16 and September 30 (ODFW 2011).

### 3.6.2 Whitewater Boating

In 2002, the BLM estimated that there were approximately 5,000 visitor days per year for whitewater boating in the J.C. Boyle peaking reach (PacifiCorp 2004d). Craft used on the reach include kayaks, rafts, and occasionally, inflatable kayaks. River conditions and the degree of use are dictated by controlled flows and for the most part, limited to the peaking reach. Whitewater boating was the most common activity reported by visitors to the J.C. Boyle peaking reach in a survey of visitors conducted in 2001 and 2002 (PacifiCorp 2004a); 69 percent of participants in the visitor study reported taking part in whitewater boating, and 24 percent reported canoeing/kayaking (PacifiCorp 2004d).

There are 76 rapids within the 17 mile peaking reach, and the reach is considered Class IV+. The first several miles are a Class III whitewater run. Class V rapids are then encountered in a reach known as "Hell's Corner." Consistent challenging rapids follow in a five-mile gorge (beyond the proposed project area). Approximately 90 percent of individuals participating in whitewater boating in the reach hire a private outfitter. More than 20 outfitters have permits with the BLM for travel through this reach (PacifiCorp 2004d).

The Spring Island Boaters Access downstream of the J.C. Boyle powerhouse is a heavily used put-in site. Boater put-in and take-out opportunities are also available 2.5 miles further downstream at the BLM Klamath River Campground. Frain Ranch and the Stateline take-out site in California are common take-out sites. The most common day trip for rafters is from the Spring Island Boater Access site to Fishing Access Site 6 (in California), which outfitters may use for a fee (PacifiCorp 2004d).

Though boating opportunities exist year round, most trips occur from April through October. Based on interviews conducted in 2001 and 2002, the "prime season" for guided trips is June through August, with the earliest reported trips occurring in April and the latest in September.

Among private boaters, the "prime season" was considered to be from July through September, with the earliest trips occurring in March and the latest trips in October. Day trips are the norm; only seven percent of trips in 2001 were overnight (PacifiCorp 2004d).

### 3.6.3 General Riverside Recreation/Other In-Water activities

Tent camping (62 percent) and resting/relaxing (59 percent) were the second and third most common activities that visitors to the J.C. Boyle peaking reach participated in, based on responses to the 2001 and 2002 visitor surveys (PacifiCorp 2004d). Hiking (49 percent) and sightseeing (46 percent) were also popular activities. In-water activities besides whitewater boating included swimming (38 percent) and tubing (11 percent).

Though there are some good off-trail hiking opportunities and riverside clearings along parts of the bypass reach, hiking/walking appears to be limited in this area (PacifiCorp 2004d). There are also a few pools and runs in the bypass that could be used as swimming holes, but the spring-fed water is relatively cold. Some dispersed camping is known to occur in an area by the powerhouse. Hiking/walking appears to be more common along the peaking reach, where there is access on both sides of the river (PacifiCorp 2004d). There are several informal trails as well as portions of the riparian area that offer good off-trail hiking opportunities. The BLM's Klamath

River Campground is within the peaking reach, as are a few dispersed camping sites. The Frain Ranch area is a popular dispersed camping site, as well as a base for all-terrain vehicle use, particularly on summer weekends and during the fall hunting season (PacifiCorp 2004d).

### 3.6.4 Overall Recreation Use

For the 2004 Recreational Final Technical Report, PacifiCorp developed estimates of recreation use during different seasons based on site operator estimates, user surveys, a series of instantaneous counts, and 3-hour field observations made in 2001 and 2002 (PacifiCorp 2004d). Combined recreation day estimates from this report for recreation sites along the J.C. Boyle peaking reach are presented below (Table 7). A "recreation day" is defined as a visit by a single person during any portion of a 24-hour day. Seasons are defined as follows:

- Early shoulder season: mid-April to just prior to Memorial Day
- Peak season: Memorial Day through Labor Day
- Late shoulder season: after Labor Day through late October
- Off season: November through mid-April

**Table 7. Estimated recreation days in the J.C. Boyle peaking reach in 2001 and 2002.[1]**

| Early Shoulder Season | Peak Season | | Late Shoulder Season | Off Season | Total |
|---|---|---|---|---|---|
| | Weekday | Weekend | | | |
| 1,094 | 3,356 | 7,023 | 1,174 | 0 | 12,647 |

[1]PacifiCorp 2004(d)

The above estimates show that 82 percent of the recreational use between the J.C. Boyle powerhouse and Copco Reservoir occurs in the peak season. By 2010, annual recreation days between J.C. Boyle powerhouse and Copco Reservoir were projected to reach 13,369 (PacifiCorp 2004d).

## 3.7 Archaeological, Historic, and Cultural Resources

The majority of the project area overlaps with the area that was surveyed for cultural resources as part of PacifiCorp's relicensing studies (PacifiCorp 2004e). While specific locations must be kept confidential, they include archaeological sites and isolated finds consisting of stone tools and stone tool debitage. One location proposed for gravel "shooting" is within the boundaries of an archaeological site, however an existing road traverses the site and project activities would not leave the existing road.

As lead federal agency, the BLM has assessed the potential of the project to impact archaeological, historic, and cultural resources. The BLM has confirmed that historic properties would not be adversely impacted via project design. The BLM is consulted with the State Historic Preservation Office (SHPO) and the region's tribes to ensure that concerns about potential impacts to archaeological, historic, and cultural resources are addressed.

## 3.8 Wild and Scenic River and Areas of Critical Environmental Concern (ACEC)

The 11-mile stretch of the Klamath River between the J.C. Boyle powerhouse and the Oregon/California state line was designated an Oregon State Scenic Waterway in 1988 and was

added to the federal Wild and Scenic Rivers system in 1994; the Secretary of the Interior designated this segment as scenic. The J.C. Boyle peaking reach features steep canyon walls, large basaltic boulder fields, pine forests, a riparian zone composed of grasses and sedges as well as thicker forest and brush. Development is limited to gravel roads, a few historic and active ranching buildings, and some remnant bridge pilings or low-head diversion weirs on the lower river (PacifiCorp 2004d). In addition to scenery, this stretch of the Klamath was designated a Wild and Scenic River for five other Outstandingly Remarkable Values: the redband trout fishery, diverse wildlife habitats, recreation opportunities associated with whitewater boating, historic and prehistoric sites, and evidence of Native American traditional use for at least 7,000 years (BLM 1990). This stretch of the river and its riparian zone are also designated an Area of Critical Environmental Concern by the BLM (BLM 2007a).

### 3.9 Wetlands and Riparian Zones

As part of vegetation cover type/wildlife habitat inventory and mapping for the KHP relicensing process, a preliminary vegetation map was produced in early 2002 that included riparian and wetland vegetation throughout the KHP study area. During field work in 2002, the preliminary vegetation map and GIS data were field-verified and updated. Acreage and percent-of-reach data for the wetland and riparian habitats mapped within the J.C. Boyle peaking and bypass reaches of the KHP are shown below (Tables 8 and 9).

**Table 8. Acreage of wetland habitats mapped within the J.C. Boyle Peaking reach.**

| | | |
|---|---|---|
| Palustrine Aquatic Bed | 0.1 | 0 |
| Palustrine Emergent | 89.9 | 8.3 |
| Palustrine Forested | 0 | 5.0 |
| Palustrine Scrub-Shrub | 0 | 0.8 |
| **Total** | **89.9** | **14.1** |
| **Percent of Reach** | **0.4%** | **0.7%** |

**Table 9. Acreage of riparian habitats mapped within the J.C. Boyle reach.**

| Riparian Habitat | J.C. Boyle Peaking reach | J.C. Boyle Bypass Reach |
|---|---|---|
| Riparian Deciduous | 170.0 | 0.5 |
| Riparian Grassland | 13.8 | 20.2 |
| Riparian Mixed | 12.0 | 0 |
| Riparian Shrub | 32.5 | 11.4 |
| **Total** | **228.3** | **32.1** |
| **Percent of Reach** | **1.2%** | **1.6%** |

The occurrence, continuity, and extent of riparian and wetland vegetation areas associated with the J.C. Boyle peaking and bypass reaches are dictated by hydrology inputs, geomorphological constraints, and floodplain substrate characteristics, especially in the steeper reaches. These reaches tend to have narrow, often discontinuous bands of riparian vegetation comprised primarily of reed canarygrass, and the cobble and boulder substrates are less likely to facilitate the formation of riverine wetlands.

## 3.10 Hydrology, Channel Characteristics, and Floodplains

### 3.10.1 Hydrology

Precipitation in the Klamath basin is seasonal, with 60 percent of the annual precipitation in the basin falling between November and March; the wettest period occurring in December and January (PacifiCorp 2004b). These patterns are closely correlated to runoff and the river's flow regime (PacifiCorp 2004b). Key tributaries to the peaking reach are Rock Creek at RM 213.9 and Shovel Creek at RM 206.5. PacifiCorp's current FERC-required minimum flow release in

the J.C Boyle bypass reach is 100 cfs. Flows in the J.C. Boyle bypass reach increase downstream as the 100 cfs flow combines with spring accretion flows of 220 to 250 cfs to create a total flow of 320 to 350 cfs at the downstream end of the J.C. Boyle bypass reach.

Under current operations, the J.C. Boyle powerhouse is operated in a power peaking mode when inflow to J.C. Boyle reservoir is below 3,000 cfs. In this mode, inflow to the reservoir is typically stored at night and then diverted to the powerhouse to operate the turbines for a portion of the following day to meet the peak daytime energy demand. When inflow to J.C. Boyle reservoir is above 3,000 cfs, the powerhouse typically operates continuously and spill from the dam occurs. Spill typically takes place during the higher flow months of January through May, when river flows exceed the capacity of the J.C. Boyle powerhouse and the instream flow requirements.

The ramping limit below the J.C. Boyle powerhouse is 9 inches per hour (measured downstream at USGS gage 1151070). Flows released to the peaking reach from J.C. Boyle powerhouse during peaking operations are ramped up to either one turbine operation (up to 1,500 cfs) or two turbines operation (up to 3,000 cfs). When generation is not occurring at the J.C. Boyle powerhouse (and J.C. Boyle Dam is not spilling), typical base flows in the peaking reach are about 320 to 350 cfs, consisting of the 100 cfs minimum flow release from J.C. Boyle dam and the accretion of 220 to 250 cfs of spring flow in the J.C. Boyle bypass reach.

Peak flows in both reaches occur when inflow exceeds reservoir storage and powerhouse capacities and water is released at J.C. Boyle Dam. Estimated peak flow recurrences at the U.S. Geological Service (USGS) stream gage just downstream of the J.C. Boyle powerhouse in the peaking reach are shown in Table 10. These data are based on annual instantaneous peak flows recorded at the gage and can be used to analyze the frequency of gravel transport. Peak flows in the bypass reach upstream of the powerhouse are lower than those at the gage since the powerhouse is generally operating during spill events.

**Table 10. Estimated peak flow frequency, Klamath River below J.C. Boyle Power Plant (USGS gage 1151070).**

| Return period (years) | Estimated peak flow (cfs) |
|---|---|
| 1.25 | 3,366 |
| 2 | 5,147 |
| 5 | 8,019 |
| 10 | 10,190 |
| 25 | 13,220 |
| 50 | 15,700 |
| 100 | 18,360 |

(Based on 51 years of instantaneous peak flow records)

Critical shear stress data analyzed during the relicensing studies suggest that flows from 1,451 to 44,869 cfs would be required to transport the existing cobble and boulder substrate in different reaches, and flows of 1,228 to 4,786 would be required to transport smaller, gravel sized particles (Table 11).

**Table 11. Substrate characteristics of the J.C. Boyle sub-reaches.**

| Sub-reach | Dominant/ subdominant substrate (aquatic habitat mapping) | $D_{50}$ (mm) | Local gradient (ft/ft) | Estimated discharge to mobilize existing substrate (cfs) | Estimated discharge to mobilize 34mm (1.75 in) substrate (cfs) |
|---|---|---|---|---|---|
| Bypass Upstream of RM 220.9 | Large boulder/small boulder | 55-172 | 0.014 | 1,451 | 1,228 |
| Bypass Downstream of RM. 220.9 | Large boulder/small boulder | 20-128 | 0.023 | 3,855 | 1,778 |
| Peaking Downstream of Power Plant at USGS gage | Large boulder/small boulder/large cobble | 101-136 | 0.017 | 4,391 | 2,340 |
| Peaking at BLM Campground | Large cobble/small cobble | 25-154 | 0.003 | 44,869 | 4,786 |
| Peaking Gorge Reach | Boulder/cobble | 14-40 | 0.02 | 3,410 | 3,186 |
| Near Shovel Creek | Cobble/large gravel | 50-187 | 0.006 | 4,685 | 1,283 |

Source: PacifiCorp 2004a

### 3.10.2 Channel Characteristics and Floodplains

There are four geomorphic reaches within the J.C. Boyle reach, each with different channel gradient and confinement characteristics. The J.C. Boyle bypass reach is confined, relatively high gradient (average gradient 1.9 percent) bedrock channel with large boulders and limited sediment storage areas. Sediment sources in the reach include three small landslides and the emergency spillway. Gradient in the J.C. Boyle peaking reach between the powerhouse and Frain

Ranch (RM 214.5) decreases in a downstream direction with an average reach gradient of 0.7 percent. This reach is less confined, flanked by a floodplain and multiple terrace levels. The pool/riffle sequences have a boulder and cobble substrate.

Between Frain Ranch and RM 209, the peaking reach is confined and lacks a floodplain; this section is referred to as the gorge reach with an average gradient of 1.4 percent, with bedrock and boulder cascades. There are minimal sediment storage areas, primarily behind large boulders. Downstream of the gorge the gradient drops, and the valley widens. The channel exhibits a pool/riffle morphology, several side channels, and is flanked by a floodplain. Average reach gradient is 0.6 percent; substrate ranges from large cobble at the upstream end to coarse gravel at the downstream end. Key tributaries to the peaking reach are Rock Creek at RM 213.9 and Shovel Creek at RM 206.5.

### 3.11 Water Quality

The Klamath River between RM 207 and RM 231.1 is listed by the Oregon Department of Environmental Quality (ODEQ) as water quality limited for temperature under section 303(d) of the Clean Water Act (ODEQ 2004). During the summer, water that is discharged from the J.C. Boyle Dam typically exceeds 70°F (21.2°C) (PacifiCorp 2004c). Water entering the bypass reach from springs that begin about 0.5 miles downstream of the dam is much cooler (about 48°F (8.9°C); the springs contribute an estimated 220-250 cfs to the river flow (PacifiCorp 2004c, 2004d). Due to the spring water influence, the water temperature at the end of the bypass reach is about 55°F (12.8° C) in the summer when the dam is not spilling (PacifiCorp 2004c). Water temperatures at this location are less variable than at upstream locations in the KHP area, likely due to the springs (PacifiCorp 2004d). Most of the J.C. Boyle reach is steep with turbulent flow and frequent rapids. These physical characteristics promote reaeration and support near saturation dissolved oxygen conditions. During the fall, winter, and spring, dissolved oxygen values fluctuate in the vicinity of 100 percent saturation.

### 3.12 Air Quality

The U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) for a limited number of pollutants pursuant to the Clean Air Act of 1970 and the Amendments of 1975 and 1977 (USEPA 2006a; Clean Air Act 1970). The NAAQS are designed to protect the health and welfare of the public. Air quality conditions also have consequences for visibility.

In 2006, the USEPA revised the 24-hour NAAQS for fine particles ($PM_{2.5}$), which are particles that are 2.5 micrometers in diameter and smaller. The standard for $PM_{2.5}$ was reduced from 65 to 35 $\mu g/m^3$ (USEPA 2006b). Klamath Falls County was designated as non-attainment for $PM_{2.5}$ in October 2009 (EPA, 2009). Sources of particulate matter in the Klamath Basin include woodstoves, open burning, industrial plants, and internal combustion engines (BLM EA #OR-014-08-10), however, these sources are concentrated in industrial and residential areas of the county. Not many of the sources of particulate matter in the Klamath Basin occur near the project site.

### 3.13 Noise

Specific noise analysis has not been conducted for the area surrounding the J.C. Boyle reach. However, studies of noise in rural recreational environments provide a relevant frame of

reference. Decibel (dB) measurements reported with A-weighting provide a metric that considers the human ear's sensitivity to different frequencies (dB(A)). A study by Kariel (1991) reported that ambient noise in a wilderness setting is 35 dB(A); a medium creek, measured from 15 meters away, produces 50 dB(A); and sound measurements taken from 15 meters away from a small creek with rapids range from 47-61 dB(A) (University of Washington 2010). In addition to natural elements, existing sources of noise in the J.C. Boyle reach include the spillway, the powerhouse, recreationists, and vehicles travelling on the access roads. Overall, wildlife and visitors are accustomed to a low level of human produced noise in the area due to the limited infrastructure and human presence.

### 3.14 Scenic Resources

The vast majority of the Oregon portion of the J.C. Boyle peaking reach is classified as "high scenic quality" in the BLM Visual Resource Inventory (BLM 2007b). All BLM managed lands within the project area are designated and managed as VRM (Visual Resource Management) class II. VRM class II lands are to be managed for low levels of change to the characteristic landscape. Management activities may be seen but should not attract the attention of the casual observer (BLM KFRA Resource Management Plan, 1995). The northern portion of the J.C. Boyle bypass reach is classified as VRM class II but has "lower scenic quality" and is managed to largely retain the existing character of the landscape (BLM 2007b).

## 4.0 ENVIRONMENTAL IMPACTS

The following descriptions of the No Action Alternative and the Proposed Action assume the combined relevant effects of all past actions. It is not necessary to individually identify or catalog these past actions as the description of the affected environment incorporates all those actions. For the cumulative effects analysis the description of resulting impacts is the cumulative effect of all past, present and reasonably foreseeable actions. Reasonably foreseeable future actions are assumed the same for the No Action as well as the Proposed Action. The cumulative effects of the proposed action relative to the KHSA are adequately discussed in the FEIS (FERC 2007), and as such, not addressed in this document.

The potential environmental impacts resulting from the alternatives relative to critical resource values are summarized below (Table 12). If the critical resources are potentially affected by the proposed actions, the impacts are described below.

**Table 12. Critical Resource Values Impact Summary for the proposed J.C. Boyle Gravel Placement and Bypass Barrier Removal Project.**

| Critical Element / Resource Value | Affected | | Critical Element / Resource Value | Affected | |
|---|---|---|---|---|---|
| | Yes | No | | Yes | No |
| Air Quality | X | | T & E Species | X | |
| ACEC/RNA's | X | | Wilderness | | X |
| Cultural Resources | | X | Wild & Scenic Rivers | X | |
| Farmlands, Prime/Unique | | X | Hazardous Waste | | X |
| Floodplains | X | | Water Quality | X | |

**Table 12. Critical Resource Values Impact Summary for the proposed J.C. Boyle Gravel Placement and Bypass Barrier Removal Project (continued).**

| | | | | | |
|---|---|---|---|---|---|
| Native American Cultural Concerns | | X | Wetlands / Riparian Zones | X | |
| Low Income / Minority Population | | X | Noxious Weeds | | X |

## 4.1 Botanical Species

### 4.1.1 No Action

The No Action alternative would have no direct or indirect impacts to Special Status or Survey & Manage botanical species or their habitats.

### 4.1.2 Proposed Action

The proposed action would have no impact on Special Status or Survey & Manage botanical species. All proposed actions would occur along existing roadways and within the active channel of the Klamath River. As such, the proposed project would not result in ground disturbance to upland, wetland, or riparian habitats associated with Special Status or Survey & Manage botanical species.

## 4.2 Noxious Weeds/Invasive Plants

### 4.2.1 No Action

No effects would occur to existing noxious weeds and invasive plant species under the no action alternative, including the number of species and the locations and extents of current infestations. PacifiCorp would continue to implement periodic noxious weed inventories and established control plans as part of the overall KHP.

### 4.2.2 Proposed Action

The proposed action would have no impact to existing noxious or invasive species infestations associated with the gravel placement project area. The proposed action, including use of the stockpile area, does not require any new ground disturbance or staging activities outside of existing roadways, pullouts, or campground areas. It is not anticipated that the project would result in the spread of existing populations or the introduction of new invasive or noxious species. Gravel used for placement would be sorted and washed, as to not introduce invasive or noxious species to the banks or floodplains of the project reaches. On completion of the gravel augmentation project, disturbed areas, including staging and stockpile areas, will be re-seeded with a native, certified noxious weed-free seed mix.

## 4.3 Wildlife Species

### 4.3.1 No Action

The No Action alternative would have no direct or indirect impacts on Special Status wildlife species or their habitats. The current management of the project area would continue to provide

habitat for Special Status wildlife species. No Survey & Manage wildlife species are documented or suspected within the vicinity of the proposed project area.

### 4.3.2 Proposed Action

The primary affects from the proposed action to the majority of Special Status wildlife species discussed in this analysis (i.e., bird species) would come in the form of short-term noise disturbance to individuals occurring within the proximity of the gravel placement and rock removal activities.

Impacts to foothill yellow-legged frogs are not anticipated given their lack of occurrence within the action area. In addition, potential project impacts to northwestern pond turtles would likely be negligible given the proposed timing of the action (November).

#### *4.3.2.1 Northwestern pond turtle*

The northwestern pond turtle has been documented throughout the J.C. Boyle reach. During the winter months the pond turtle enters a state of torpor and would generally rest quietly under refugium such as a log or undercut bank. Individuals may occasionally emerge to bask on particularly warm or sunny days (Holland 1994). It is likely that the proposed action would not impact northwestern pond turtles given that gravel placement would occur in the month of November, during a period when pond turtles are relatively inactive. In addition, gravel placement would only occur within the river channel, and would likely not impact riparian vegetation and/or habitats. Potential long term improvements to geomorphorphic processes (e.g., gravel bar formation in riparian areas) could result in the formation of suitable basking sites for the northwestern pond turtle.

#### *4.3.2.2 American peregrine falcon*

The peregrine falcon is known to occur along the J.C. Boyle bypass reach; however, it was not documented during PacifiCorp's relicensing surveys (PacifiCorp 2004b). In addition, no active nest sites are known to occur within the proposed project vicinity. Given that no peregrine falcons were recorded within the project vicinity, and that proposed actions would occur outside of the typical nesting season (February – June) and would not impact suitable habitat for this species (as described in Table 5), the proposed project would likely have no impact on the peregrine falcon.

#### *4.3.2.3 Bald eagle*

Bald eagles were documented throughout the J.C. Boyle reach during PacifiCorp's relicensing surveys (PacifiCorp 2004b). In addition, one of the 10 known bald eagle nests which occur within the KHP is located immediately along the J.C. Boyle peaking reach (the Pony Express nest). Wintering eagles occurring within the proximity of the gravel placement activities during the month of November may experience short-term noise disturbance resulting from operation of the gravel shooter and/or helicopter. However, given that proposed actions would occur in November outside of the bald eagle nesting season (February – August) and would not impact suitable nesting or roosting habitat for this species, the proposed project would likely have minimal impact on the bald eagle. Foraging eagles would be able to move away from all noise related activities, and would not be adversely affected. In addition, a helicopter flight plan would be developed in coordination with BLM to avoid impacts to existing nest sites.

#### *4.3.2.4 Lewis' woodpecker*

Lewis' woodpecker was documented during PacifiCorp's relicensing surveys within upland and riparian habitats of the J.C. Boyle peaking reach (PacifiCorp 2004b). Proposed project activities would not impact suitable habitat (e.g., oak/conifer habitat and cottonwood dominated riparian zones), and would occur outside of the typical nesting season for this species (March – July [Tobalsky 1997]). Wintering woodpeckers occurring within the proximity of the gravel placement activities during the month of November may experience short-term noise disturbance resulting from operation of the gravel shooter and/or helicopter. However, these individuals would be able to move away from all noise related activities, and would not be adversely affected.

#### *4.3.2.5 Osprey*

Ospreys have been documented along the J.C. Boyle peaking reach and bypass reach. A minimum of 16 active osprey nests, both artificial nesting platforms and natural sites, are located along the shores of the Klamath River reservoirs and river reaches, including one nest site along the J.C. Boyle reservoir, and one in the J.C. Boyle peaking reach. This species is a summer breeder in the project vicinity and is likely to occur around active and historic nest sites (PacifiCorp 2004b). Proposed project activities would not impact suitable habitat (as described in Table 5) and would occur outside of the typical nesting season for this species in Oregon (March – July [Poole 2002]). Wintering ospreys occurring within the proximity of the gravel placement activities during the month of November may experience short-term noise disturbance resulting from operation of the gravel shooter and/or helicopter. However, these individuals would be able to move away from all noise related activities, and would not be adversely affected. As noted above, a helicopter flight plan would be developed in coordination with BLM to avoid impacts to existing nest sites.

#### *4.3.2.6 American white pelican*

PacifiCorp documented American white pelicans along the J.C. Boyle bypass during relicensing surveys; however, this species is more closely associated with nearby reservoirs. Although suitable breeding habitat for the species occurs near the project area, individuals occurring within the project area are likely either non-breeding birds or are associated with Upper Klamath Lake breeding populations (PacifiCorp 2004b). Proposed project activities would not impact suitable habitat (i.e., lake habitat) and would occur outside of the typical nesting season for this species (March – July [Knopf 2004]). Wintering pelicans occurring within the proximity of the gravel placement activities during the month of November may experience short-term noise disturbance resulting from operation of the gravel shooter and/or helicopter. However, these individuals would be able to move away from all noise related activities, and would not be adversely affected.

#### *4.3.2.7 White-headed woodpecker*

White-headed woodpeckers were documented during PacifiCorp's relicensing surveys within ponderosa pine habitat of the J.C. Boyle bypass reach (PacificCorp 2004b). Proposed project activities would not impact suitable habitat (e.g., ponderosa pines), and would occur outside of the typical nesting season for this species (March – July [Garrett 1996]). Wintering birds occurring within the proximity of the gravel placement activities during the month of November

may experience short-term noise disturbance resulting from operation of the gravel shooter and/or helicopter. However, these individuals would be able to move away from all noise related activities, and would not be adversely affected.

#### *4.3.2.8 Foothill yellow-legged frog*

The foothill yellow-legged frog is known to occur along the J.C. Boyle bypass reach near J.C. Boyle dam; however, this species was not documented within the J.C. Boyle bypass or peaking reach during PacifiCorp's relicensing surveys (PacifiCorp 2004b). As such, proposed project actions would likely have no impact on the foothill yellow-legged frog.

#### *4.3.2.9 Northern spotted owl*

Northern spotted owl protocol surveys were conducted in suitable habitat located throughout the KHP vicinity during the 2002 and 2003 field seasons. In 2002, five northern spotted owl detections were recorded, including one male along the J.C. Boyle peaking reach, and one pair along the J.C. Boyle peaking reach in the same general area. Five spotted owl detections also were recorded during 2003 protocol surveys. A pair of owls was detected southwest of the Beswick Ranch in the J.C. Boyle peaking reach. The National Council for Air and Stream Improvement (NCASI) monitors a breeding pair of owls in the upper J.C. Boyle peaking reach, (PacifiCorp 2004b).

Based on conversations with the BLM Biologist, Matt Broyles, northern spotted owls within the vicinity of the proposed project are likely resident single owls which only move down into the river valley during the winter months to forage (M. Broyles, BLM, personal communication March 22, 2011). Foraging owls occurring within the proximity of the gravel placement activities during the month of November may experience short-term noise disturbance resulting from operation of the gravel shooter and/or helicopter. However, given that proposed actions would occur outside of the spotted owl nesting season (March – September [Dyck et al. 2002]) and would not impact suitable nesting, roosting or foraging habitat for this species, the proposed project would have minimal impact on the spotted owl. Foraging owls would be able to move away from all noise related activities, and would not be adversely affected. ESA compliance for potential impacts to northern spotted owls would be provided through USFWS Endangered Species Act Section 7 Formal Programmatic Consultation for Aquatic Habitat Restoration Activities in Oregon and Washington (ARBO).an existing Biological Opinion (Andy Hamilton, BLM, pers. comm., August 8, 2011).

With respect to potential disturbance to northern spotted owls, discussion with BLM indicates that coverage will be provided under the existing USFWS Endangered Species Act Section 7 Formal Programmatic Consultation for Aquatic Habitat Restoration Activities in Oregon and Washington (ARBO). This programmatic Aquatic Restoration Biological Opinion (ARBO) biological opinion was issued for Fiscal Year 2007-2012 (USFWS 2007) (Andy Hamilton, BLM Biologist, pers. comm. April 20, 2011).

## 4.4 Aquatic Species

### 4.4.1 No Action

The No Action alternative would have no direct impacts on Special Status and Survey & Manage species or their habitats. However, the current deficit of course sediment deposits and spawning gravels for existing fish species (e.g., redband trout) within the J.C. Boyle reach would persist.

As such, the No Action alternative would indirectly affect aquatic species by furthering the reduction in spawning habitat, macroinvertebrate habitat, and geomorphorphic processes (e.g., gravel bar formation for aquatic and riparian species).

### 4.4.2 Proposed Action

The proposed project would benefit Special Status and Survey & Manage aquatic species by increasing course sediment and gravel deposits along the J.C. Boyle reach of the Klamath River (IM-7) and by removing a potential upstream fish passage barrier (IM-8). As stated above, adding gravel to the J.C. Boyle reach would enhance current and potential fish spawning habitat, macroinvertebrate habitat, and overall geomorphorphic processes.

#### *4.4.2.1 Klamath smallscale sucker*

Relicensing surveys conducted by PacifiCorp in 2001 and 2002, confirmed the presence of the Klamath smallscale suckers within the J.C. Boyle peaking reach. No smallscale suckers were collected in 2001 or 2002 within the bypass reach (PacifiCorp 2004c).

Proposed gravel placement within the J.C. Boyle peaking reach would occur at five separate locations, including cobble and boulder riffles, runs, and pool tailouts. Given that smallscale suckers could occur at any of these proposed locations during gravel placement, it is likely that the proposed action would result in temporary physical displacement of the species due to gravel placement and/or short-term, localized increases in background turbidity. However, introducing potential spawning and macroinvertebrate habitat into the J.C. Boyle peaking reach is expected to improve long-term, in stream habitat conditions for this species. Potential temporary impacts associated with proposed gravel placement activities would not adversely affect the Klamath smallscale sucker over the long-term.

#### *4.4.2.2 Shortnose and Lost River suckers*

Shortnose suckers were documented within the J.C. Boyle peaking reach and bypass reach during relicensing surveys conducted by PacifiCorp in 2001 and none were collected in 2002. No Lost River suckers were collected either year (FEIS 2007). It is likely that the presence of listed suckers in the J.C. Boyle reach is limited to downstream emigration of juveniles and adults from their preferred lake habitat (PacifiCorp 2004c). In addition, they do not maintain self-sustaining populations below Keno dam and due to the timing of the project, sensitive/vulnerable life stages (larvae) of suckers would be absent. As such, the potential for shortnose and Lost River suckers to occur within the proposed project area is limited. It is possible that the proposed action may result in temporary physical displacement of the species due to gravel placement and/or short-term, localized increases in background turbidity. These effects would not be meaningfully measurable and would be considered insignificant, and therefore a determination of "May Affect, Not Likely to Adversely Affect" has been made by the BLM for these species. Temporary

impacts to these species would be covered under the existing USFWS ARBO document for the life of the project (USFWS 2007 and USFWS 2011), as agreed upon by the USFWS and BLM (Nolan Banish and Rob Roninger, USFWS and BLM Biologists).

#### *4.4.2.3 Pacific giant salamander*

Neotenic (larval) forms of the Pacific giant salamander were documented during PacifiCorp's relicensing surveys within the J.C. Boyle bypass reach (PacifiCorp 2004b). BLM has also confirmed Pacific giant salamander presence within the mainstem of the river, where the salamander retains its neotenic form (M. Broyles, BLM, pers. comm. March 22, 2010). Given that the pacific giant salamander could occur at any of the proposed gravel placement locations throughout the J.C. Boyle reach, it is likely that the proposed action would result in temporary physical displacement of the species due to gravel placement and/or short-term, localized increases in background turbidity. It is also possible, given the relatively sedentary nature of this species, that gravel placement could result in individual salamanders being buried by gravel. However, increasing course sediment and gravel deposits along the J.C. Boyle reach of the Klamath River may improve long-term, in stream habitat conditions for this species. Potential temporary impacts associated with proposed gravel placement activities would not adversely affect the pacific giant salamander over the long-term.

#### *4.4.2.4 Aquatic mollusks*

Due to the "Pechman Exemptions" two aquatic mollusks, the Klamath rim pebblesnail and the scale lanx do not need to be analyzed in detail.

#### *4.4.2.5 Redband trout*

Redband trout are documented throughout the J.C. Boyle reach. Some spawning of redband trout has been documented in the J.C. Boyle bypass reach, but studies by the ODFW and City of Klamath Falls reported that spawning gravel was scarce and limited to small areas behind boulders. The extent of spawning in the J.C. Boyle peaking reach is unknown. As such, one of the primary goals of the proposed gravel augmentation project is to improve spawning habitat for this species.

Redband trout are primarily spring spawners and the proposed timing of gravel placement should not interfere with spawning activity. If present, the proposed action would only result in temporary physical displacement of individual redband trout due to gravel placement and/or short-term, localized increases in background turbidity. However, increasing course sediment and gravel deposits along the J.C. Boyle reach of the Klamath River would improve long-term, in stream spawning conditions for this species. Potential temporary impacts associated with proposed gravel placement activities would likely not adversely affect redband trout over the long-term.

## 4.5 Recreation

### 4.5.1 No Action

No effects would occur to recreation in the J.C. Boyle reach if no action was taken. Recreation opportunities including fishing, whitewater boating, and walking would continue to be available.

### 4.5.2 Proposed Action

The project is expected to have a modest impact on recreation opportunities in the short term since the proposed actions would occur in November, beyond the primary recreation season. Most whitewater boating trips occur from April through October and the "prime season" for guided trips is June through August. The majority of camping trips along the reach area are also made during the spring, summer, and early fall months. Therefore, the placement of gravel by truck and helicopter should pose minimal interference with these activities. A helicopter flight plan would be developed in coordination with BLM to avoid impacts to recreation areas and inadvertent loss of gravel during delivery. Signs would also be posted to notify recreationists in the vicinity of proposed drop sites. In addition, it is anticipated that the volume of gravel being proposed would not impact boat use or passage by creating shallow areas. Gravel will be placed approximately one foot deep across the placement areas. This will provide suitable gravel depths for spawning while minimizing hydraulic changes at the placement sites but not be enough to affect navigability in normal conditions.

Fishing during the month of November may be modestly impacted in areas close to the gravel placement sites. However, the most popular fishing site, five miles downstream of the powerhouse, is not a proposed gravel placement site. In the long term, fishing can be expected to improve in the reach as a result of the proposed action's improvement of spawning habitat and the removal of a potential fish passage barrier.

## 4.6 Archaeological, Historic, and Cultural Resources

### 4.6.1 No Action

No effects would occur to archaeological, historic, and cultural resources in the J.C. Boyle reach if no action was taken. The current management of the project area would continue to provide protection of known archaeological, historic, and cultural resources.

### 4.6.2 Proposed Action

As lead federal agency, BLM has reviewed potential project effects on archaeological, historic, and cultural resources and finds the project to have no adverse effects to historic properties. BLM has coordinated as needed with the SHPO and the region's tribes. There are archaeological, historic, and cultural resources within and adjacent to portions of the project area; however, given the nature of the project and project design, it is anticipated that adverse impacts to them would be avoided.

## 4.7 Wild and Scenic River and Areas of Critical Environmental Concern (ACEC)

### 4.7.1 No Action

No effects would occur to the ACEC and scenic resources if no action were taken. Similarly, no effects would occur to the Outstandingly Remarkable Values that merit the reach's Wild and Scenic River designation.

### 4.7.2 Proposed Action

The project is expected to maintain or enhance the values of the ACEC by enhancing fisheries habitat and fish passage. Similarly, the project would enhance the native redband trout fishery that is one of the five Outstandingly Remarkable Values that earned the reach the Wild and

Scenic River designation. As noted above, the timing of the proposed actions is expected to have a minimal effect on whitewater boating opportunities, another of the reach's Outstandingly Remarkable Values.

## 4.8 Wetlands and Riparian Zones

### 4.8.1 No Action

No effects would occur to existing riparian and wetland areas either adjacent to or abutting the J.C. Boyle peaking and bypasses reaches if no action were taken. This determination includes no effects to wetland and riparian vegetation communities, functions, or other habitat values.

### 4.8.2 Proposed Action

The proposed action would have no effect on wetland areas adjacent to or abutting the OWHM of the J.C. Boyle peaking and bypasses reaches. However, the proposed action is expected to maintain or enhance riparian areas associated within the project reaches. As one of the project's objectives is to improve geomorphological functions by mitigating the gravel deficit, the proposed action may have a positive effect on bank/floodplain maintenance and riparian species recruitment via the entrainment and deposition of placed gravels. In addition, the volume of gravel being proposed throughout an eight-year period would be negligible in terms of increasing the erosive power of dam-controlled flows. As such, the increase in gravel within the system is expected to have no effect on erosion to KHP facilities, roads, banks, floodplains, or adjacent lands.

Due to the truck or helicopter placement methods selected for this project, which are sometimes 80 to 100 feet above the placement locations, some pieces of gravel may be inadvertently placed along the bank or floodplain above the OHWM of the project reaches. However, the project has determined that any inadvertent placement of gravel would not result in changes to flow patterns, existing riparian vegetation, or other riparian functions.

## 4.9 Hydrology, Channel Characteristics, and Floodplains

### 4.9.1 No Action

No effects would occur to hydrology, channel characteristics, or floodplain areas if no action were taken.

### 4.9.2 Proposed Action

#### *4.9.2.1 Hydrology*

The proposed action would have no effect on the existing hydrologic regime of project reaches.

#### *4.9.2.2 Channel Characteristics*

The proposed action may impose short term effects on localized channel characteristics. Hydraulics within and immediately downstream of gravel placement areas would change in response to the presence of additional bedload. Dam releases below the entrainment and transport threshold for the particle size range of placement gravels would result in eddies and slight shifts in the volumetric capacities of localized channel cross-sections. Although proposed

placement volumes would have a negligible effect on the volumetric capacity of the project reaches as a whole, as the gravel deficit of the Klamath River far exceeds the volume that is being proposed.

Flows that meet or exceed mobility thresholds would transport placed gravels to hydraulic pockets and slackwater downstream of placement locations. The net effect of gravel placement on channel characteristics would be an improvement to fish and macroinvertebrate habitat. In addition, the placement of gravel is not expected to increase the erosive power of releases.

Barrier removal (IM-8) would have localized impacts on channel hydraulics at, and immediately downstream of, the existing fish passage obstruction. In addition to repositioning fractured boulders and or bedrock, IM-8 would have local effects on stream gradient and longitudinal profile, and may cause a minor shift in patterns of sediment movement and deposition (Hart et al., 2002). Using mixed sized river rock (gravel and cobble) to fill in the spaces between the boulders would similarly cause minor shifts in local stream gradient, scour and deposition patterns.

*4.9.2.3 Floodplains*

As discussed above in the effects analysis for riparian areas, the proposed action may have a positive effect on floodplain areas within unconstrained sections of the project reaches. Although peak flows rarely access the functional floodplains adjacent to project reaches, the transport and deposition of placed gravels may improve the natural recruitment of woody riparian species on gravel bars, upper banks, and floodplains, thereby improving roughness and the overall function of floodplains. Gravel that may be inadvertently placed directly on floodplain areas would not measurably affect flow patterns of peak releases that have the potential to reach floodplain elevations.

The volume of gravel being proposed throughout an eight-year period would be negligible in terms of increasing the erosive power of dam-controlled flow releases. As such, the increase in gravel within the system is expected to have no effect on erosion to floodplains, as well as KHP facilities, roads, banks, and adjacent lands.

## 4.10 Water Quality

### 4.10.1 No Action

No effects would occur to the water quality of either project reaches or downstream reaches if no action were taken.

### 4.10.2 Proposed Action

The proposed action would have no long term effect on water quality, including temperature, at or downstream of gravel placement locations. The gravels being proposed for placement would be rounded and washed, containing little or no fine materials. As such, there would be little increase in turbidity in the short term resulting from the direct placement of gravels. In addition, placement of gravel would not result in increased bank or floodplain erosion.

Haul trucks travelling from the stockpile location to sites accessible by truck (non-helicopter sites) may create fugitive dust that could result in fine sediment deposition to the Klamath River. However, the majority of trips and miles driven will occur to sites upstream of RM 219. The

road surface from the stockpile site to this location is graveled, reducing potential dust generation. Access to sites downstream of this location will be more likely to cause fugitive dust; however, the likely onset of fall rains coupled with slow moving vehicles should minimize this issue.

Potential damage to the access road is a concern that will be minimized through application of BMPs described in Section 7. The number and mileage of trips per year will vary depending on the number of truck-based sites proposed and their location. On average there will be approximately 60 trips per year over the nine year project (2011–2019), with an average of approximately 574 miles driven per year (round trip). However, as described in the Gravel Plan, there will be years in which gravel will only be applied via helicopter. The proposed annual number of trips and corresponding mileage is shown below (Table 13). To mitigate potential impacts to roads and conditions that may cause excessive sedimentation into water bodies, helicopter placement rather than truck delivery and gravel shooting may be used.

With respect to IM-8, the proposed rock expansion compound is comprised primarily (97 percent) of limestone and dolomite. The material, which may be used to fracture the existing fish passage barrier boulders, becomes an inert material when cured. As previously stated, to ensure that the compound is not spilled during placement, a PVC funnel and plastic liner would be placed on the rock and the adjacent streambed to prevent uncured material from contacting the river. The protective liner would be removed once the rocks are fractured and all remaining material has completely cured. The contractor would be required to prepare a Pollution Control Plan and/or Spill Prevention Plan to help avoid spill of the uncured material, or contact with the river and/or sediments. Best Management Practices included in Section 7 of this EA will be incorporated into these Plans.

## 4.11 Air Quality

### 4.11.1 No Action

The no action alternative would have no impacts to air quality.

### 4.11.2 Proposed Action

As noted above, ground transport of gravel along unpaved roads would likely produce some fugitive dust. Truck and helicopter traffic associated with the placement of gravel would also likely contribute to Mobile Source Air Toxics (MSAT) compounds emitted from vehicles and non-road equipment). However, effects of trucks and helicopters transporting gravel on air quality are expected to be minimal. MSATs are typically a concern where a transportation project may affect traffic congestion and where mileages greatly exceed that expected for this project (Claggett and Miller, 2011).

**Table 13. Annual number of trips and corresponding mileage (round-trip) for truck-based gravel placement.**

| RM | Site | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Trips | Miles | Trips | Miles | Trips | Miles | Trips | Miles | Trips | Miles | Trips | Miles | Trips | Miles | Trips | Miles | Trips | Miles |
| 224.5 | Upper bypass (T) | | | | | 16 | 7.2 | | | 16 | 7.2 | | | | | | | 16 | 7.2 |
| 224.2 | Upper bypass (T) | | | | | 5 | 1.5 | | | 5 | 1.5 | | | | | | | 5 | 1.5 |
| 224.1 | Upper bypass (T) | | | | | 7 | 3.7 | | | 7 | 3.7 | | | | | | | 7 | 3.7 |
| 223.8 | Upper bypass (T) | | | | | 25 | 35.2 | | | 25 | 35.2 | | | | | | | 25 | 35.2 |
| 223.1 | Middle bypass (H) | | | | | | | | | | | | | | | | | | |
| 222.5b | Bypass downstream spillway split (H) | | | | | | | | | | | | | | | | | | |
| 222.5a | Bypass downstream spillway split (H) | | | | | | | | | | | | | | | | | | |
| 221.1 | Lower bypass (H) | | | | | | | | | | | | | | | | | | |
| 219.9 | Downstream of Launch (T) | | | | | 20 | 169 | | | 20 | 169.3 | | | 20 | 169.3 | | | 20 | 169.3 |
| 219.1 | Split channel peaking reach (H) | | | | | | | | | | | | | | | | | | |
| 217.3a | BLM Klamath Campground (T) | 25 | 352.4 | | | 19 | 267.8 | | | | | | | 25 | 352.4 | | | 25 | 352.4 |
| 217.3b | BLM Klamath Campground (T) | | | 16 | 226 | | | | | 16 | 225.6 | | | | | | | | |
| 216.8 | Old Bridge (T) | | | | | 25 | 268.4 | | | | | | | 25 | 368.4 | | | 19 | 280.0 |
| 216.3a | Campground (T) | | | 22 | 365 | | | | | 22 | 365.7 | | | | | | | | |
| 216.3b | Campground (T) | 25 | 414.4 | | | | | | | 4 | 66.3 | | | 21 | 348.1 | | | | |
| **Total Trips/Miles** | | **50** | **767.9** | **38** | **590** | **117** | **853.0** | **0** | **0.0** | **115** | **873.4** | **0** | **0.0** | **91** | **1238.2** | **0** | **0.0** | **117** | **849.2** |

*Note: No. trips assumes 10-cubic yard capacity; mileage is round trip from stockpile site to designated placement location .*

In addition to MSATs, emissions from trucks and helicopters may measurably increase or contribute to greenhouse gas emissions (GHG). Recent guidance (February 2010) from the Council on Environmental Quality (CEQ) provides a framework for determining whether GHG emissions (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) merit analysis in NEPA documents. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of $CO_2$-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO2-equivalent, CEQ encourages Federal agencies to consider whether the action's long-term emissions should receive similar analysis.

For purposes of this project, quantities of GHG emissions were evaluated based on mileage travelled by and fuel consumption of trucks transporting gravel from 1) the rock quarry to the staging area near J.C. Boyle Dam, and 2) the staging area to the gravel placement sites. Assumptions made in this assessment were as follows:

- 22 cubic yard capacity (truck and trailer) for transport from the quarry,
- 10 cubic yard capacity for transport from stockpile to placement sites,
- Mileage estimates of 5.9 and 1.4 mpg for travel from quarry to stockpile site and stockpile to placement sites, respectively; and,
- 22.2 lbs. $CO_2$/gallon of diesel fuel (per U.S. EPA http://www.epa.gov/oms/climate/420f05001.htm)

A summary of the direct effects of truck-based mileage, fuel consumption, and resulting emission of $CO_2$ over the course of the project is shown below (Table 14). On an annual basis, truck-related emissions average 9.5 metric tons/year (combined), with a cumulative contribution of approximately 86 metric tons over the 9-year project. Estimated helicopter use is less than 20 hours per year, thus emissions from helicopters will not increase this significantly. In summary, total annual emissions (truck plus helicopter) are expected to be far below (less than one percent) of the CEQ guidance threshold of 25,000 metric tons/year. Indirect effects of the project on emissions, e.g., from tree removal or other activity affecting carbon storage, are not anticipated. Similarly, the cumulative effects of the project, i.e., the incremental increase in greenhouse gas emissions on a broader geographic scale, are expected to be negligible.

**Table 14. Truck-based mileage, fuel consumption, and $CO_2$ emissions, 2011-2019.**

| Quarry to Stockpile | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| Miles | 2,688 | 1,904 | 6,384 | 0 | 6,160 | 0 | 4,928 | 0 | 6,384 | 28,448 |
| Fuel (gallons) | 456 | 323 | 1083 | 0 | 1045 | 0 | 836 | 0 | 1083 | 4,824 |
| Emissions (Metric tons CO2) | 4.6 | 3.3 | 10.9 | 0.0 | 10.5 | 0.0 | 8.4 | 0.0 | 10.9 | 48.6 |
| **Stockpile to Placement Sites** | | | | | | | | | | |
| Miles | 767 | 590 | 853 | 0 | 873 | 0 | 1,238 | 0 | 849 | 5,171 |
| Fuel (gallons) | 548 | 422 | 609 | 0 | 624 | 0 | 884 | 0 | 607 | 3,694 |
| Emissions (Metric tons CO2) | 5.5 | 4.2 | 6.1 | 0.0 | 6.3 | 0.0 | 8.9 | 0.0 | 6.1 | 37.2 |
| **Project Totals** | | | | | | | | | | |
| Miles | 3,455 | 2,494 | 7,237 | 0 | 7,033 | 0 | 6,166 | 0 | 7,233 | 33,619 |
| Fuel (gallons) | 1004 | 744 | 1692 | 0 | 1668 | 0 | 1720 | 0 | 1689 | 8,518 |
| **Emissions (Metric tons CO2)** | **10.1** | **7.5** | **17.0** | **0.0** | **16.8** | **0.0** | **17.3** | **0.0** | **17.0** | **85.8** |

## 4.12 Noise

### 4.12.1 No Action

The No Action alternative would not result in any occurrences of noise above existing levels.

### 4.12.2 Proposed Action

The project would have limited duration effects on noise in the J.C. Boyle reach. The gravel delivery methods, by helicopter and truck, would both introduce noise to the area. The noise from a helicopter, measured from a distance of 150 meters, is reported to be 68 dB(A) (University of Washington 2010). At closer range, the noise of a helicopter can range up to 112 dB(A) (University of Washington 2010). The noise associated with a dump truck is reported to be 92 dB(A). The gravel shooter would also produce some additional noise, and would operate a high speed belt conveyor mounted to the tailgate of a dump truck and run hydraulic operations via the truck's power take-off.

As noted above, the limited duration increase in noise and timing of the proposed project is not expected to significantly impact wildlife in the area. Escaping the noise of urban areas is a primary reason why people visit outdoor recreation environments, and sounds that interfere with that experience are considered annoying (Kariel 1990). However, it is likely that the noise associated with the placement of gravel would have limited effect on visitor's recreational experiences, particularly given the late season timing of gravel placement. No lasting effects on noise would result from the project.

## 4.13 Scenic Resources

### 4.13.1 No Action

No effects would occur to scenic resources if no action were taken. Similarly, no effects would occur to the Outstandingly Remarkable Values that merit the reach's Wild and Scenic River designation.

4.13.2 Proposed Action

The project would have some immediate short term limited effects on scenic resources due to the presence of the trucks and helicopters transporting the gravel to the river, and subsequent dust from activities. Due to the distribution of the gravel at sites that are expected to facilitate gravel seeding downstream during peak flows, the gravel placement is expected to have a limited short term effect on the visual character of the riverbed.

## 5.0 PUBLIC INVOLVEMENT

A public scoping letter dated April 27, 2011 was mailed to approximately 148 people and organizations. Comment letters were received from three parties. The comments in the letters were reviewed by the BLM and used to refine the alternatives and the analysis. A comment summary response sheet is included as Appendix E of this EA.

## 6.0 CONSULTATION

As discussed below, ESA compliance for this project has been achieved through an existing Biological Opinion from NMFS and the USFWS. Consultation under Section 106 of the National Historic Preservation Act of 1966 has occurred for this project. As discussed below, ESA compliance for this project has been achieved through an existing Biological Opinion from NMFS and the USFWS.

### 6.1 Wildlife

A *"No Effect"* determination was made by the BLM for all listed species and designated critical habitat. Therefore, Endangered Species Act consultation with the U.S. Fish and Wildlife Service for the Proposed Action is not required.

### 6.2 Aquatic Species

The shortnose sucker *(Chasmistes brevirostris)* and Lost River sucker *(Deltistes luxatus)* were listed as endangered in 1988 under the ESA (USDI-FWS, 1988). The Upper Klamath River was identified as unit 3 in the proposed critical habitat determination rule for shortnose sucker and Lost River suckers (USDI-FWS. 1994). Proposed critical habitat unit 4 includes the waters of the Klamath River within the 100-year floodplain (USDI-FWS, 1995).

As stated in the Environmental Impacts, Aquatic Species section, the potential for shortnose and Lost River suckers to occur within the proposed project area is limited. It is possible that the proposed action may result in temporary physical displacement of the species due to gravel placement and/or short-term, localized increases in background turbidity. These effects would not be meaningfully measurable and would be considered insignificant, and therefore the BLM has made a determination of "May Affect, Not Likely to Adversely Affect" for these species.

Overall, the proposed action is anticipated to have long-term beneficial effects to proposed critical habitat for the endangered shortnose and Lost River suckers, and is likely to improve all the Primary Constituent Elements (water, physical habitat, and biological environment) for suckers in the Klamath River. Therefore, a determination of "May Affect, Not Likely to Adversely Affect" was made by the BLM for the Proposed Critical Habitat Unit #3 for the shortnose and Lost River sucker.

In May and June, 2011, the Bureau of Land Management (BLM) corresponded with the U.S. Fish and Wildlife Service to discuss the projects analyzed in these EA. During the meeting, both agencies agreed that this project meets criteria and is designed to meet Project Design Criteria for coverage under the Biological Opinion for Forest Service and Bureau of Land Management aquatic habitat restoration activities. The project is applicable to category 1 (Large Wood, Boulder, and Gravel Placement) and category 8 (Floodplain Overburden Removal) (see Biological Opinion and Letter of Concurrence, USDA Forest Service, USDI Bureau of Land Management and the Coquille Indian Tribe for Programmatic Aquatic Habitat Restoration Activities in Oregon and Washington That Affect ESA-listed Fish, Wildlife and Plant Species and their Critical Habitats, US Fish and Wildlife Service, June 14, 2007 and Reinitiation of the Biological Opinion and Letter of Concurrence on the Programmatic Aquatic Habitat Restoration Activities in Oregon and Washington That Affect ESA-Listed Fish, Wildlife, and Plant Species and Their Critical Habitats (TAILS#13420-2011-F-0129).

Use of this Biological Opinion requires that certain general and project category specific Conservation Measures (CMs) and Project Design Criteria (PDC) would be followed. These include spill containment and contingency plans, site preparation and restoration measures (see Section 7). Following the steps as outlined in the ARBO, the BLM has completed the pre-project Level 1 team meeting and notification, and ensured that the projects would integrate the PDC's, CM's and Terms and Conditions into project design and contract language. Following project implementation, the BLM would schedule a post-project Level 1 team meeting, as well as a monitoring and a Level 1 team field review.

### 6.3 Cultural Resources

A Scoping letter was sent to the following federally recognized Native American groups: Shasta Indian Nation, The Klamath Tribes, Shasta Nation, and Hoopa Valley Tribe, and to non-federally recognized Shasta Indian Nation. No comments were received. Tribal Consultation occurred with Perry Chocktoot, Director of Culture and Heritage for The Klamath Tribes on August 10, 2011 and no concerns were expressed, and a letter seeking concurrence with Oregon State Historic Preservation Office for no a finding of no adverse effect to historic properties was sent on July 21, 2011 and concurrence was received from SHPO August 22, 2011.

## 7.0 BEST MANAGEMENT PRACTICES

### 7.1 Wildlife

- Develop a flight plan that avoids known raptor nest trees.
- Avoid operation between January 1 and August 15.

### 7.2 Aquatic Species

#### 7.2.1 Stream Restoration

- Remove all equipment and supplies from project area after completion.
- Confine work in the stream channels to the low flow period unless a waiver is obtained from the permitting agencies.

- In stream channels that are sensitive to disturbance (e.g., meadow streams), do not drive heavy equipment in flowing channels and floodplains.
- Use existing roads for truck access.
- Limit the number and length of equipment access points through Riparian Reserves.
- Inspect all mechanized equipment daily for leaks and clean as necessary to help ensure that toxic materials, such as fuel and hydraulic fluid, do not enter the stream.
- Store equipment a stream channels when not in use.
- When using heavy equipment in or adjacent to stream channels during restoration activities, develop and implement an approved spill containment plan that includes having a spill containment kit on-site and at previously identified containment locations. Refuel equipment, including hand power tools, at least 100 feet from water bodies (or as far as possible from the water body where local site conditions do not allow a 150-foot setback) to prevent direct delivery of contaminants into a water body.
- Use waterbars, barricades, seeding, and mulching to stabilize bare soil areas at the gravel placement sites and along project access routes prior to the wet season.
- Rehabilitate and stabilize disturbed areas where soil would support seed growth by seeding and planting with native seed mixes or plants, or using erosion control matting.

### 7.2.2 Roads operations

- Perform appropriate road maintenance to assure that drainage is in place and appropriately designed to protect adjacent resources during wet periods.
- Maintain roads in a passable condition during operations.
- Return roads to like condition after each year's operations.
- If possible, retain an undisturbed riparian buffer strip between operations and water bodies, floodplains, and wetlands.
- Locate gravel stockpile sites on stable ground where the material would not move into waterbodies, floodplains, and wetlands.
- Avoid expanding gravel placement sites in Riparian Management Areas and Riparian Reserves where sediment delivery to stream channels could occur.
- Where deemed necessary, use temporary sediment containment structures to contain runoff from gravel placement sites (e.g. silt fencing).
- Surface roads if they would be subject to traffic during prolonged wet weather, or deliver gravel to placement sites by helicopter in lieu of using large trucks.
- Apply durable rock surfacing to withstand expected loads and traffic volume, and season of use. Remove snow on haul roads in a manner that would protect roads and adjacent resources. Remove or place snow berms to prevent water concentration on the roadway or on erodible side- slopes or soils.

- Complete construction activities prior to fall rains and winter snows. Prevent erosion in areas with direct connectivity to streams by stabilizing exposed soil materials.
- Keep road inlet and outlet ditches, catch basins, and culverts free of obstructions, particularly before and during winter precipitation and spring run-off.
- Repair damaged inlets and downspouts to maintain drainage design capacity.
- Avoid blading and shaping of road surfaces during the wet season, generally November through May).
- Blade and shape roads to conserve existing aggregate surface material, retain the original crowned or out-sloped self-draining cross section, prevent or remove eroding berms except those designed for slope protection, and other irregularities that retard normal surface runoff.
- Eliminate undesirable berms that retard surface runoff.
- Retain low-growing, herbaceous ground cover and brush on cut-and-fill slopes. Where workable, retain ground cover in ditchlines, except where sediment deposition or obstructions require maintenance.
- Drain the road surface by using crowning, insloping or outsloping during maintenance operations. Road surfaces, regardless of traffic volume, may use a combination of these methods for effective road drainage.
    a) Roads can be insloped for specific purposes, such as to drain unstable areas or where the underlying formation is very rocky and not erodible.
    b) Out-slope low traffic volume roads to provide surface drainage on road gradients up to 8 percent, where an inside ditch is not planned.
    c) Use rolling drainage dips and/or lead-off ditches as options in lieu of culverts for low traffic volume roads with less than 10 percent gradient into nonerodible areas.
- Divert road and gravel placement site runoff water away from headwalls, unstable areas or stream channels and onto well-vegetated, stable ground.
- Armor drainage dips to maintain functionality in areas of erosive soils that are subject to rapid erosion by runoff.
- Wash equipment at sites with no potential for runoff into waterbodies, floodplains, or wetlands.
- Use water or approved surface stabilizers/dust palliatives to reduce surfacing material loss and buildup of fine sediment that may wash off into waterbodies, floodplains, or wetlands.

#### 7.2.3 Spill control

- Inspect and clean heavy equipment as necessary prior to moving on to the project site, in order to remove oil and grease, noxious weeds, and excessive soil.
- Inspect hydraulic fluid and fuel lines on heavy-mechanized equipment for proper working condition.

- Where possible, maintain and refuel equipment a minimum of 100 feet away from streams and other waterbodies.
- In the event of a spill or release, all reasonable and safe actions to contain the material would be taken. Specific actions are dependent on the nature of the material spilled.
- Use spill containment booms as required by DEQ. Have access to booms and other absorbent containment materials.
- Immediately remove waste or spilled hazardous materials (including but not limited to diesel, oil, hydraulic fluid) and contaminated soils near any stream or other waterbody, and dispose of it/them in accordance with the applicable regulatory standard. Notify Oregon Emergency Response System of any spill over the material reportable quantity, and any spill not totally cleaned up after 24 hours.
- Store equipment containing reportable quantities of toxic fluids outside of riparian areas.

#### 7.2.4 Fuel and Chemical Transport

If more than 42 gallons of fuel or combined quantity of petroleum product and chemical substances, as project materials, would be transported to a project site, the following precautions would be implemented:

- Plan a safe route and fuel transfer sites so that all spilled material would be contained easily at that designated location.
- Plan an active dispatch system that can relay the information to appropriate resources.
- Ensure a spill containment kit that can adsorb and contain 55 gallons of petroleum product and chemical substances is readily available.
- Provide for immediate notification to OERS in the event of a spill. Have a radio-equipped vehicle lead the chemical or fuel truck to the project site.
- Assemble a spill notification list that includes the district hazardous materials coordinator, DEQ, and spill clean-up contractors.
- Construct a downstream water user contact list with addresses and phone numbers.
- When operating within Source Water watersheds, pre-estimate water flow travel times through the watershed to predict downstream arrival times.
- Be prepared to sample water and carry sample containers.
- Be prepared to assist OSP and ODFW assess wildlife impacts of any material spilled.

#### 7.2.5 Fuel Spill Abatement

- Spill Prevention, Control, and Countermeasure Plan (SPCC): All operators shall develop a modified SPCC plan prior to initiating project work if there is a potential risk of chemical or petroleum spills near water bodies. The SPCC plan would include the appropriate containers to be used and design of the material transfer locations. No interim fuel depot or storage location other than a manned transport vehicle.

- Spill Containment Kit (SCK): All operators shall have a SCK as described in the SPCC plan on-site during any operation with potential for run-off to adjacent water bodies. The SCK would be appropriate in size and type for the oil or hazardous material carried by the operator.
- Operators shall be responsible for the clean-up, removal, and proper disposal of contaminated materials from the site.

### 7.3 Recreation

- Recreation-- Prevent the spread of noxious weeds by cleaning machinery, etc. away from developed Recreation Sites to avoid infestation.
- Control vehicle traffic by project design to avoid/minimize creating new routes and roads in Recreation Sites. Lessen impact to existing vegetation, reduce dust caused by bare soil by using the same route each time.

### 7.4 Archaeology

Follow procedures for cultural protection and management outlined in the KFRA ROD/RMP (page 43), and protect identified sites by buffering.

### 7.5 Noxious and Invasive Weeds

- Control vehicle traffic by project design to minimize impacts to vegetation and avoid creating new turn around sites. Lessen impact to existing vegetation soil by using the same route each time.
- All vehicles and equipment will be cleaned off prior to operating on BLM lands. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts is required and may be accomplished with a pressure hose.
- High concentrations of noxious weeds in the immediate area of mechanical operations shall be mowed to ground level prior to the start of project activities.
- All equipment and vehicles operating off of main roads shall be cleaned off prior to leaving the job site when the job site includes noxious weed populations. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts is required and may be accomplished with a pressure hose.

### 7.5 Safety

#### 7.5.1 Helicopter Operations

- Develop a flight plan to avoid recreation impacts.

#### 7.5.2 Truck Operations

- Develop an operations plan to notify the public including signing roads and notifying any users that are in the vicinity of proposed drop sites.

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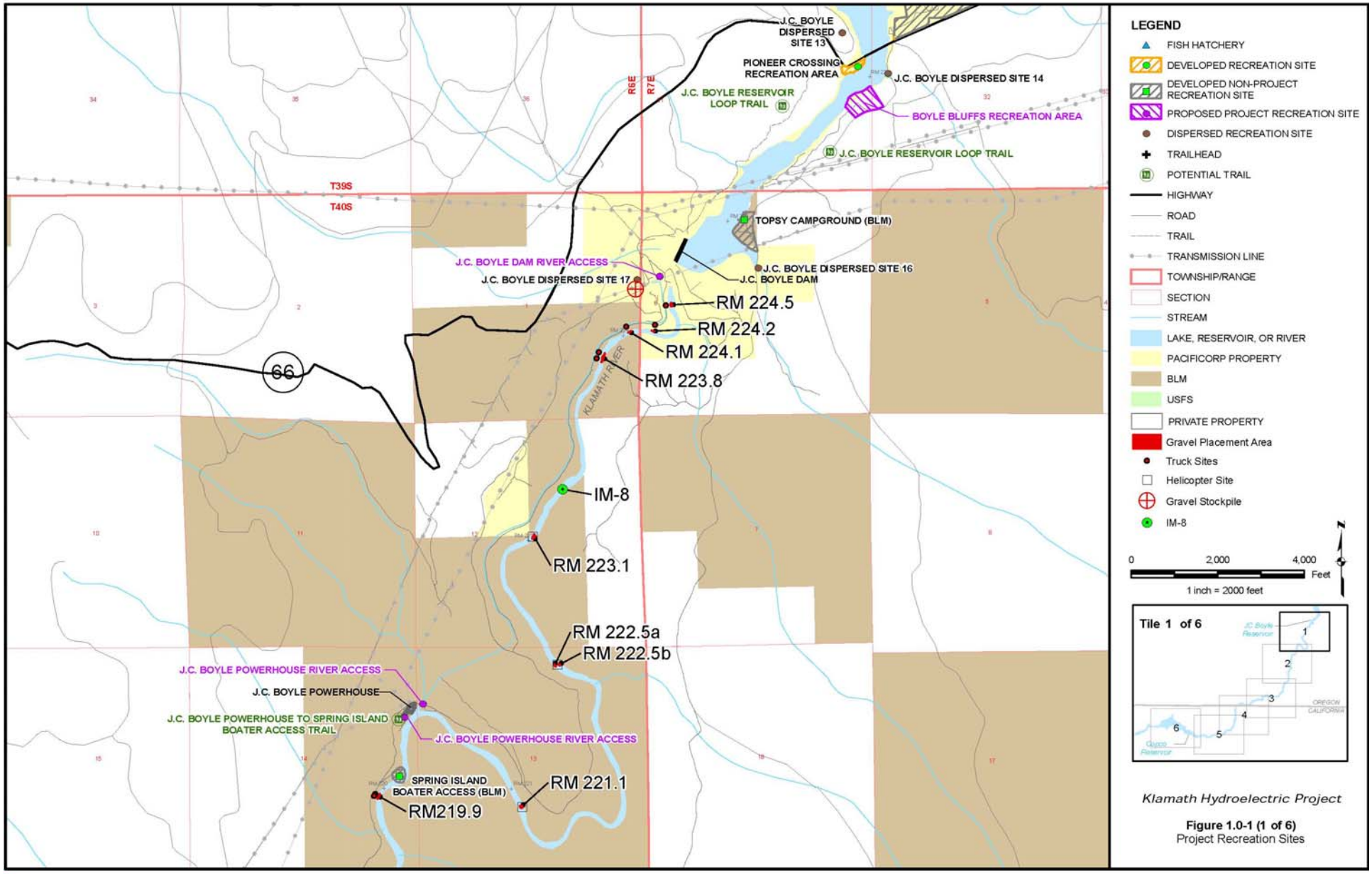
# APPENDIX A

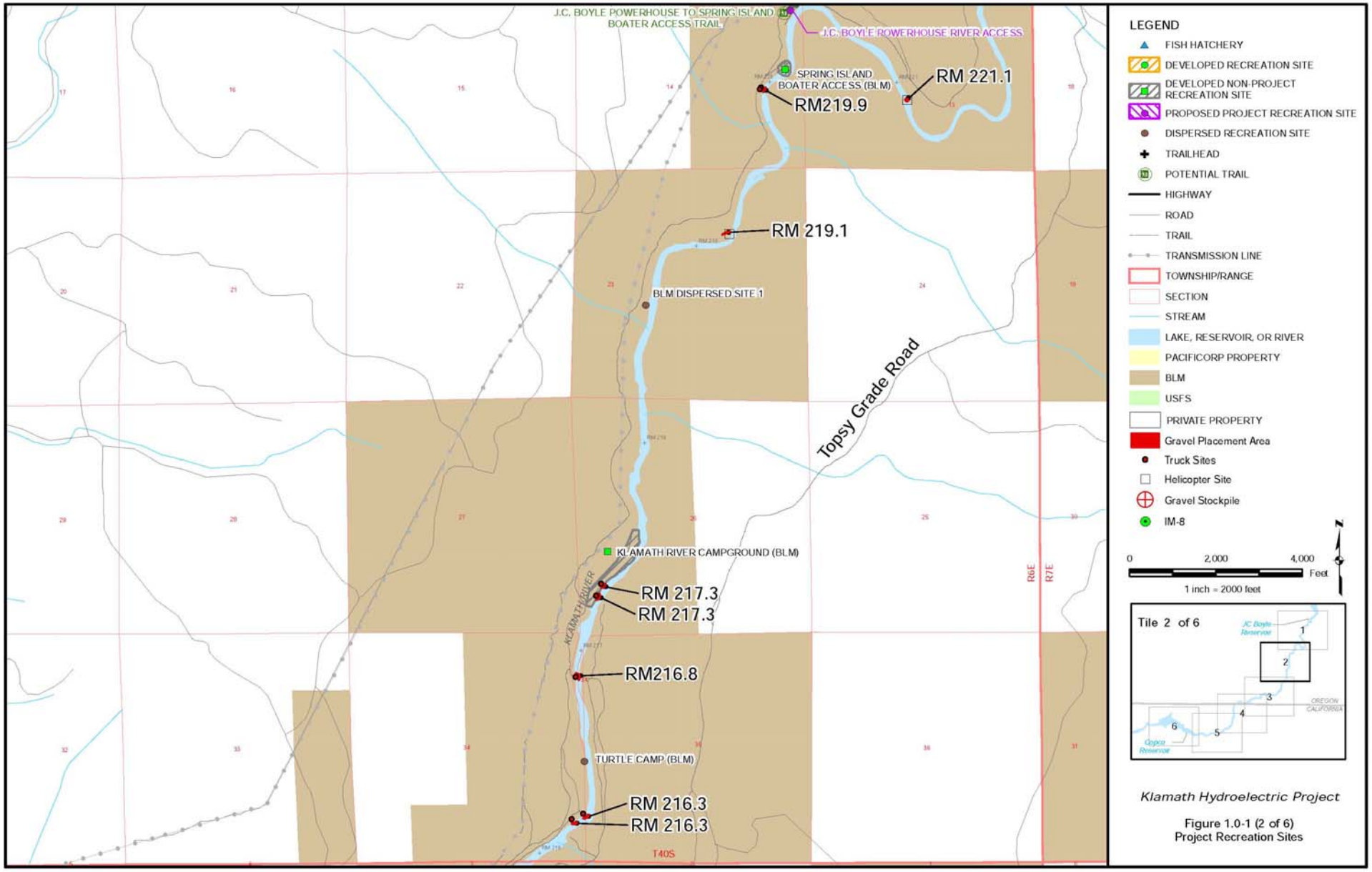
## KHP RECREATION SITE MAPS




*Klamath Hydroelectric Project*

**Figure 1.0-1 (1 of 6)**
Project Recreation Sites

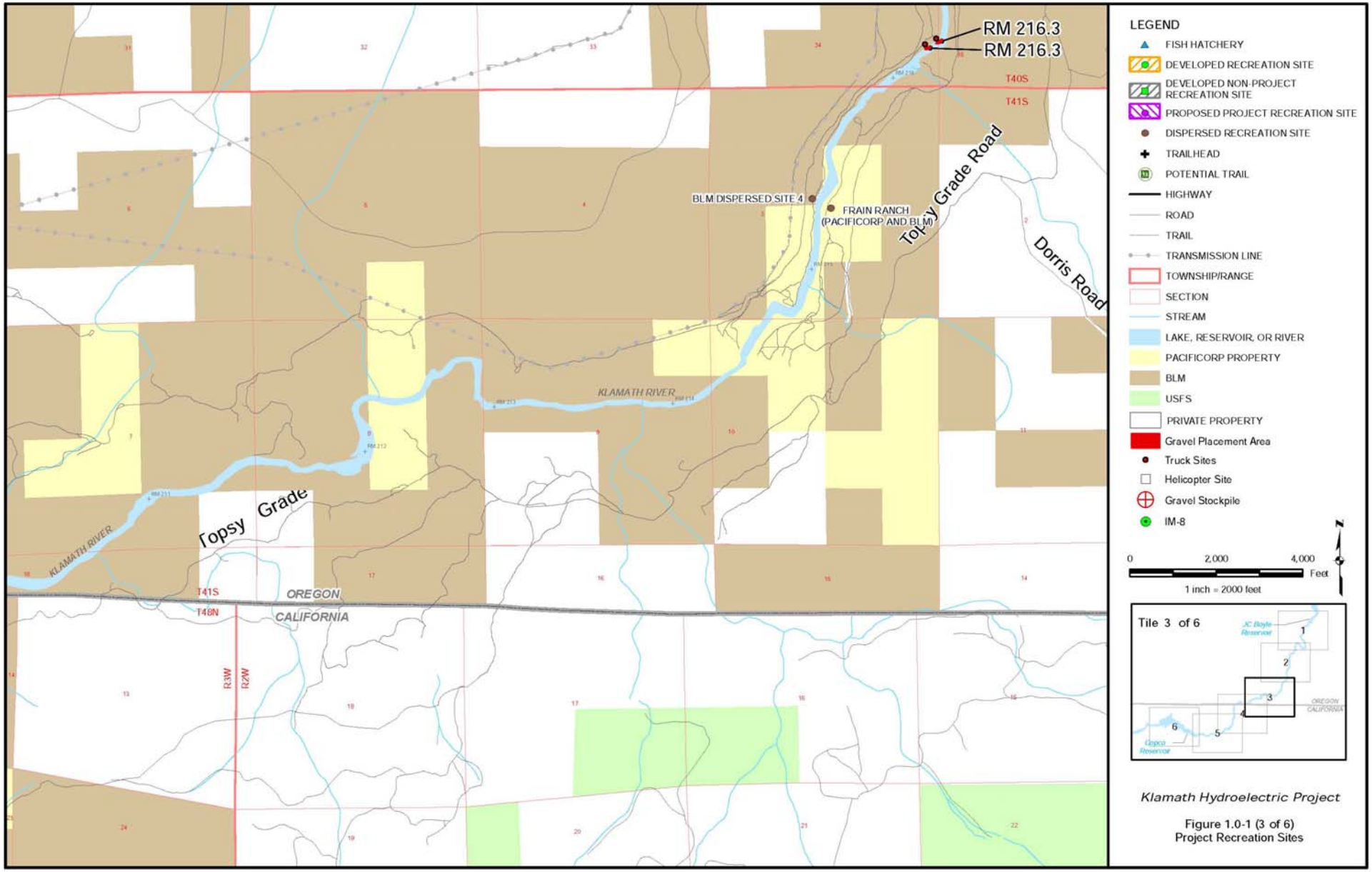
PACIFICORP ENERGY ©July 2011 PacifiCorp




*Klamath Hydroelectric Project*

Figure 1.0-1 (2 of 6)
Project Recreation Sites

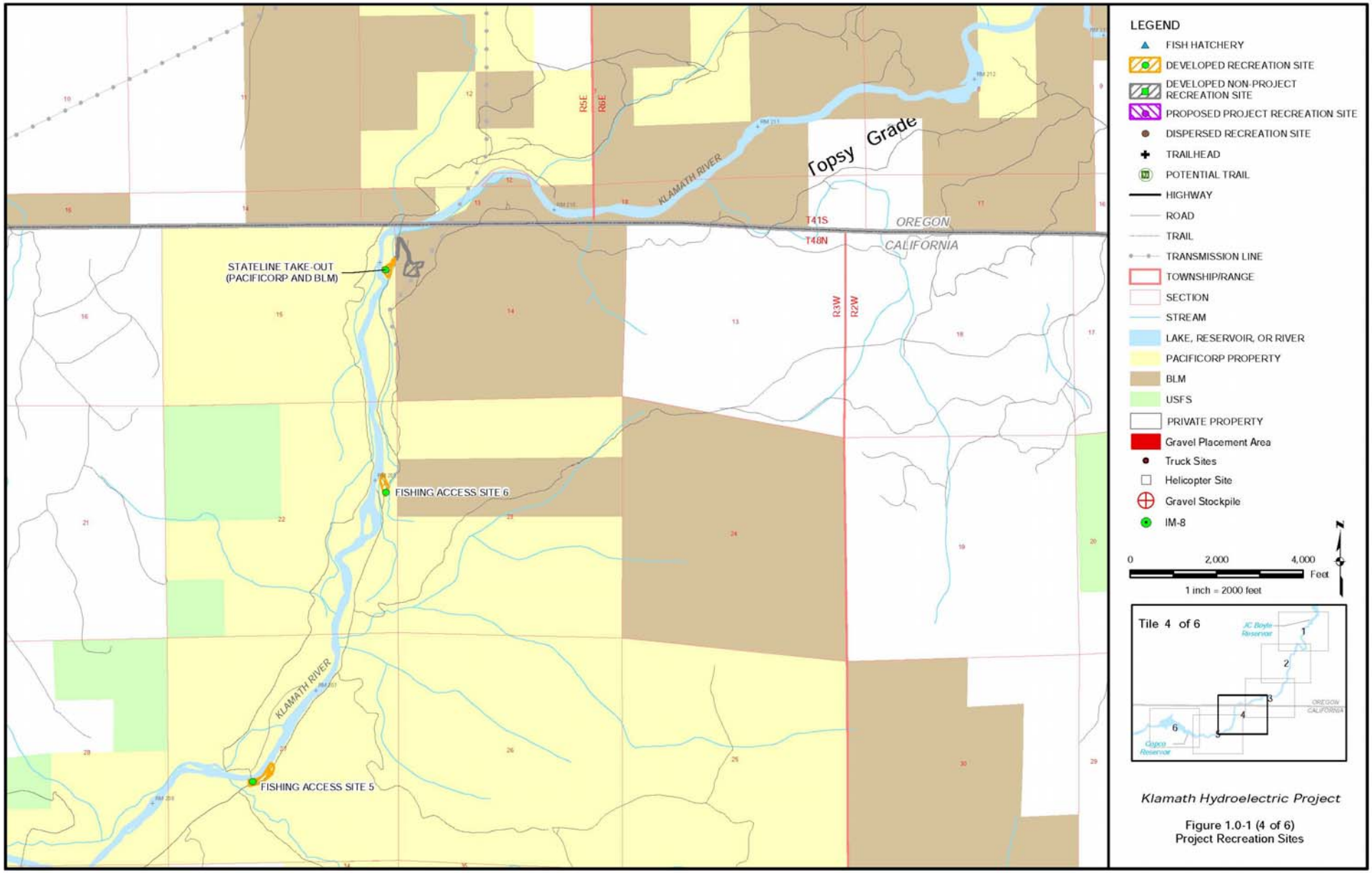
PACIFICORP ENERGY ©July 2011 PacifiCorp




*Klamath Hydroelectric Project*

Figure 1.0-1 (3 of 6)
Project Recreation Sites

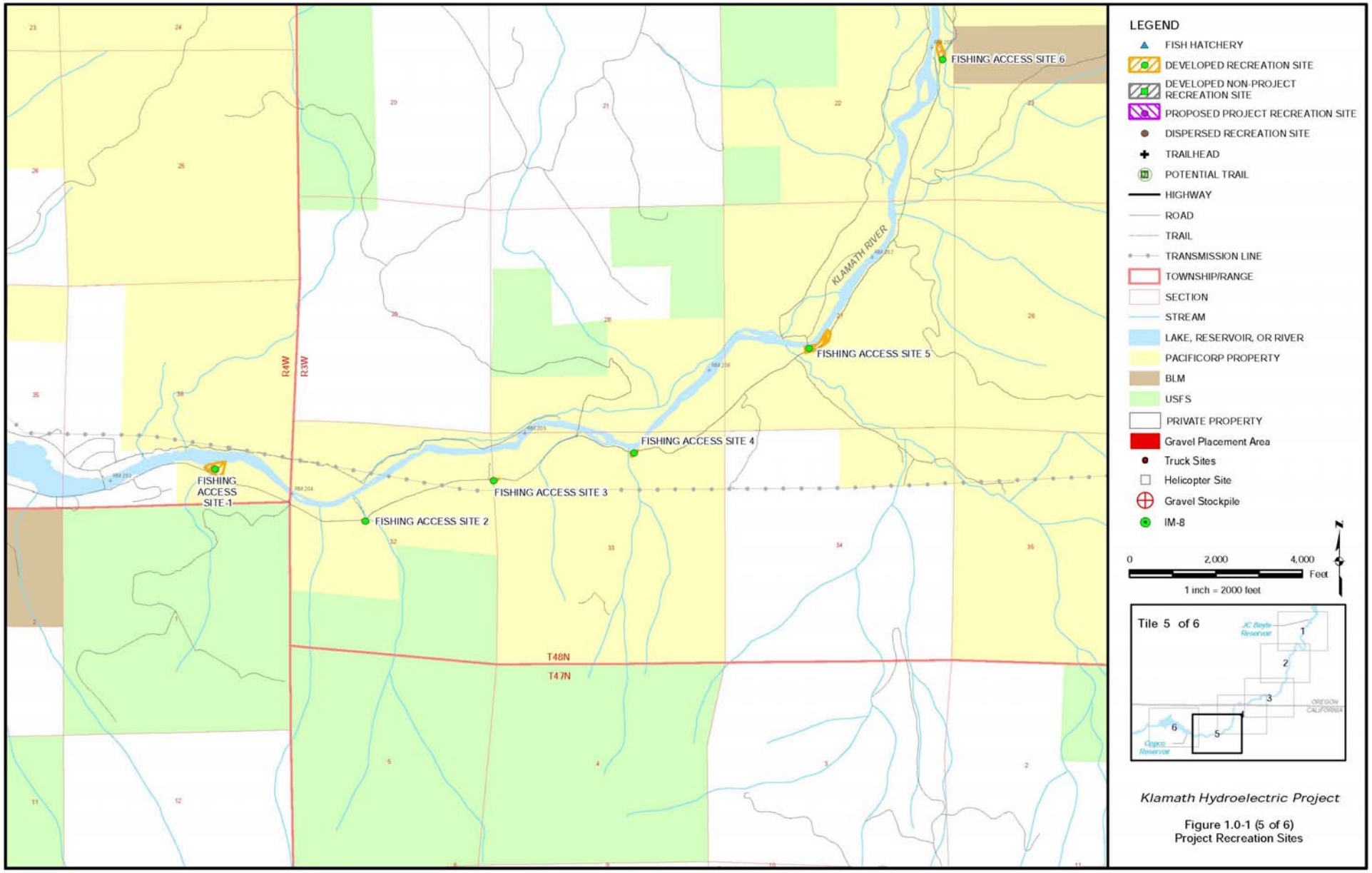
PACIFICORP ENERGY © July 2011 PacifiCorp




*Klamath Hydroelectric Project*

Figure 1.0-1 (4 of 6)
Project Recreation Sites

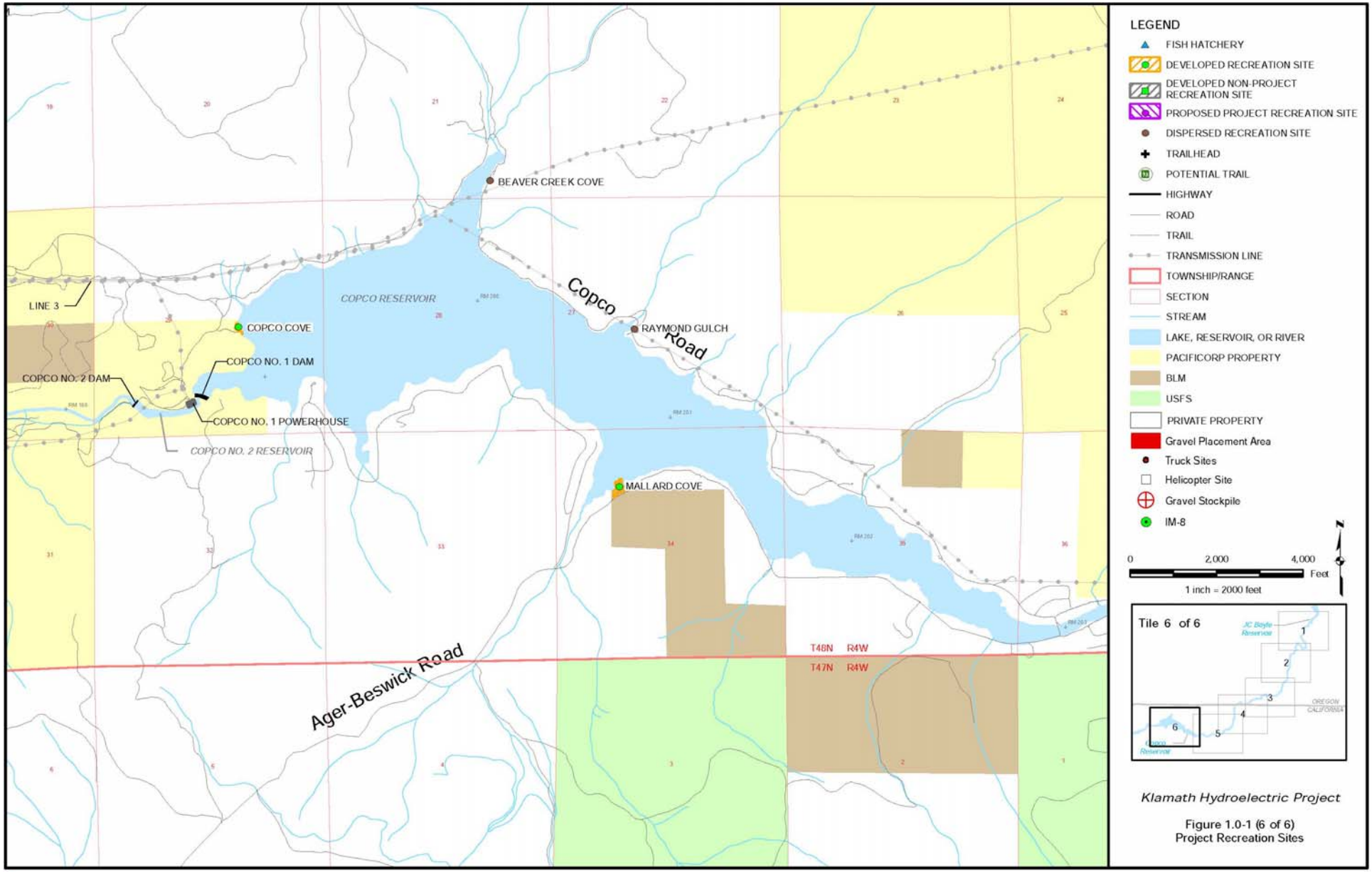
PACIFICORP ENERGY © July 2011 PacifiCorp




*Klamath Hydroelectric Project*

Figure 1.0-1 (5 of 6)
Project Recreation Sites

PACIFICORP ENERGY ©July 2011 PacifiCorp




*Klamath Hydroelectric Project*

Figure 1.0-1 (6 of 6)
Project Recreation Sites

PACIFICORP ENERGY © July 2011 PacifiCorp

# APPENDIX B

## MSDS – BUSTAR ROCK EXPANSION COMPOUND

1

| [1]**Material, Safety Data Sheet**<br>May be used to comply with OSHA Hazard Communication Standard, 29 CFR 1910 1200. Standard must be consulted for specific requirements. | **US Department of Labor**<br>Occupational Safety and Health Administration<br>(Non-mandatory Form)<br>Form Approved<br>OMB No.1218-0072 |
|---|---|
| IDENTITY (as Used on Label and List<br>CRAS –NON- EXPLOSIVE DEMOLITION GROUT | Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that. |

## Section I

| | |
|---|---|
| Manufactures' name<br>KAYATI SL. | Emergency Telephone Number.<br>334-382-1000 |
| Address(Number, Street, City, State and ZIP Code)<br>Calle A, no. 5-polígono Indus. San José de los Llanos.<br>01230 NANCLARES DE LA OCA-ALAVA (Spain) | Telephone Number for Information<br>(34) 945 135626 (Spain) |
| | Date Prepared<br>October 20, 2004 |
| | Signature of Preparer (optional) |

## Section II-Hazardous Ingredients/ Identity Information

| Hazardous Components (Specific Chemical Identity, Common Name(S) | OSHA | ACGIH TLV | Other Limits Recommended | % (optional) |
|---|---|---|---|---|
| 1.-HAZARDOUS COMPONENTS: NONE<br>2.-NON-HAZARDOUS CHEMICAL COMPOUNDS: (% BY Weight) | | | | |
| 2.1 Limestone and Dolomite | | | 95/97% | |
| 2.2 Regulatory additives of the reaction | | | 3/5% | |
| | | | | |
| | | | | |
| | | | | |
| | | | TOTAL 100% | |

| **Section III-Physical/Chemical Characteristics** | | | |
|---|---|---|---|
| Boiling Point | Not Applicable | Specific Gravity (H2O=1) | 2.20 |
| Vapor Pressure (mm Hg) | Not Applicable | Melting Point | 1000C |
| Vapor Density (AIR=1) | Not Applicable | Evaporation Rate (Butyl Acetate=1) | Not Applicable |
| Solubility in Water Slight | | | |
| Appearance and Odor<br>Gray Powder, No Odor | | | |

| **Section IV-Fire and Explosion Hazard Data** | | | |
|---|---|---|---|
| Flash Point (Method Used)<br>Not Applicable | Flammable Limits<br>Not Applicable | LEL | UEL |
| Extinguishing Media<br>Not Applicable | | | |
| Special fire Fighting Procedures<br>In the event of fire near product, use foam only. Do not use water. | | | |
| Unusual Fire and Explosion hazards<br>When used incorrectly, such as incorrect hole-diameter, improper temperature range, or warm water, blow outs of material may occur. | | | |
| | | | |
| | | | |

| **Section V-Reactivity Data** | | | |
|---|---|---|---|
| Stability | Unstable | | Conditions to Avoid<br>Not Applicable |
| | Stable | Yes | |
| Incompatibility (Materials to Avoid)<br>Water (Storage Only) | | | |
| Hazardous Decomposition or By products<br>None | | | |
| Hazardous Polymerization | May Occur | | Conditions to Avoid<br>Not Applicable |
| | Will Not Occur | Yes | |

| **Section VI Health Hazard Data** | | | | |
|---|---|---|---|---|
| Route(s) of Entry | Inhalation?<br>Avoid | Skin<br>Avoid | Ingestion?<br>Avoid | Eye Contact?<br>Avoid |
| Health Hazards (Acute and Chronic) | | | | |
| 1. -Skin and eye contact: Irritation, Burn | | | | |
| 2. Inhalation and Ingestion: The same symptoms as cement or quicklime will appear. | | | | |
| Carcinogencity | NTP?<br>Not Applicable | IARC Monographs?<br>Not Applicable | OSHA Regulated?<br>Not Applicable | |
| Signs and Symptoms of Exposure | | | | |
| Since the product is an alkali material, skin etc. may be irritated | | | | |
| Medical Conditions<br>Generally aggravated by exposure. Skin, eyes, nose, and throat may be irritated and burned unless immediately rinsed off completely | | | | |
| Emergency and First-Aid Procedures | | | | |
| If skin comes in contact with the product, rinse thoroughly with water; wash with soap and rise with water. If eyes come in contact with the product, rinse thoroughly water and consult with a doctor as soon as possible. Remove the dirty clothes. | | | | |

| **Section VII-Precautions for Safe Handling and Use** |
|---|
| Gather the released or spilled product with broom or shovel. |
| Waste Disposal Method: Gather the released or spilled powder with broom or shovel. Dilute the remaining powder by hosing area thoroughly with water.<br>After product has activated and become hard, it can be safely removed with debris. |
| Precautions to be taken in Handling and Storing:<br>Store the product under dry conditions. Avoid dust while handling the product. For safe handling follow precautions for safety and hygiene, like washing hands before and after handling. Do not drink, eat or smoke during handling. Always wear safety goggles, dust-proof mask and rubber gloves when handling the product. |
| Other Precautions<br>When mixed with water, the product expands under high temperature development. Stay away from holes filled with the mixture of the product and water to avoid any accident to be caused by blow out. Avoid any heat source near holes and product. |

| **Section VIII Control Measures** | | |
|---|---|---|
| Respiratory protection (Specify Type)<br>It is recommended to wear ordinary dust-proof mask | | |
| Ventilation<br>Good ventilation | Local Exhaust<br>Not Applicable | Special<br>Not Applicable |
| | Mechanical (General)<br>Not Applicable | Other<br>Not Applicable |
| Protective gloves<br>Ordinary Rubber gloves | Eye Protection<br>Safety Goggles | |
| Other Protective Clothing or Equipment<br>Dust Proof Mask | | |
| Work/Hygienic Practices<br>Not Applicable | | |

# APPENDIX C

## USFWS AQUATIC PROGRAMMATIC BIOLOGICAL OPINION CONSULTATION PDCS, CMS AND APPLICABLE PROJECT ACTIVITY CATEGORIES

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**The following**

**General PDCs and CM Applicable to All Activity Categories**

General Project Design Criteria (PDC)s: All projects will be guided by PDCs that help restore or enhance stream channel, riparian, wetland, and/or upland functions that would occur under natural disturbance regimes.

General Conservation Measures (CM)s: CMs are intended to minimize effects to the aquatic environment, and the following apply, when relevant, to all 19 activity types:

i. Technical Skill and Planning Requirements

- Ensure that an experienced professional fisheries biologist, hydrologist or technician is involved in the design of all projects covered by this BO. The experience should be commensurate with technical requirements of a project. If ESA-listed wildlife/plant species occur in the planning area, as determined by a unit wildlife biologist or botanist, the appropriate specialist will assist with project design.

- Planning and design includes field evaluations and site-specific surveys, which may include reference reach evaluations that describe the appropriate geomorphic context in which to implement the project. Planning and design involves appropriate expertise from professional staff or experienced technicians (e.g., engineer, silviculturist, fire/fuels specialists.)

- The project biologist should insure that PDCs and CMs are incorporated into any implementation contract agreements. If a biologist is not the Contracting Officers Representative (COR), then the biologist must regularly coordinate with the project COR to insure the PDCs and CMs are being followed.

ii. State and Federal Requirements

- Follow the appropriate state (Oregon Department of Fish and Wildlife (ODFW) or Washington Department of Fish and Wildlife (WDFW)) guidelines for timing of inwater work. Exceptions to ODFW and WDFW in-water work windows must be requested and granted from the appropriate state agency. Exceptions can be approved through documented phone conversations or email messages with the state agency(s). Such guidelines are intended to prevent project implementation in fish spawning habitat when fish spawning is taking place or while eggs and young fish are in or associated with channel substrates.

- Project actions will follow all provisions and requirements (including permits) of the Clean Water Act for maintenance of water quality standards as described by Oregon Department of Environmental Quality (Oregon FS and BLM), Washington Department of Ecology (Washington FS and BLM) and the MOU between WDFW and the FS regarding Hydraulic Projects Conducted by USDA Forest Service, Pacific Northwest Region, January 2005.

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

iii. Pollution and Erosion Control Plans

- Administrative Units will develop and implement a Pollution and Erosion Control Plan (PECP) for each authorized project, one that includes methods and measures to minimize erosion and sedimentation associated with the project. The following measures will assist in the creation of a PECP.

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

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

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

iv. Minimize Site Preparation Impacts

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

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

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

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

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

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

- Wildlife biologist should determine if a hazard tree is a potential ESA listed bird nest tree. Nesting trees that are hazardous to restoration activities may only be removed outside of active nesting season. No BE nest trees will be removed. Hazard trees that are also suitable NSO and murrelet nest trees may only be removed if there are sufficient

alternative suitable NSO and murrelet nest trees within the same stand that the hazard tree is located.

v. Minimize Heavy Equipment Impacts

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

- The size and capability of heavy equipment will be commensurate with the project.

- All equipment used for instream work shall be cleaned and leaks repaired prior to entering the project area. Remove external oil and grease, along with dirt and mud prior to construction. Thereafter, inspect equipment daily for leaks or accumulations of grease, and fix any identified problems before entering streams or areas that drain directly to streams or wetlands.

- All equipment shall be cleaned of all dirt and weeds before entering the project area to prevent the spread of noxious weeds.

- Equipment used for instream or riparian work shall be fueled and serviced in an established staging area outside of riparian zone. When not in use, vehicles shall be stored in the staging area.

- Minimize the number and length of stream crossings and access routes through riparian areas. Crossings and access routes should be at right angles. Stream crossings shall not increase risks of channel re-routing at low and high water conditions and shall avoid potential listed fish spawning areas when possible.

- Existing roadways or travel paths will be used whenever reasonable. Minimize the number of new access paths to minimize impacts to riparian vegetation and functions.

- Project operations must cease under high flow conditions that inundate the project area, except for efforts to avoid or minimize resource damage.

- Minimize time in which heavy equipment is in stream channels, riparian areas, and wetlands. When operating heavy equipment in stream channels it is because project specialists reasoned that such actions are the only reasonable alternative for implementation and/or would result in less sediment in the stream channel or damage (short-or long-term) to the overall aquatic/riparian ecosystem relative to other alternatives.

vi. Site Restoration

- Upon project completion, remove project related waste.

- Initiate rehabilitation of all disturbed areas in a manner that results in similar or better than pre-work conditions through spreading of stockpiled materials (from b.iv.b. above), seeding, and/or planting with locally native seed mixes or plants. Planting shall be completed no later than spring planting season of the year following construction.

- 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.

- All riparian plantings shall follow one or both of the following direction documents: Regional FS letter to Units, Use of Native and Nonnative Plants on National Forests and Grasslands, May 2006 (Final Draft), and BLM Instruction Memorandum No. OR-2001-014, Policy on the Use of Native Species Plant Materials. When necessary, loosen compacted areas, such as access roads, stream crossings, staging, and stockpile areas.

**Applicable Categories:**

**Category 1. Gravel Placement**

A) Description: In areas where natural gravel supplies are low (immediately below reservoirs, for instance), gravel placement may be used to improve spawning habitat. Gravel projects would include the use of dump trucks for transport and/ or helicopters for placement

b) Design Criteria (DC):

i. Gravel Placement – Gravel augmentation should only occur in areas where the natural supply has been eliminated or significantly reduced through anthropogenic means. Gravel to be placed in streams shall be a properly sized gradation for that stream, clean, and nonangular. When possible use gravel of the same lithology as found in the watershed. After gravel placement, allow the stream to naturally sort and distribute the material. If other aquatic restoration activities included in this BO are used as complementary actions, follow the associated PDCs and CMs.

**<u>Category 2. Floodplain Overburden Removal</u>**

a) Description: Remove anthropogenic overburden and fill, such as dredged mine tailings, railroad beds, dikes, berms, levees, and other fill types, from floodplains to restore natural floodplain functions. Such functions include overland flow during high-water events, dissipation of flood energy, increased water storage to augment low flows, sediment and debris deposition, growth of riparian vegetation, nutrient cycling, and development of side channels and alcoves. Construction would involve use of heavy equipment, such as excavators, earthmovers, scrapers, backhoes, front-end loaders, dump trucks, and bull dozers.

b) Design Criteria

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

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

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

iv. Consider decompaction of soils once overburden material is removed.

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

c) Conservation Measures -No additional CMs are required.

# APPENDIX D

## WILD AND SCENIC RIVERS ACT SECTION 7 DETERMINATION

# Wild & Scenic Rivers Act Section 7 Analysis and Determination — Upper Klamath River Gravel Placement and Barrier Removal Project

## Introduction

To be considered for inclusion in the National Wild and Scenic Rivers System a river must be free-flowing. A second criterion to be eligible is that it must possess one or more Outstandingly Remarkable Values (ORV). The ORVs identified for this designation include recreational, wildlife, fish, prehistoric, historic, scenic and Native American traditional use. This analysis and subsequent determination evaluates the effects of the proposed project on the Klamath River's free-flowing attributes and ORVs, and ensures their protection as required under Section 7 of the Wild and Scenic Rivers Act. Due to the level of detail provided in the Environmental Analysis (EA), this analysis is presented in a summary format and refers the reader to the EA for additional information on impacts to floodplains and hydrology, aquatic species, wildlife, flora, and recreational effects.

The proposed project activities evaluated in this document are attributed to a proposal to implement Interim Measures 7 and 8 (IM-7, IM-8); of the February 18, 2010 Klamath Hydroelectric Settlement Agreement (KHSA) and as described in the environmental assessment prepared for the BLM titled, Klamath Hydroelectric Project Interim Measures 7 and 8: J.C. Boyle Gravel Placement and Bypass Barrier Removal Environmental Assessment, BLM 2011.

The proposed project is located within the Klamath Hydroelectric Project (KHP) area along the J.C. Boyle reach of the upper Klamath River in Klamath County, Oregon (Figure 1). Twelve gravel placement sites are proposed to enhance aquatic habitat throughout the reach. Seven of these sites are proposed within the 3.8-mile-long bypass reach between the J.C. Boyle Dam (River Mile [RM] 224.7) and the powerhouse (RM 220.4). The remaining five placement sites are proposed within the upstream portion of the approximately 11-mile-long WSR designated reach. Gravel would be placed at various sites over an eight-year period with timing and total quantities to be adjusted based on monitoring results during the interim period. In addition, the proposed project will remove a potential upstream fish passage barrier identified within the bypass reach at RM 223.3.

The purpose of the proposed project is to implement Interim Measures 7 and 8 of the KHSA and thereby enhance fish passage and improve the following habitat elements in the Klamath River between J.C. Boyle Dam and Copco Reservoir (the J.C. Boyle reach):

- Current (resident) and potential future (anadromous) fish spawning habitat
- Macroinvertebrate habitat
- Channel geomorphorphic processes (e.g., gravel bar formation for aquatic and riparian species).

## Section 7 Analysis for Projects Inside the Designated River Section

Five placement sites are proposed within the approximately 11-mile-long WSR designated reach (the peaking reach) between the powerhouse (RM 220.4) and the Oregon-California stateline (approximately RM 209.3) (Figure 1). The location, habitat descriptions, quantities, and placement method are provided in Table 1.

**Table 1. Proposed Interim Measure 7 gravel placement sites within the Klamath WSR**

| | | | | | | |
|---|---|---|---|---|---|---|
| RM 219.9 – Peaking reach | Boulder riffle and run | 85 feet | 0.013 | 200 cy | 801 cy | Truck |
| RM 219.1 – Peaking reach | Side channel of cobble riffle & run | 100 feet | 0.017 | 225 cy | 911 cy | Helicopter |
| RM 217.3 – Peaking reach | Boulder/cobble pool tailout and glide | 175 feet | 0.003 | 475 cy (two locations) | 1,241 cy | Truck |
| RM 216.8 – Peaking Reach | Cobble/boulder riffle/run | 85 feet | 0.004 | 350 cy | 688 cy | Truck |
| RM 216.3 – Peaking reach | Cobble pool tailout and riffle run | 160 feet | 0.005 | 450 cy | 912 cy | Truck |

### Effects on Free Flowing Condition

Three areas of potential alterations to the free flowing condition due to project implementation were analyzed including within channel conditions, riparian floodplain conditions, and upland conditions.

*Within Channel Conditions*

As described in Section 4.9 of the EA, proposed project would have no long term effect on the existing hydrologic regime of project reaches. The proposed action may impose short term effects on localized channel characteristics. Hydraulics within and immediately downstream of gravel placement areas will change in response to the presence of additional bedload. Dam releases below the entrainment and transport threshold for the particle size range of placement gravels will result in eddies and slight shifts in the volumetric capacities of localized channel cross-sections. The gravel deficit of the Klamath River far exceeds the volume that is being

proposed, thus placement volumes will have a negligible effect on the volumetric capacity of the project reaches as a whole.

Flows that meet or exceed mobility thresholds will transport placed gravels to hydraulic pockets and slackwater downstream of placement locations.

The net effect of gravel placement on channel characteristics will be an improvement to fish and macroinvertebrate habitat. In addition, the placement of gravel is not expected to increase the erosive power of releases.

Observable changes in local hydraulics at placement sites would be limited to the immediate period after placement and the first threshold mobility flow event. Additionally, the magnitude and spatial extent of any hydraulic effects would be so small as to be imperceptible.

*Riparian and/or floodplain conditions*

The proposed action will have no negative effect on wetland and riparian areas adjacent to or abutting the active channel of the WSR reach (see sections 4.8 and 4.9 of the EA). However, the proposed action is expected to maintain or enhance riparian areas associated with the project reaches. As one of the project's objectives is to improve geomorphological functions by mitigating the gravel deficit, the proposed action may have a positive effect on bank/floodplain maintenance and riparian species recruitment via the entrainment and deposition of placed gravels. In addition, the volume of gravel being proposed throughout an eight-year period will be negligible in terms of increasing the erosive power of dam-controlled flows. As such, the increase in gravel within the system is expected to have no effect on erosion to developed facilities, roads, banks, floodplains, or adjacent lands.

As discussed in the effects analysis for riparian areas, the proposed action may have a positive effect on floodplain areas within unconstrained sections of the project reaches. Although peak flows rarely access the functional floodplains adjacent to project reaches, the transport and deposition of placed gravels may improve the natural recruitment of woody riparian species on gravel bars, upper banks, and floodplains, thereby improving roughness and the overall function of floodplains. Gravel that is inadvertently placed directly on floodplain areas, it will not measurably affect flow patterns of peak releases that have the potential to reach floodplain elevations.

The volume of gravel being proposed throughout an eight-year period will be negligible in terms of increasing the erosive power of dam-controlled flow releases. As such, the increase in gravel within the system is expected to have no effect on erosion to floodplains, as well as KHP facilities, roads, banks, and adjacent lands.

*Upland conditions*

Due to the truck or helicopter placement methods selected for this project, which are sometimes 80 to 100 feet above the placement locations, some pieces of gravel may be inadvertently placed along the bank or floodplain above the river and riparian areas of the placement sites. These are expected to be few and scattered and will not affect any of the ORVs.

**Determination on ORVs**

Effects on the ORVs of the designated section are:

- Recreation -- The proposed project is not expected to have any long term direct or indirect effects to the recreation resources. There will be short term effects such as the presence of heavy machinery and trucks, helicopters, and noise and dust associated with placing gravel in the river and removing rock channel barriers, as well as increased vehicle traffic. These short term effects should have no to minimal impact on actual recreational use in the area, as all of the work is proposed to occur in late fall—winter, a period of very light to nonexistent recreational activity in the project area.

- Wildlife - The diverse plant communities found in the upper Klamath River Canyon provide a great variety of wildlife habitats and wildlife species. The combination of numerous wildlife populations and diverse habitats found within this segment qualified it as an outstandingly remarkable resource. The proposed project is not expected to have any adverse effects on wildlife populations or their habitat.

- Fish – The population of native wild rainbow trout that inhabit this segment qualified it as an outstandingly remarkable resource. The proposed project is not expected to have any long term direct adverse effects on native fish populations. The proposed project will benefit aquatic species by increasing course sediment and gravel deposits in the project reach. By adding gravel to the reach, current and potential fish spawning habitat, macroinvertebrate habitat, and overall geomorphic processes will be enhanced.

- Prehistoric – The prehistoric resources in this segment have been determined to be outstandingly remarkable because of the abundance of sites and their regional interpretive value. The proposed project is not expected to have adverse effects on prehistoric sites along the Klamath River Canyon. Long term effects could reduce riverbank erosion along areas where sites are located, thus creating site stabilization. Oregon SHPO concurred with BLM's finding 8/22/11.

- Historic - In this segment sites are primarily associated with Topsy Road, a historic stagecoach/freight road that extends along 5.1 miles of the canyon. The proposed project is not expected to have adverse effects on historic sites along the Topsy Road and the Klamath River Canyon. Long term effects could reduce riverbank erosion along areas where sites are located, thus creating site stabilization. Oregon SHPO concurred with BLM's finding 8/22/11.

- Scenic - The scenic value of the upper Klamath River Canyon has been classified as Scenic Quality A. The outstandingly remarkable scenic value is predominantly due to unique landform, diverse vegetation, water, and a lack of negative cultural modifications. The proposed project is not expected to have any long term direct or indirect effects to these scenic resources. There will be short term effects such due to the presence of heavy machinery, trucks, and helicopters, and associated dust with placing gravel in the river and removing rock channel barriers, however this will have no lasting impact to scenic resources.

- Native American Traditional Use - Native American traditional use in this segment has been determined to be outstandingly remarkable. The proposed project is not expected to have any effect on traditional use locations for Native Americans. Tribal consultation yielded no concerns as well.

## Section 7 Evaluation for Projects Outside The Designated River Corridor

### Effects on Free Flowing Condition

The project proposal includes seven placement sites and one fish passage barrier removal site in the bypass reach above the WSR reach and above the power house (see Table 1 of the EA). There are not expected to be direct or indirect impacts from these projects because almost all of the gravel is expected to be entrained within a few hundred yards of the initial placement sites.

Section 7(a) of the Act provides a specific standard for review of developments below or above or on a stream tributary to a designated river. Such developments may occur as long as the project "will not invade the area or unreasonably diminish the outstandingly remarkable values present in the area as of the date of designation. This standard applies to projects outside the designated river corridor but on the same river or tributary.

The initial question to be addressed is whether or not the proposed project invades the designated river. The term invade is defined as encroachment or intrusion upon. If the project is determined to invade the designated river, the proponent would be advised to develop measures to eliminate this unacceptable effect.

The proposed barrier removal work site is located at RM 223.3 which is 3 miles upstream of the WSR upstream boundary (RM 220.3). Additionally, 7 of the gravel placement sites are located between .8 (RM 221.1) and 4.2 (RM 224.5) miles upstream of the upstream boundary of the WSR.

### Determination on ORVs

If the proposed project does not invade the designated river, the next question to be answered, relative to the standard in Section 7(a), is whether or not the proposed project will "unreasonably diminish" any of the specified values. Given that the standard implies that some diminution of values may be determined reasonable, there are two questions to consider:

1. Does the proposed project cause diminution of the outstandingly remarkable values of the designated river as present at the date of designation?

2. If there is diminution, is it unreasonable? This would suggest an evaluation of the magnitude of the loss. Factors to be considered include:

    (1) Whether the value contributed to the designation of the river (i.e. outstandingly remarkable value)

(2) The current condition and trends of the resource. (If diminution is determined unreasonable, measures may be recommended to reduce adverse effects to within acceptable levels).

- Recreational - The proposed project is expected to similarly affect the recreational activities as with the sites within the Upper Klamath designated Wild and Scenic River although it is not expected to have any long term direct or indirect effects to the recreation resources. Recreationists will have to travel through this non-designated segment to access the majority of the recreational sites within the Wild and Scenic River segment. There will be short term effects such as the presence of heavy machinery and trucks, helicopters, and noise and dust associated with placing gravel in the river and removing rock channel barriers, as well as increased vehicle traffic. These short term effects should have no to minimal impact on actual recreational use in the area, as all of the work is proposed to occur in late fall—winter, a period of very light to nonexistent recreational activity in the project area.

- Wildlife - The proposed project is not expected to have any adverse effects on the diverse plant communities, wildlife habitats or wildlife species found in the upper Klamath River Canyon.

- Fish - The proposed project is not expected to invade or unreasonably diminish the aquatic resources found in the Upper Klamath designated Wild and Scenic River. There are not expected to be direct or indirect impacts from these projects on the downstream designated reach because almost all of the gravel is expected to be entrained within a few hundred yards of the initial placement sites. In addition, the barrier removal will not directly impact aquatic species or habitat in the designated WSR segment.

- Prehistoric- The proposed project is not expected to have adverse effects on prehistoric sites along the Klamath River Canyon. Long term effects could reduce riverbank erosion along areas where sites are located, thus creating site stabilization. Oregon SHPO concurred with BLM's finding 8/22/11.

- Historic- The proposed project is not expected to have adverse effects on historic sites along the Klamath River Canyon. Long term effects could reduce riverbank erosion along areas where sites are located, thus creating site stabilization. Oregon SHPO concurred with BLM's finding 8/22/11.

- Scenic -- The proposed project is not expected to invade or unreasonably diminish the scenic resources found in the Upper Klamath designated Wild and Scenic River. There are not expected to be direct or indirect impacts from these gravel placements on the downstream designated reach because almost all of the gravel is expected to be entrained within a few hundred yards of the initial placement sites.

- Native American Traditional Use - The proposed project is not expected to have adverse effects on traditional use for Native Americans. Tribal consultation yielded no concerns as well.

**Conclusion**

The implementation of the proposed action will incorporate measures to assure that the project is consistent with the goals established under the BLM's Klamath Falls RMP, specifically to support management actions that will result in maintain and enhancing ACS objectives and ORV fishery values. Based on the above analysis, the project will not diminish the recreational, wildlife, prehistoric, historic, scenic and Native American traditional use values for which the river was designated. The proposed project will benefit aquatic species by increasing course sediment and gravel deposits in the project reach thus the fishery values will be enhanced.

Determining Official: *Donald J. Holmstrom* Date: 8/30/11
(Signature)
Name: Donald J. Holmstrom
Title: Manager, Klamath Falls Resource Area

**Section 7 Determination Evaluation Team**

| **Outstandingly Remarkable Values** | **Resource Specialist** |
|---|---|
| Historic, Prehistoric and Native American Traditional Use Values: | Brooke Brown |
| Recreation/Scenic Resource Values: | Grant Weidenbach |
| Hydrology/Riparian: | Andy Hamilton |
| Wildlife Values: | Matt Broyles |
| Fishery Values: | Rob Roninger |

# APPENDIX E

## PUBLIC COMMENT SUMMARY RESPONSE

**Public Comments on Klamath River Gravel Augmentation Scoping Letter**

| Comment Number | Comment | Response |
|---|---|---|
| A-1 | Aquatic resources should benefit from the proposed measures. | Agree, comment noted. |
| A-2 | The use of Bustar for fracturing side-cast boulders is a good alternative to road construction. | Agree, this is a good application for this product. |
| A-3 | Project timeline (for implementation) is unclear; will IM7 precede IM8? | IM8 is very limited in terms of both the spatial extent of the project, quantity of rock to be removed, and project duration. Additionally, benefits to fish are limited in comparison to IM7. Schedule is therefore to begin implementation of IM7 first; IM8 will most likely occur during the 2013 or 2014 field seasons. |
| A-4 | Is there a gravel stockpile below J.C. Boyle or will transport from outside of the project be necessary? | Gravel will be obtained outside of the immediate project area from a source that meets project specifications. |
| A-5 | Will Bustar be disruptive to already placed gravels, and if so should IM8 precede IM7? | Gravel placed in connection with IM7 will not be influenced by IM8. The small amount of material removed from the existing sidecast barrier will be placed in an upland location or, in consultation with the agencies, at selected areas in the river to enhance habitat. |
| A-6 | What are the fallback measures in the event of unforeseen circumstances? | A project of this nature is inherently uncertain - gravel availability; unforeseen high flows, mechanical failures, weather - all could prevent successful implementation at times. However, the extended duration of the project will minimize impacts of any of these factors within a single year and thus not impact overall goals and objectives. |
| B-1 | This evaluation includes and applies to the KHSA's Interim Measures. A careful analysis of the fish passage and water quality benefits of facilities removal will demonstrate that facilities removal will advance the restoration of salmonids fisheries of the Klamath Basin and is in the public interest. | Comments noted; this is outside the scope of this project. |
| B-2 | Roads should be utilized by the BLM in a limited and strategic fashion due to their documented (and referenced) negative effects on terrestrial and aquatic systems. | Road use will be in late season and short duration (less than one week). Impacts of road use have been considered in the NEPA process. |

| | | |
|---|---|---|
| B-3 | While the current Scoping Letter addresses only IM 7 and 8, the overall interim measures in the KHSA are inadequate. They allow PacifiCorp to operate for 10 more years without implementing the non-structural operational requirements that are part of the mandatory conditions for a new license. | Comments noted. |
| B-4 | Any implementation of the KHSA and its associated IM must analyze the adverse impacts of the KHSA as well as any potential benefits. | While IM7 and IM8 are both elements of the KHSA, reviewer's comments on this and other issues relative to removal of the lower four Klamath River dams, the KHSA, and the KBRA are outside the scope of this project. |
| B-5 | PacifiCorp should remain liable and its operations should remain subject to the Clean Water Act and Endangered Species Act. | Comment noted; this project is being done in cooperation with state and federal resource agencies and under all required permits. |
| B-6 | Explore feasibility of operating Copco 1 and Iron Gate at reduced pool levels to minimize temperature increases and toxic algae in the reservoirs. | Comments noted; this is outside the scope of this project. |
| B-7 | Consider the origin of noted boulders. Blasting should be done only if deemed necessary by regions best available science. | No blasting is proposed. |
| C-1 | Request that a more complete review of impacts to navigability be considered in regard to modifying river channel at "Sidecast Slide" rapid. | Impacts to recreation and navigability have been considered in the NEPA document. |
| C-2 | Alternative proposal to place smaller diameter rock upstream of "Sidecast Slide" is unclear. Any hydrologic analysis should address navigability, as well as fish passage. | Agree; this will be clarified in the NEPA document. |
| C-3 | Usually don't support riverbed modification due to unforeseen results, but feel it is appropriate in this instance. | Comment noted. |
| C-4 | NEPA analysis should consider navigability in more detail. | Impacts to recreation and navigability have been clarified in the NEPA document. |