BIOLOGICAL ASSESSMENT
LAKE CREEK RESTORATION PROJECT

Jefferson County
170103010904 HUC
Columbia River DPS Bull trout – Metolius Basin

Prepared for

Upper Deschutes Watershed Council
Bend, Oregon

Prepared by

Pacific Habitat Services, Inc.
Wilsonville, Oregon

August 2005

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Pacific Habitat Services
John van Staveren
Gregg Lomnicky

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1.0 INTRODUCTION

1.1 Background

The purpose of this Biological Assessment (BA) is to address the effects of the Lake Creek Restoration Project on Columbia River Bull Trout (*Salvelinus confluentus*), which is listed as threatened under the Federal Endangered Species Act (ESA) of 1973 (50 CFR Part 17, 1999). The Lake Creek Restoration Project will involve significant stream channel and riparian restoration on Lake Creek at the Lake Creek Lodge, south of Camp Sherman in Jefferson County, Oregon. Restoration activities include wetland creation, removal of an artificial in-channel pond, keying in significant numbers of whole trees, installing boulders, and replacing a small access bridge.

The restoration activities have the potential to impact bull trout and/or its habitat. The proposed work will require a permit from the US Army Corps of Engineers (COE) for proposed work within Waters of the United States. This permit constitutes the project's federal nexus.

This BA was prepared by Pacific Habitat Services, Inc. for the Upper Deschutes Watershed Council (UDWC). The species population addressed in this document is the Columbia River Bull Trout Distinct Population Segment (DPS), which is under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). This BA addresses the proposed action in compliance with Section 7(c) of the ESA of 1973, as amended. Section 7 of the ESA assures that, through consultation with the USFWS, federal actions do not jeopardize the continued existence of any threatened, endangered or proposed species, or result in the destruction or adverse modification of critical habitat. Conservation measures are identified in this BA, which avoid or minimize any adverse effects of the proposed project on listed species [and/or] critical habitat.

The project will not remove any trees, nor will it impact any of the surrounding forest. Therefore, this BA will not address the northern spotted owl, which is listed as threatened (FR 55(123): 26114, 1990) under the ESA. Ryan Houston, Director of the UDWC has stated that no spotted owls are known to nest nearby (August 2005).

The UDWC entered into a partnership with Gordon Jones, the owner of the Lake Creek Lodge in 2004, to develop a stream restoration project on the lodge property. The US Forest Service (Deschutes National Forest, DNF) contracted with the UDWC to develop the stream restoration design under Collection Agreement No. 2005-CO-11060120-012. Project designs were revised several times based on technical assistance from the USFWS, the Oregon Department of Fish and Wildlife (ODFW), Pacific Habitat Services (PHS), and based upon needs by the Lodge property owners.

Early coordination and pre-consultation with the agencies was conducted during a series of site visits, meetings, and phone conversations during the development phase of the restoration project. The proposed restoration plan was prepared by Louis Wasniewski, DNF. Prior to the involvement by PHS, the project had been visited and reviewed by representatives from

ODFW and USFWS, the property owner, and Louis Wasniewski. A scoping meeting was held at the proposed site, abutting Lake Creek Lodge, on January 27, 2005. Present at this meeting were Ryan Houston, UDWC, John van Staveren, PHS, Gregg Lomnicky, PHS, Jennifer O'Reilly, USFWS, and Gordon Jones. Additionally, information pertinent to construction of the project and project impacts were received through email and conversations with Louis Wasniewski, and Ryan Houston.

The site was viewed and input provided to Louis for consideration on a revised plan. On May 6, 2005, a revised restoration plan was presented by Louis for additional technical input.

1.2 Location

The project area is located within HUC 170703010904 on Lake Creek approximately 1.5 miles from Camp Sherman, Jefferson County, Oregon (Figure 1). All Figures are in Appendix A). The project site is approximately 1 mile upstream of the Metolius River and just downstream of county road 1419.

1.3 Purpose and Need

In the 1920's, approximately 725 feet of Lake Creek was channelized with concrete and rock retaining walls as part of the development of the Lake Creek Lodge. A large pond was created at that time to provide recreational opportunities including swimming and fishing. Currently, the riparian area surrounding the pond consists of closely mowed grass. The absence of riparian vegetation results in poor fish habitat and causes seasonal fish passage barriers. Since the pond's creation, it has filled-in with sediments and is now a shallow pool with a large surface area contributing to stream warming. Thus, Lake Creek, which includes the project site, is currently listed on the Oregon Department of Environmental Quality (DEQ) 303(d) List of Water Quality Limited Water Bodies for temperature (DEQ 1999). The water exceeds the 17.8°C standard set by DEQ. Though other private and recreational use occurs in the watershed, no other standards are exceeded (Dactler 2003).

The proposed action will restore 725 feet of Lake Creek and its riparian zone to a naturally functioning stream system. Riparian vegetation was historically removed and continues to be unable to adequately colonize due to the hard structures incorporated into the bank decades ago. To help remove some of these existing structures, an access bridge will be replaced over its existing footprint. The current access bridge contains a midstream support piling that will be removed. The new bridge will span the entire channel with pads 3 feet beyond bank full height, on each side of the creek.

Also, the large excavated pool will be filled and replaced with a more natural meander in the channel, much like it probably was prior to the pond excavation. At other meander bends and in two flood channels along the project site, Large Woody Debris (LWD) in the form of whole trees will be keyed into the banks to provide erosion protection, stream channel stability and fish habitat enhancement. Approximately 0.23 acre of wetland (Wasniewski, 2005) will be created adjacent to an existing wetland to provide habitat complexity and flood relief during elevated flows.

The purpose of the proposed action is to restore a naturally functioning stream channel, stream banks and riparian margin along the stream to benefit fish habitat and improve water quality. This project will also provide a naturalized setting for guests of the lodge. Finally, it will enhance community awareness of channel restoration and naturally functioning streams while it improves critical habitat for the threatened bull trout.

2.0 EVALUATION METHODS

2.1 Analytical Framework(s) Used

Factors considered in evaluating project impacts included the species' dependence on specific habitat components that would be removed or modified, the abundance and distribution of habitat, habitat components in the project vicinity, distribution and population levels of the species (if known), the possibility of direct impact to fish, the degree of impact to habitat, and the potential to mitigate the adverse effect

2.2 Information Gathering

The information presented in this BA is based upon a literature review of documents on Lake Creek and the Metolius River watershed and its biota, meetings and on-site discussions with USFWS and USFS staff, telephone calls, mailings and electronic transmittals. The information contained in this document was produced predominately from these communications. The methods outlined in *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996) were modified for use at the project level scale and used to analyze the potential for project impacts on water quality and in-stream and riparian habitat quality. The strategy outlined in this document is to determine the environmental baseline for the watershed, discuss how the proposed action would affect the environmental baseline, and then use that information to arrive at a determination of effect.

3.0 PROJECT DESCRIPTION

3.1 Project Area and Action Area

The project area includes the stream just downstream of county road 1419 and continues for 725 feet to the end of the restoration area (Figure 2). All impacts will be confined near the stream.

The action area includes the streambed and riparian habitat of Lake Creek and extends along Lake Creek approximately 30 feet east (upstream) of the county road 1419 bridge to 500 feet downstream of the proposed restoration site. The upper extent was determined by potential backfilling of water associated with boulders placed just downstream of the bridge for habitat complexity and erosion control. The downstream extent of the action area is the anticipated extent of temporary turbidity resulting from the excavation of banks for keying in LWD and placement of permanent point bar bank fill in the pond location, bridge construction and demolition, and side/flood channel alternation.

3.2 Existing Conditions

The project is located on Lake Creek which is part of the easterly-draining Metolius basin. Though headwaters originate from snowmelt flowing off the steep eastern facing Cascades, Lake Creek flows are made up of Sutton Lake surface waters exiting the lake and meandering through gently rolling glacial tills which now contain private residences in addition to the National Deschutes forest land.

3.3 Proposed Project and Construction Methods

The following is a description of the project and activities to be authorized and carried out by the Deschutes National Forest Service personnel. Funding will be provided by the UDWC. In-water work within Lake Creek will be necessary for bridge piling removal, filling in the pond, concrete and riprap removal, and the installation of LWD and selectively placed 2-3 feet boulders. All construction work will be accomplished during the 2006 in-water work period (July 1- September 30th) or just thereafter if an extension is granted. This discussion was taken from the July 2005 report from Louis Wasniewski, *Stream Restoration Plan, Middle Fork Lake Creek at Lake Creek Lodge,* prepared for the Upper Deschutes Watershed Council, Bend, Oregon

AREA 1

Area 1 is located under the 1419 country road bridge and extends downstream through the first meander. This area is further divided in to two sites: Site 1, which is under the bridge and Site 2, which is the first meander (Figures 3 and 4).

Site 1

This existing channel has a width of 36 feet. It is proposed to create a narrower and deeper channel (20-25 feet) that will improve fish habitat and maintain flood capacity. The project proposes to use 2-3 foot diameter boulders, whole trees with root wads, and coarse gravel/cobble fill river rock to create the deeper channel. The whole trees will be used to push the boulders upstream without damaging the bridge. The trees will be trenched 50-80% into the bank or bed (Figures 4 and 5). Coarse gravel/cobble river rock will be either hand placed using five gallon buckets or by an excavator.

Site 2

This site is to alleviate concerns about a possible increase of shear stress on the banks of the next meander downstream. The areas consist of creating a meander log jam complex (Figures 4, and 5) to handle increases in shear stress. This log jam will also increase bank stability, pool volume and fish habitat complexity. Existing larch trees will be retained and the log jam built around them to maintain the live tree excellent bank holding capacity.

AREA 2

Area 2 is located in the vicinity of the existing pond, bypass channel and access bridge (Figure 3). Area 2 is also divided in to three additional sites (sites 3, 4, 5). Site 3 is the conversion of the pond to a channel, Site 4 is a bridge modification and pool formation, and site 5 is the conversion of the bypass channel to a flood plan and flood channel.

Site 3. Pond Removal and Meander Bend Creation

To convert the pond to a 10-21 foot wide channel, it will be filled with an estimated 1,170 yards of material. The fill material will be acquired by expanding an existing wetland to the east by 0.23 acres (Figure 6). Coarse sediment excavated from the wetland creation area will be used to develop a point bar and a stream meander bend in the present pond location. All sediments that are stockpiled as the wetland is created will be temporarily stored on grass located on-site, but away from the creek. A silt fence will be positioned between the newly created wetland and the creek to keep these sediments from sloughing into the stream as they drain and solidify. Before the pond area is filled, it will be sequentially drained to access and remove fine silt and organic sediments, the fines will be used to augment soil within the constructed wetland (Figures 7 and 8).

The cement and rock retaining wall around the pond will be removed and hauled off-site. To create bank stability in the outside meander through the old pond, two log jam complexes would be constructed (Figures 7 and 8). These log jams will help dissipate stream energy and maintain constructed pools and essential fish habitat.

The project will be completed by planting native plants to the restored and disturbed banks, and the new wetland.

Site 4. Bridge Replacement

The existing bridge, which has a support piling in the active channel, will be replaced by an iron, wood, and stone single span bridge. The supports for the new bridge will be existing concrete pads that are 3 feet above OHW. The structure is planned to consist of timbers over a steel I-bar structure that will rest on the existing pads. It will also have stone abutments that will cap the edges and create a visually appealing finishing touch (See Figures 7 and 8 for location). Since this is a very low volume pedestrian and service access bridge, no sidewalks are anticipated or needed. Lodge guests walking over the short bridge (approximately 21) feet will be the primary user. County road 1419 will be used as a detour route for pedestrians, staff and the construction crew.

In order to remove the existing bridge structure, there will be temporary work in the riparian area adjacent to the bridge and below the OHW. The only in-water work will be the removal of the support piling. The removed structure will be disposed of in an approved location such as the county landfill. No woody riparian vegetation occurs in the area of the bridge, and there will be no grading or earthwork below OHW associated with the installation of the new bridge.

The is also a proposed foot path bridge, between Areas 1 and 2, the will completely span Lake Creek and have no in water or earthwork below the OHW. It will also cause minimal inconvenience (Figure 3). It is anticipated that the replacement will be finished in a single day (Ryan Houston, UDWC, and August, 2005).

Site 5. Pond bypass channel

The existing pond bypass channel will be rehabilitated to a 22 foot floodplain / flood channel (Figures 7 and 8). Whole trees and rocks will be used to harden the flood channel to prevent recapture during large stream flow events. Soil from the created wetland would also be used as side channel fill in and around the rocks and trees. Buried trees would have roots or tops exposed about 1-2 feet above the surface to maintain a low and safe profile while creating a natural floodplain appearance.

AREA 3

Area 3 contains the last three meanders of the restoration reach (Figure 3, Sites 6, 7, and 8). Area 3 predominantly focuses on creating bank stability and habitat complexity on the outside meanders that have signs of erosion (Figure 9)

Site 6

Site 6 does not have signs of erosion, due to boulder riprap that was placed along the banks due to flooding and meander cutoff concerns. However, to increase pool complexity some of the riprap will be replaced with whole trees. These trees are proposed to be placed in the floodplain to provide additional floodplain roughness and protection from a meander cutoff.

Sites 7 and 8

Sites 7 and 8 are proposed for log jam complexes to restore the eroded banks. Site 7 and 8 will add a maximum of 14 and 4 foot of bank, respectively. Material excavated from the pool would be used to build the bank as well as additional material from the created wetland.

3.4 Additional Project Details and Summary

Many trees that are stockpiled on-site will be available for incorporating into the stream bank to provide structural stability and habitat complexity. Figure 6 shows the location of the stockpiled trees. Channels will be excavated into the banks to key in multiple pieces of LWD at each location. First the LWD will be keyed in by an excavator, then the LWD will be backfilled with native soils and then capped with gravel to minimize any fine sediment contributions. LWD will also be incorporated into the overflow channels to provide roughness and resistance to channel capture when the creek overflows. The channels are designed to fill with a 5 year or greater magnitude.

At meander bends, slots in the banks will be excavated below the OHW allowing enough room to key in whole trees. These will then be backfilled with native soil. Gravels will cap the backfilling at the water/bank interface to minimize fines entrainment.

This proposed project will also result in the removal of concrete and some revetting stone. At county road 1419, both trees and boulders will be used to constrict the channel and to protect the first meander bend downstream of the bridge.

The increased bank stability and naturalizing of the banks and riparian zone will greatly enhance the stream and mitigate for the disturbance associated with the bridge replacement, pond removal, revetment removal, and keying in of LWD. The stream will have increased floodplain storage area and in-stream fish habitat complexity, while also reducing thermal loading. The restoration will also provide a new functional side channel for habitat during flooding, native plants to provide streamside aesthetics, nutrients and cover to the stream, and an increased dynamic connection with the surrounding riparian zone.

3.5 Project Effect on Bull Trout in Lake Creek

The potential for the presence of bull trout in the section of Lake Creek to be renovated is very low. Although a couple of bull trout have been identified in Lake Creek in recent years (Dachtler et al 2003), the likelihood of finding one during the in-water work period is very low. Adults and juveniles will likely be seeking thermal refugia in much cooler flows downstream in the Metolius River. However, there is a slight possibility that other salmonid species (red band trout, brown trout, and sculpin), may be present in the pool. Nevertheless, the presence of bull trout will be assumed and all attempts to protect existing populations will be made. Additionally, the pond area will be blocked off and fish will be removed from the work area using a methodology recommended by ODFW and USFWS. The removal methods will likely include the use of blocks nets and a backpack electrofisher. After any collected fish have been removed from the work area, the area will remain blocked off to fish while sediments are drained and then gravel bedload will be used to fill the pool in and create the point bar to define the new channel.

Once the biologists are sure that no fish remain in the dewatering area, a temporary sandbag dam will be placed across the width of the stream channel upstream of the pool. The dam will allow the stream to enter the side channel and bypass the pool and empty back into the creek bed. Maintenance of the sandbag dam through the construction period is a priority. If necessary, all construction activities will stop to ensure that water flow bypasses the meander bend construction and flow is maintained. Also, once the pond has been dewatered, all erosion control measures will be installed. Care will be taken to reestablish flow so that the channel does not get dewatered when the new meander bend is rewetted. Prior to permanently restoring flow in the channel, the regulatory agencies will be notified and invited to the construction site.

3.6 Description of Mitigation and Monitoring (if any) Required Under Other Federal, State, or Local Permits

Due to the small area of permanent and temporary disturbance within jurisdictional waters and the net reduction in the area and volume of permanent in-water structures (pond) within the creek, mitigation will be accomplished through restoration of the temporarily disturbed riparian areas within the project area.

The project site covers about 1.75 acres. The restoration areas total approximately (0.6-0.8 acres). Providing all bank slopes have been established or restored, they will be lined with a planting medium and seeded with a native herbaceous seed mix. After completion of pond removal, bridge replacement, wetland creation and LWD insets, any temporarily disturbed riparian areas will replanted with native trees and shrubs. Table 1 includes the species and quantity proposed for planting in these restored areas.

Table 1. Native plants to be incorporated into the Lake Creek riparian restoration.

Common Name	Scientific Name	Size	Quantity
Dogwood	*Cornus sericea*	5 gallon	75
Alder	*Alnus incana*	5 gallon	75
Willow	*Salix spp.*	5 gallon	100
Aspen	*Populus trichocarpa*	5 gallon	40
Spirea	*Spirea douglasii*	5 gallon	40
Nootka rose	*Rosa nutkana*	2/5 gallon	30
Woods rose	*Rosa woodsii*	2/5 gallon	40
Blue elderberry	*Sambucus cerulea*	5 gallon	40
Misc. Currant	*Ribes spp.*	5 gallon	40
Serviceberry	*Amelanchier alnifolia*	5 gallon	40
Snowberry	*Symphoricarpos albus*	2 gallon	20
Oceanspray	*Holodiscus discolor*	5 gallon	20
Mockorange	*Philadelphus lewisii*	5 gallon	20
Ninebark	*Physocarpus capitatus*	2 gallon	20
Sedge	*Carex spp.*	6 cu in plugs	4000
Total			**4,600**

This planting plan proposes planting approximately 4,600 native plants in the disturbed soils, and a conceptual planting plan has been completed but specific plant locations within the restoration areas will be determined by UDWC. Additionally, the UDWC will alter the planting plan to take into account the exact location of woody debris. Trees and shrubs will be installed in the early spring (early February to mid-March).

3.7 Monitoring and Reporting

The proposed riparian enhancement plantings will be monitored for 5 years following installation. The results of the monitoring will be reported in 5 annual monitoring reports sent to the COE and other agencies by December 31 of each year. In the first year, there will be two site visits to monitor the condition of the plantings. The first site visit will consist of an

as-built inspection within 60 days of tree and shrub installation. This monitoring visit will include counting all trees and shrubs installed to ensure that these numbers match those specified on the planting plans. The first site visit will also establish permanent photo monitoring stations to photo document site development.

Subsequent annual monitoring visits will occur once a year sometime between May and September to assess site conditions. Each monitoring visit will include a stem count and photos taken from the photo monitoring stations to evaluate the success rate of the plantings. Each monitoring report will convey these findings as well as make maintenance and/or additional planting recommendations if needed to meet the standards of success outlined below. If monitoring determines that there is species specific mortality, then a more suitable native species may be specified for replacement and these changes would be outlined in the annual monitoring reports.

3.7.1 Performance Standards

The goal of the riparian enhancement area is to establish a riparian area dominated by native trees and shrubs. The reference area for these plantings is the adjacent riparian area of Lower Lake Creek identified by Louis Wasniewski, DNF (Figure 3). While this area has an established overstory of native trees and shrubs, there are non-native species in the understory. The standards of success in the riparian enhancement area focus on native tree and shrub establishment rather than percent cover of species throughout this area. It is anticipated that naturalized non-native species may be present in the understory; however, so long as their dominance does not compromise the survival of the installed native trees and shrubs their percent cover will be considered irrelevant to site success. Thus, the standards of success proposed for the mitigation area are 75% survival of the installed native trees and shrubs. If native recruits establish throughout the riparian enhancement area, then these may be included in the stem count because after about 2 years these individuals are difficult to differentiate from the installed plants.

4.0 AVOIDANCE MINIMIZATION AND CONSERVATION

Avoidance, minimization, and conservation measures are intended to minimize or avoid environmental impacts to listed species or critical habitat. The measures for this project will be similar to practices outlined in ODOT's *Standard Specifications for Highway Construction* (2002) *Section 00290.00 Environmental Protection* and the *Supplemental Standard Specifications for Highway Construction* (1998). The restoration work performed by the Deschutes National forest under contract to the UDWC will use BMP's as outlined below to follow minimization, avoidance and conservation measures for the benefit of the Columbia River DPS ESU bull trout.

Additional avoidance, minimization, and conservation measures may be agreed upon by state and federal government representatives, as conditions of the resulting federal Letter of Concurrence or Biological Opinion. Failure to meet these conditions may have repercussions to the project.

4.1 Standard Specifications

The following section as stated above is taken from measures followed by ODOT in their work.

Section 00280 – Erosion and Sediment Control

This work consists of installing, maintaining, and removing temporary erosion and sediment control devices such as berms, sediment fences, sediment barriers, construction accesses, and other structural or nonstructural erosion and sediment control devices. Typical work areas include areas disturbed by Project construction, material sources, and storage and disposal sites.

The work described in these Specifications and shown on the plans is the Erosion and Sediment Control Plan (ESCP) and is the minimum requirement for wet weather site conditions.

Coordinate all temporary erosion control features with all permanent erosion control features, if applicable, to the extent practicable to assure economical, effective, and continuous erosion control throughout the construction and post-construction period.

Stabilization - Stabilize soil areas as follows:

(a) oil Exposure Limitations - Stabilize all soils which are exposed and disturbed during construction related activities according to the following:
- Statewide (Entire Year) - Stabilize within seven days of exposure, all areas within 30 meters (100 feet) of waterways, wetlands, or other sensitive areas using methods that do not rely solely upon germination to control erosion.

(b) Temporary Stabilization - Protect from erosion the surface area of exposed soils caused by construction activities. Temporarily stabilize exposed soil surfaces not at finish grade at all times and soil surfaces at finish grade when working outside the permanent seeding dates. Provide the following until permanent stabilization measures are implemented:
- Schedule temporary stabilization on a 14-day basis, or more frequent, if needed or directed.
- Implement at a minimum, appropriate temporary stabilization measures according to the schedule. Temporary stabilization includes, chemical soil tackifiers, temporary seeding, temporary mulching, erosion control matting, plastic sheeting, preparing seed bed, fertilizing, watering, and adding soil amendments.
- Document implemented measures on the ESCP.
- Active work areas scheduled for re-disturbance before the next scheduled temporary stabilization period may be left unstabilized if approved by the Agency.

(c) Permanent Stabilization - Permanently stabilize exposed soil surfaces at finished grade. Permanent stabilization methods include, but are not limited to, seeding, mulching, riprap protection, planting vegetation, and bio-engineered slope stabilization. Permanent stabilization includes stabilization of temporary structures such as detours, stockpiles, and staged earthwork. Immediately perform permanent stabilization at each completed excavation and embankment area except for areas that are scheduled to be redisturbed.

- If areas that have been seeded and are not sufficiently stabilized by an established stand of vegetation according to 01030.60, or the soil surface is not protected with sufficient temporary stabilization measures by November 1 of each year, do the following:
- Take measures necessary to redirect the flows away from the disturbed areas.
- Re-grade disturbed areas to finished grade.
- Apply permanent seeding at the original specified rate.
- Apply temporary mulching or matting.
- If areas to be stabilized, prior to re-grading, are too steep or lack access for effective straw mulch application, apply, upon approval, other effective measures such as chemical soil stabilizers.

- Incorporate permanent erosion control features into the Project at the earliest practicable time. Use temporary erosion control features for the following situations:
- To correct conditions that occur during construction activities that were not foreseen during the design stage of the Project.
- That are needed prior to installing permanent erosion control features.
- To temporarily control erosion that develops during normal construction activities.
- Where erosion will be a problem and if construction permits, construct permanent erosion control features immediately after clearing and grubbing and grading operations are complete. If permanent erosion control features cannot be constructed furnish and install temporary erosion control features.

00280.61 Erosion and Sediment Control Manager (ESCM) – The ESCM's duties include:

- Manage and insure proper implementation of the ESCP.
- Accompany the Agency's representative to the field to review the ESCP before beginning construction activities.
- Monitor rainfall on and in the vicinity of the Project site.
- Monitor receiving streams in the vicinity of the Project site.
- Weekly inspect erosion and sediment control features on active construction sites.
- Every two weeks inspect erosion and sediment control features on inactive sites.
- Inspect erosion and sediment control features on all inactive and active sites at least daily during rainy periods when 15 mm (5/8 inch) or more of rain has fallen within a 24-hour period.
- Mobilize crews to make immediate repairs to the control devices or to install additional control devices during working and non-working hours.
- Record actions taken to clean up significant amounts of sediment.
- Complete the Erosion Control Monitoring form.
- Update the ESCP monthly and within 24 hours after changes are implemented.
- Prepare a contingency plan in preparation for emergencies and the rainy season.
- Accompany the Agency's representative on inspections and, if requested, on inspections made by the regulating agency representatives.

Section 00290 - Environmental Protection

00290.00 Scope - This Section describes the Contractor's duties and obligations with respect to protection of the waters, air, wildlife and other environmental resources of the State.

- Comply with all applicable federal, State and local environmental, health, safety and other laws, acts, statutes, regulations, administrative rules, ordinances, orders and permits, as they may be amended from time to time (referred to in this Section as "Laws"). Comply with all applicable Laws, whether or not specifically referenced in this Section or elsewhere in the Contract.

00290.30 Pollution Control - Prevent, control and abate pollution of the environment as required by the Contract and all applicable Laws. Perform changes or alterations of work required by new or amended environmental pollution Laws, not contemplated at the time of bid preparation, according to 00140.50 and ORS 279.318.

(a) Water Pollution Control Measures - Prevent, control and abate pollution of state waters as required by the Contract and local, state and federal regulations and requirements. Be fully informed of the NPDES Storm Water General Conditions, and conduct construction operations accordingly.

Minimum Required Measures - As a minimum, take the following measures:

- Allow no pollutant of any kind (e.g., petroleum products, grindings, or fresh concrete) to come in contact with an active flowing stream.
- Promptly correct or repair operational procedures, leaks, or equipment problems that may cause pollution at the Project Site. If soils or other media become contaminated as a result of operational procedures or equipment problems, remove and dispose of them according to applicable Laws and Subsection 00290.20(i).
- Dispose of material waste according to 00290.20(d) and (e). Do not bury, dump or discharge material wastes or unused materials at the Project Site, except as provided in 00310.43.
- Limit water leakage from trucks carrying saturated soils to less than 4 liters/hour (1 gallon/hour) before allowing them to leave the Project Site.

Additional measures applicable to the Project will be included in the Special Provisions.

(b) Pollution Control Plan (PCP) – Develop and submit a PCP to prevent point-source pollution related to Contractor operations for approval 10 days before the pre-construction conference. Maintain a copy of the PCP on the Project Site at all times during construction activities, readily available to employees and inspectors. Ensure that all employees comply with the provisions of the PCP. The PCP shall satisfy all pertinent requirements of all applicable Laws, and shall include the following:

- Methods for confining, removing, and disposing of excess concrete, cement and other mortars if any are used.
- Measures for containing fluids and debris from washout facilities.
- Identify hazardous products or materials to be used such as petroleum derived products. Include how they will be handled, monitored, inventoried, and stored as well as spill prevention practices to be followed.
- A spill containment and control plan that includes: notification procedures; specific clean up and disposal instructions for different products; quick response containment and clean up measures which will be available on site; proposed methods for disposal of spilled materials; and employee training for spill containment.
- Vehicle and equipment maintenance procedures and associated pollution prevention practices.
- Preserving and Trimming Vegetation:

Within the Work Areas – Avoid injuring vegetation designated to remain in place. Preservation of this vegetation includes protection and special care.

Outside Work Areas – Avoid injuring any vegetation. Confine operations which may injure vegetation to areas that have no vegetation or to the work areas.

- Work over areas to be cleared and reworked with LWD to minimize disturbance footprint to degree possible.

- Tree Trimming – Trim trees according to good tree surgery practices and as directed to remove safety hazards

- Preserving vegetation includes keeping equipment and materials off of the critical root zone as directed.

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4.2 Amendments to Standard Specifications

00290.30(a-1) Minimum Required Measures

For this Project, the Regulated Work Area is also referred to as the in-water work area, the ordinary high water mark [OHWM], and areas at or below 121 feet elevation, as shown on the plans.

The ODFW in-water work period extends from June 1 to September 30. Requests for extension of the in-water work period require approval by the Corps, ODFW, and USFWS. Requests for an extension of the in-water work period shall be coordinated through UDWC. Contractor shall supply reasoning and justification for the extension request to UDWC a minimum of 21 calendar days in advance of the beginning or end of the in-water work period, as applicable. Approval of an in-water extension request is not guaranteed.

Earthwork

- Placement or removal of embankment material or riprap within the Regulated Work Area is restricted to the in-water work period and the work area will be isolated from the active flowing stream according to 00290.31(d).
- Minimize alteration or disturbance of stream banks and existing riparian vegetation.
- End-dumping of riprap within the Regulated Work Area is prohibited, unless work is isolated from the active flowing stream.
- Confine construction impacts to the minimum area necessary to complete the project.
- No grading of existing ground will be allowed, unless included in the contract documents.
- Stabilize all disturbed areas following any break in work unless construction will resume within four days.

Discharge Water and Turbidity

- Installation and removal of in-water work area isolation devices is restricted to the in-water work period(s). Cofferdams, sheet piling, or other appropriate in-water work area isolation (devices) are required for decommissioning of the artificial pond.
- Do not discharge contaminated or sediment-laden water, or water contained within a cofferdam or Enclosure, directly into any waters of the State until it has been satisfactorily treated (e.g., by bioswale, filter, settlement pond, or pumping to vegetated upland location).
- The Engineer (DNF – L. Wasniewski) retains the authority to temporarily halt or modify the Project in case of excessive turbidity or damage to natural resources.
- Limit turbidity increase to 10% above background reading, as measured visually 30 meters (100 feet) below the Project.
- Discharge no water in a manner that could cause erosion in the existing channel or ground within the regulated work area.

Material Staging and Equipment

- Place "diapers" on equipment operating within 10 m (30 feet) of the Regulated Work Area.
- No Equipment will be allowed to enter or work in or on the water.
- Inspect and clean all Equipment prior to operating it within 45 meters (150 feet) of the Regulated Work Area. Check all equipment for fluid leaks. Remove external oil, grease, dirt and caked mud. Do not discharge untreated wash and rinse water into the Regulated Work Areas. Establish temporary impoundments to catch water from Equipment cleansing, at least 45 meters (150 feet) from the Regulated Work Area and in locations so as not to contribute untreated wastewater to any flowing stream.
- Locate areas for non-workshift storage of equipment and vehicles, other than track-mounted vehicles, at least 45 meters (150 feet) away from the Regulated Work Area.
- Locate areas for storing fuels and other potentially hazardous materials and areas for refueling and servicing Equipment and vehicles at least 45 meters (150 feet) away from the Regulated Work Area.

- For track-mounted Equipment, cranes, and other Equipment whose limited mobility makes it impractical to move it for refueling, take precautions to minimize the risk of fuel reaching the Regulated Work Area. Implement spill prevention measures and provide fuel containment systems designed to completely contain a potential spill (such as absorbent booms , as well as other pollution control devices and measures adequate to provide containment of hazardous material. Perform refueling operations to minimize the amount of fuel remaining in vehicles stored during non-work times.

- Do not refuel equipment or vehicles after 1 p.m. without the Engineer's approval.
- Maintain hazardous material containment booms and spill containment booms on-site to facilitate the cleanup of hazardous material spills. Install hazardous material containment booms in instances where there is a potential for release of petroleum or other toxicants.

Bridge Removal and Construction

- Do not use treated timbers within the Regulated Work Area.
- Use bridge removal techniques conforming to the requirements of Section 00501.
- Implement containment measures adequate to prevent pollutants or construction and demolition materials, such as waste spoils, petroleum products, concrete cured less than 24 hours, concrete cure water, silt, welding slag and grindings, concrete saw cutting by-products and sandblasting abrasives, from entering the Regulated Work Area or any off-site waterway, pond, or wetland not shown on the plans.

High Water Conditions

- If flooding of the Project Site is expected to occur within 24 hours, evacuate areas used for staging, access roads, or storage and remove Materials, Equipment, and fuel.
- Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize environmental resource damage.

00290.31 Protection of Fish, Wildlife and Plants

(a) General: Meet with the Resource Representative (UDWC), Engineer (DNF) and inspector on site prior to moving equipment on-site or beginning any work, to ensure that all parties understand the locations of sensitive biological sites and the measures that shall be taken to protect them. The following measures apply to the Project:

- Maintain passage for adult and juvenile fish for the duration of the Project

4.3 Non-Contractual Obligations and Agreements

All significant riparian replant areas will be monitored to insure the following:

Finished grade slopes and elevations will perform the appropriate role for which they were designed.
Plantings will achieve 75% coverage of restored sites after 5 years.
Large woody debris are placed appropriately and adequately secured.

- A copy of the Biological Assessment and Biological Opinion will be available at the Construction Project Manager's field office.

5.0 NATURAL HISTORY AND SPECIES OCCURRENCE

5.1 Status of Species and Critical Habitat

Bull trout in the entire Deschutes drainage, including the Metolius and its tributaries are part of the Columbia River Bull Trout Distinct Population Segment (DPS) which was listed on June 10, 1998. (63 FR 31647). The Metolius basin bull trout population is presently considered to be expanding, (Biological Assessment for Bull Trout, 2003 in ODOT EA, 2003)

5.2 Biological Requirements

Much of the following information on bull trout was taken from McPhail, J. D., and J. S. Baxter (1996) and ODOT 2003. Bull trout are in the entire Deschutes drainage, including the Metolius and its tributaries.

Bull trout generally reach sexual maturity at age five. The bull trout spawns in the fall (September to October) in flowing water. The threshold spawning temperature is around 9°C. Courtship and spawning behavior are similar to char. The female chooses the deposition site and digs the redd. The degree of sexual dimorphism varies among populations, but in most populations males develop bright spawning colors and a kype, while females are less colorful. The eggs are about 5-6 mm in diameter and optimal incubation temperature ranges from 2 to 4°C.

In the wild, fry emerge approximately 220 days after egg deposition. Newly emerged fry are secretive and hide in the gravel along stream edges, and in side channels. Juveniles are found mainly in pools, but also in riffles and runs. They maintain focal sites near the bottom and are strongly associated with instream cover, especially overhead cover. Juveniles feed primarily on aquatic insects taken from the bottom or from drift. As they grow, their diet shifts to fish, and most adults (except for stream residents) are piscivores.

Like many char, the bull trout occurs as a number of life-history forms. The stream-resident form lives out its life in small headwater streams. It is often dwarfed and reaches sexual maturity at a small size, and sometimes at an early age. The fluvial form lives as an adult in large rivers but spawns in small tributary streams. It often attains a large size, reaches sexual maturity at about five, and undergoes long migrations between mainstem rivers and small tributary spawning streams. The lacustrine-adfluvial form has a similar life-history. It spawns in tributary streams but lives as an adult in lakes. It grows to a large size, usually reaches sexual maturity in about its fifth year, and often makes long migrations between lakes and spawning streams. A fourth possible life-history type is anadromy, though this form would not exist in the project area.

Clean gravel with upwelling ground water is critical for spawning. Cover, in the form of undercut banks, overhanging vegetation and in-stream woody material is needed to protect bull trout from predators. Complex habitat, characterized by a variety of pools, riffles and water depths and velocities, is important to meet the seasonal needs of all age classes of bull trout. Long spawning migrations make habitat connectivity important. Fish passage barriers, such as irrigation developments, may interrupt bull trout movements.

5.3 Limiting Factors for Species Recovery

The Columbia River DPS bull trout is represented by widespread subpopulations that have declined in overall range and numbers of fish. A majority of Columbia River bull trout occur in isolated, fragmented habitat that support low numbers of fish and are inaccessible to migratory bull trout. A few remaining bull trout "strongholds" still remain in the Columbia River basin and are found in contiguous habitats in the Snake River Basin of the Central Idaho Mountains, upper Clark Fork and Flathead Rivers in Montana, and several streams in the Blue Mountains in Washington and Oregon. The USFWS considers this distinct population segment threatened because of habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, and the introduction of non-native species (Biological Assessment for Bull Trout, 2003 *in* ODOT EA, 2003).

5.4 Site Specific Biological and Critical Habitat Context

The USFWS proposed critical habitat for the Columbia River Bull Trout DPS on November 29, 2002. The 358-mile proposed critical habitat in the Upper Deschutes River Basin includes the entire Lake Creek stream system that contains bull trout foraging, migratory, and over-wintering habitat of unknown occupancy. Data from the Forest Service indicates that the closest occurrence of bull trout to the project area is at Metolius Meadows, about a mile downstream from the project. The streams and lakes of the Lake Creek system are identified as habitat essential to supporting an expanding bull trout population necessary for the recovery of the species (Biological Assessment for Bull Trout, 2003).

Although bull trout historically used Suttle Lake and its connection to the Metolius, Lake Creek, is currently a thermal barrier in the summer, thereby preventing the migration of bull trout into the project area and beyond. Since 1997, the bull trout water temperature standards have been exceeded near Lake Creek's headwaters by Suttle Lake. Because the Metolius Basin bull trout population is expanding, there is likelihood that bull trout may occupy Suttle Lake and the project area in the foreseeable future (Biological Assessment for Bull Trout, 2003 in ODOT EA, 2003; Steve Marx, ODFW 2005).

Critical habitat for the Lake Creek stream system is defined as the bankfull elevation. Adjacent floodplains are not proposed as critical habitat. However, the quality of the habitat within stream channels is intrinsically related to the character of the floodplains and associated riparian zones, and human activities that occur outside the stream channels can have demonstrable effects on physical and biological features of the aquatic environment.

6.0 ENVIRONMENTAL BASELINE CONDITIONS

6.1 Existing Environmental Baseline

The Lake Creek watershed is a major tributary of the Metolius River watershed which is part of the larger Deschutes River watershed in the Columbia River Province. The Columbia River province is characterized by grass/steppe vegetation, warm summers, and cold winters. Streams in the Columbia River province tend to be alkaline in nature, subject to elevated temperatures in the summer and cold in the winter with the possibility of anchor ice forming.

The Metolius watershed remains relatively intact compared to other areas of the Deschutes Basin. Spring Chinook Salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*O. nerka*) and steelhead trout (*O. mykiss*) were present in the Metolius River and its tributaries including Lake Creek (Black et al 2004). With changes in land use patterns creating increased human impacts particularly the building of the Pelton-Round Butte Dam complex in the 1960s, anadromous fish runs in the upper Deschutes Basin were eliminated

The Lake Creek watershed lies on the east slope of the Cascade Range within the Lower Cascades ecological subsection which is bounded by the Upper Cascades to the west and Green Ridge to the east. The volcanic upper slopes of the Cascades were shaped with periods of glaciation which have left ground moraines and deeply eroded volcanic peaks dominating the upper elevations. In the Lower Cascade subsection, the Lake Creek area is dominated by gently sloping plains of glacial outwash and by hills and ridges of lava that rise above the outwash plains. (USDA Forest Service, 1996 in Wasniewski 2005).

Lake Creek flows out of Suttle Lake traveling east through the glacial outwash plains. As the creek travels though this glacial alluvium, the creek splits into three separate channels. The North Fork continues to the Metolius without rejoining the other forks. The other two forks (Middle and South) rejoin prior to running through the Lake Creek Lodge property and continue for another mile to the Metolius.

Human activities including construction of roads, timber harvesting, residential development, and recreation continue to increase in the Lake Creek watershed, particularly around Suttle Lake and Camp Sherman. In particular, residential development, recreation, and water diversion have had noteable impacts on the watershed (Black et al 2004). Dachtler et al. (2003) reports that private home development on Lake Creek is associated with a number of important impacts to the stream including vegetation removal, alteration of in-stream woody debris, and construction of small diversions. Much riparian vegetation has been removed and owners have extended lawns up to the edge of the stream bank. The result has been a decrease in water quality from degraded riparian buffers.

The removal of LWD and diversions of water have been part of the history for Lake Creek. Dachtler et al. (2003) speculates that LWD has been removed for aesthetic reasons, though the consequence has been a reduction in habitat available to fish. Water diversions are numerous, and are primarily for aesthetic purposes with the majority of the water returning to the stream. Water flow may be minimally affected, but temperatures likely increase as a result of the diversions.

Dachtler et al. (2003) reports in a stream inventory, that this reach of the creek has substrate consisting of mostly sand, gravel, and cobble, with very few boulders and no bedrock. Slow water units were long and fairly deep scour pools, while fast water sections were long non-turbulent riffles.

Currently, redband trout (*O. mykiss*), bull trout (*S. confluentus*), brown trout (*Salmo salar*), brook trout (*S. fontinalis*), kokanee salmon (*O. nerka*), mountain whitefish (*Prosopium williamsoni*), sculpins (*Cottus sp*.) and longnose dace (*Richardsonius cataractae*) inhabit Lake Creek (Dachtler et al. 2003).

6.1.1 Lake Creek Watershed Vegetation

Vegetation assemblages found in the Metolius watershed and surrounding Lake Creek Lodge include coniferous forest, grasslands and riparian communities. The riparian corridor at the project site consists of Pacific ninebark (*Physocarpus capitatus*), Douglas spirea (*Spirea douglasii*), black hawthorn (*Crataegus douglasii*), alder (*Alnus incana*), serviceberry (*Amelanchier alnifolia*), cascara (*Ramnus purshiana*), snowberry (*Symphoricarpos albus*), and rose (*Rosa* sp.), (Karen Allen 2003). Wetland species identified include small-fruited bulrush (*Scirpus microcarpus)*, common forget-me-not (*Myosotis scorpioides*), beaked sedge (*Carex utriculata*), and wooly sedge (*Carex lanuginosa*).

In upland areas ponderosa pine (*Pinus ponderosa*), snowberry , black hawthorn, Oregon grape (*Mahonia nervosa*), bitter brush (*Purshia tridentate*), Idaho fescue (*Festuca idahoensis*), rabbit brush (*Chrysothamnus nauseosus*), white fir (*Abies concolor*), and western larch (*Larix occidentalis*) were identified.

6.2 Relationship between Habitat in the Action Area and the Biological Requirements of the Species

At the Lake Creek Lodge, a large amount of work was done in the 1920s to modify and control Lake Creek. Banks were revetted with rock and concrete, a pond was dug, weirs installed and the stream cleaned of obstructions such as LWD to facilitate water passage or flood control purposes and aesthetics. Additionally, the vegetation was removed from the riparian zone so that guests would have unobstructed views of the creek. The pond was periodically stocked with nonnative rainbow trout in the 1940s, and other trout species were stocked in the creek including brown trout and brook trout. The weirs were used in the summer to maintain an elevated water surface in the pond. All of these changes effected fish habitat and migration.

A small access bridge spans the creek between the lodge and a number of cottages allowing guests and maintenance vehicles access between the buildings. The existing bank bents are out of the OHW though a midstream piling which inhibits debris movement down the channel. The pond, which has nearly infilled with sediments over the years, is situated just upstream of the bridge and no longer provides much fish habitat. Instead, it contributes to stream warming.

Baseline conditions in the Lake Creek Watershed are summarized in Table 2.

Table 2. Checklist for documenting environmental baseline of proposed actions on relevant indicators (NMFS 1996) for the Columbia River DPS Bull Trout, *Salvelinus confluentus*

PATHWAY INDICATORS	ENVIRONMENTAL BASELINE	RATIONAL
Water Quality:		
Temperature	Not Properly Functioning	Water temperature rises above 17.8°C DEQ limit set for salmonids
Sediment/Turbidity	At Risk	Meets state requirements for turbidity. However large deposit of fines has accumulated in the artificial pond and increasing impacts from human alterations leave this indicator at risk
Chemical Contamination	At risk	Not 303d listed but inputs from private and recreational land-use continue to occur including the risk from septic drain fields
Habitat Access:		
Physical Barriers	Properly Functioning	Recently, local barriers have been removed.
Habitat Elements:		
Substrate	Properly functioning	Dominant substrate is gravel though potential exists for increased impacts from private and recreational use increase fines due to bank erosion.
Large Wood	Not Properly Functioning	Stream has been cleared of LWD historically
Pool Frequency	At risk	Complex structure creating and maintaining pools is severely lacking.
Pool Quality	Not Properly Functioning	Pools generally < 3 feet deep
Off-Channel Habitat	Not Properly Functioning	Severely lacking. There is little to no off channel habitat in action area
Refugia	At risk	Some exists, but poor quality riparian zone increases risk
Channel Condition and Dynamics:		
Width/Depth Ratio	Not Properly Functioning	W:D ratio is 22.7 in this reach, higher than normal suggesting disturbance
Streambank Condition.	Not Properly Functioning	Natural riparian vegetation has been greatly replaced by mowed turf grass.
Floodplain Connectivity	Not Properly Functioning	Steep and armored banks on-site leave little floodplain connectivity.
Flow/Hydrology:		
Peak/Base Flows	At risk	Irrigation diversions

PATHWAY INDICATORS	ENVIRONMENTAL BASELINE	RATIONAL
Drainage Network Increase	At risk	Roads and other water diversions and increased network.
Watershed Conditions:		
Road Density & Location	At risk	Lots of recreational use increasing road networks in watershed. Many crossings
Disturbance History	At risk	Clearing of LWD and fires within watershed
Riparian Reserves	Not Properly Functioning	Lawns to bank

6.2.1 Water Quality

Temperature

The Oregon Department of Environmental Quality (ODEQ) has set a maximum standard of a 7-day average high water temperature of 17.8 °C for basins in which salmonid rearing is of beneficial use. The temperature standard drops to 12.8 °C for waters that support salmonid spawning, egg incubation, and fry emergence (ODEQ, 2003). For bull trout spawning and rearing the standard drops down to 10°C. Water quality in Lake Creek is at risk. The temperature standard is not being met for bull trout or for the more relaxed salmonid standard of 17.8°C. **Not properly functioning**

Sediments/Turbidity

The primary sources of sediment and turbidity in the watershed are rural/private road runoff. Lake Creek does not exceed the DEQ criterion for sediment/turbidity (Dachtler, 2003). Sediments in the creek are generally in good shape due to the base of glacial till that the creek courses through. However, at the project site, an increase in fines has occurred through deposition in the artificial pond. **At Risk**

Chemicals/Nutrients

In the greater Metolius system nutrient concentrations are low and do not exceed State standards or established standards in the Metolius Wild and Scenic River Plan for water quality (Houslet, 2000). Due to recreational and private use, fecal coliform from septic systems puts the creek water quality at risk. Houslet noted that fecal coliform counts spiked in the fall/winter in the Lake Creek system, although counts were in the 4-5 colonies/100ml range rather than more elevated levels of 72/100ml. None of the E. coli samples analyzed to date have exceeded the ODEQ standards for recreational waters (Cotter and Riehle, 2002, in Dachtler et al., 2003). **At Risk**

6.2.2 Habitat Access and Connectivity

Lake Creek is physically accessible the entire year now that two weir barriers have been partially removed at the project site. Only anadromous fish are blocked from returning to the stream due to the Pelton/Round Butte dam complex on the Deschutes. Over the years, side channels have been decreased or eliminated and the main channel has been modified, but the main channel is connected with no barriers to both the Metolius River and Suttle Lake. A number of non screened diversions along the creek are providing increased off channel habitat though these diversions are likely very warm during the summer and likely harm rather than help habitat complexity. Therefore, temperatures are effectively providing a physical barrier to migrating bull trout during the warmer portions of the year.

6.2.3 Habitat Elements

Substrate

The substrate in Lake Creek is largely a washed glacial till through which the creek meanders. Thus, it has a large percentage of gravel with cobbles and sand. Within the project site however, a large amount of fines have deposited in the artificial pool**. Properly functioning.**

Large Woody Debris

LWD has long ago been cleared out of the creek and much riparian clearing has decreased recruitment opportunities. From county road 1419 down to the mouth of the Creek, Dachtler et al (2003) found very low numbers of medium to large LWD, only 7 pieces per mile compared to up to 82 pieces per mile in more up-stream reaches of the Creek. In addition, road crossing blocks the movement of LWD downstream with flood flows. **Not Functioning Properly**

6.2.4 Channel Conditions and Dynamics

Pool Frequency

Pool frequency is about half than in other reaches of Lake Creek. Dachlter et al. (2003) identified an average number of 22.8 pools per mile, while some areas of the Creek contained an average of up to 30.5 pools per mile. The loss of pool forming structure such as LWD has decreased the number and quality of remaining pools. **At Risk**

Pool Quality

Nowhere in the creek was the average maximum pool depth greater than 3 feet . In the reach section including the project zone, average maximum depth is 2.8 feet. These depths would be increased by a greater number LWD and larger substrate including boulders. **Not Properly Functioning.**

Off Channel Habitat/Refugia

The percent of side channel habitat in Lake Creek near the project site is second lowest in the Lake Creek system with only 2.5% (versus 8.3% in an upstream reach) of the channel habitat contained in off-channel areas (Dachtler et al., 2003). Since the channel meanders through a floodplain in this portion of the watershed, the wide flat floodplain should encourage side channel development. Most likely, the lack of this habitat is due to land use practices that have

removed side channels to protect private property and to ensure sufficient flow to ditch diversions for personal water use. With little side channel or backwater habitat and a poorly vegetated riparian zone, little refugia exists for bull trout or other salmonids for rearing and flood relief out of the main channel. **Not Properly Functioning**

Width/Depth

The width to depth ratio of the stream (Rated a Rosgen C4 type stream, Dachtler 2003) in this section of the creek was found to be 22.7. This higher value suggests the stream is over widened due to some instability. **Not Properly Functioning**

Streambank Condition

Streambanks throughout the action are armored with rock and concrete from modifications started in the 1920s. **Not Properly Functioning**

Floodplain connectivity

Lake Creek has been cleared of LWD and channelized in places, particularly through the Lodge property to minimize flooding. The reference reach downstream shows a much greater connectivity to the floodplain with much greater wetland development. **Not Properly Functioning**

6.2.5 Flow Hydrology

Peak Flows

The stream flows originate from Suttle Lake, so permanent flows are relatively consistent. Peak flows occur at snowmelt during the early part of June or during rain on snow events which are most common in the late winter. The largest peak flow on record for the gauge near Suttle Lake is 578 cfs recorded on February 10, 1996. **At Risk**

Base flows

Perennial flows originate entirely from Suttle Lake though springs near the mouth at the Metolius. The springs provide much of the water that enters the Metolius River. These flows are fairly consistent but irrigation withdrawals are likely having an affect on base stream flows in the watershed during the summer. **At Risk**

Drainage Network Increase

The watershed is well used for recreational purposes and thus has road impacts. Road and irrigation diversions have increased the drainage network though the percentage of increase is not known. **At Risk**

6.2.6 Watershed Conditions

Road Density

Road density within the watershed of Lake Creek provides a threat to water quality due to inputs of fine sediments at the stream crossings. Cinders are used on Highway 20 which crosses over Lake Creek just downstream of Suttle Lake. Though roads continue to be built, a number of nonpaved roads have been closed off to allow foot traffic only. Plans include further decommissioning of nonpaved roads (Dachtler et al., 2003). **Not Properly Functioning**

Disturbance History

A significant portion of the watershed has burned in the last several years. This provides a large-scale disturbance that will be contributing sediments to the creek system. Much of the burned area is in the Suttle Lake watershed upstream of the Lodge, so most of the fines will be deposited in the Lake. **At Risk**

Riparian Reserves

Much of the riparian zone of the creek has been cut out or downed and large areas of turf grass now provide existing riparian vegetation. In the project area, grass is mown right up to the bank of the stream. No riparian corridor exists. In the reference reach downstream, there is better riparian vegetation cover. **Not Properly Functioning**

Table 3 represents the potential impacts of proposed actions on the project area.

Table 3. Checklist for Documenting Environmental Baseline and Effects of Proposed Actions on Relevant Indicators (NMFS, 1996) for the Columbia River DPS bull trout ESU

PATHWAYS: INDICATORS	ENVIRONMENTAL BASELINE	EFFECTS OF THE ACTIONS	COMMENTS
Water Quality:			
Temperature	Not Properly Functioning	Maintain+	Exposed riparian areas resulting from the keying in of LWD will be restored with fast growing tree and shrub species. The minimal forested riparian areas will remain adjacent to these insignificant cleared areas to continue to provide some shade while the disturbed areas re-vegetate. The temporary loss of a small amount of riparian vegetation will be improved by native plantings. The removal of the pond will greatly decrease solar insolation locally.
Sediment/Turbidity	At Risk	Maintain(+)	Construction activity may cause a temporary local increase in suspended sediment, particularly during removal of existing concrete banks. However, strict adherence of the conservation measures will ensure this is minimized. Water quality within the action area will improve over the long-term as a vegetated riparian zone traps fines and further stabilizes the banks.

PATHWAYS: INDICATORS	ENVIRONMENTAL BASELINE	EFFECTS OF THE ACTIONS	COMMENTS
Chemical Contamination	At Risk	Maintain(+)	The conservation measures proposed should prevent the transport of potential contaminants. Construction will temporarily increase the chance of hydraulic fluids or other petroleum products entering the stream.
Habitat Access:			
Physical Barriers	Properly Functioning	Maintain(+)	The project will finish removing the two weirs on site though no physical barrier now exists.
Habitat Elements:			
Substrate	Properly Functioning	Maintain(+)	There will be an improvement in substrate composition, quality and availability in Lake Creek. Boulders will be incorporated for pool formation and fines from the artificial pool will be removed.
Large Wood	Not Properly Functioning	Maintain (+)	A large number of trees will be incorporated as LWD into several locations throughout the project site. No trees will be removed as a result of this project. Tree and shrub plantings will help restore the riparian areas to a more naturalized pre-disturbed condition.
Pool Frequency	At Risk	Maintain (+)	The project will increase pool frequency by adding pools in the new meander bend.
Pool Quality	Not Properly Functioning	Maintain(+)	The project will improve pool quality in the action area. A number of pools have been hydraulically designed (see Wasniewski 2005) to create higher quality deep pools.

PATHWAYS: INDICATORS	ENVIRONMENTAL BASELINE	EFFECTS OF THE ACTIONS	COMMENTS
Off-Channel Habitat	Not Properly Functioning	Maintain (+)	Project will create increased off channel habitat by lowering elevation of two side channels and incorporating wood to create a complex habitat more representative of high quality fish habitat
Refugia	At Risk	Maintain (+)	Project will create a wetland that will be part of refugia during high water events for fish. This will allow juvenile salmonids to get up out of the main channel during flood type events.
Channel Condition and Dynamics:			
Width/Depth Ratio	Not Properly Functioning	Maintain (+)	Project will decrease the channel width in several places and deepening it in others
Streambank Condition.	Not Properly Functioning	Maintain (+)	Extraction of concrete and insetting LWD methods will minimize bank disturbance. Plantings will restore the work areas to maintain bank structure.
Floodplain Connectivity	Not Properly Functioning	Maintain (+)	The riparian area will be more accessible to the stream due to some graded banks around the new meander bend, and the new wetland will open up additional riparian area to floods.
Flow/Hydrology:			
Change in Peak/Base Flows	At risk	Maintain (+)	Stream will have 0.23 acre increased storage capacity with creation of new wetland
Drainage Network Increase	At Risk	Maintain	There are currently no roadside ditches within the project area and none will be generated as a result of the project. This project will not increase the Drainage network.

PATHWAYS: INDICATORS	ENVIRONMENTAL BASELINE	EFFECTS OF THE ACTIONS	COMMENTS
Watershed Conditions:			
Road Density & Location	Not Properly Functioning	Maintain	The project will not alter the number or location of existing roads in the watershed.
Disturbance History	Not Properly Functioning	Maintain	No reduction in tree cover will result from this project. Numerous trees will be planted in the riparian zone.
Riparian Reserves	At Risk	Maintain	Vegetation removed from the riparian area for construction purposes will be replaced. A significant amount of new native riparian vegetation will replace some of the grass turf presently located next to the creek. However no significant riparian corridors will be created by the project. .

Restore = system-wide beneficial effect.
Maintain(+) = localized benefit; no system-wide effect.
Maintain(-) = localized, temporary impact; no system-wide effect.
Maintain = no localized, temporary, or system-wide effect.
Degrade = system wide impact.

7.0 ANALYSIS OF EFFECT OF THE ACTION

This section includes a description of how effects from the proposed action would alter the environmental baseline (described in Section 6). The Matrix of Pathways and Indicators (NMFS, 1996) was used to determine potential impacts of the project to Columbia River DPS bull trout, within the action area.

7.1 Direct Effects

Direct effects of the proposed project, are those immediate impacts resulting from construction activities. Potential direct impacts to bull trout and their habitats from a project like this are typically related to earthmoving activities and in-water work.

Short-term and temporary water quality impacts may result from erosion and sedimentation during any grading, keying in of LWD, placing boulders, depositing sediments to fill in the artificial pool or removing hardened banks or other earthwork activities. The presence of construction equipment near sensitive habitats such as streams and wetlands creates the potential for introduction of toxic materials from accidental spills, improper storage of petrochemicals or

mechanical failure. These potential impacts can be avoided through the implementation and enforcement of erosion and pollution control plans. Application and maintenance of appropriate Best Management Practices or BMP's are especially important given the fine particle size of the fine sediments from the pond that would stay suspended longer and travel farther downstream. Typical BMP's are described in Section 4

In-water work related to piling and remnant concrete bank removal creates a higher likelihood for impacts because of the potential for turbidity created by dislodging driven piles and concrete remnants. However, piling and remnant concrete pier removal will occur during the in-water work period. The pond work area will be isolated from flowing water for sediment removal and point bar development, which may release a small amount of local sediment. To prevent the release of sediment, the water pipe can be routed through the new meander bend while it is isolated so that the channel is not trenched while water flows over the stream bed. Due to seasonally low flow and prohibitively warm temperatures in Lake Creek during the in-water work period, no bull trout are expected in the project area. Over the past few years only a couple of bull trout have been identified in the entire stream network. Therefore the timing, dry work area, and removal methods have been designed to reduce the potential for direct "take" (harm or harassment) of Columbia River DPS bull trout.

Displacement of the fines in the pond to the new wetland will remove a large potential source of fine sediments from the stream. During the pond decommissioning, flow will be maintained around the work area by being redirected through the secondary flood channel. The pond will be slowly drained to firm up sediments prior to excavation so that decreased sediment suspension in the creek will occur. Filling of the new meander bend through the old pond will result in some temporary fine sediment suspension and dispersal downstream as will keying in the LWD. Temporary turbidity within the stream bed resulting from these activities will occur both when flow is restored to the dewatered section, and at the time of the return of fall precipitation, when flows in the creek will increase.

The access bridge removal and installation, will be done within the designated in-water work period (July 1 – September 30th), and as described above, all appropriate protective BMP's will be applied (see Section 4). This in-water work will be very minor as the only in-water work will be to remove the midstream piling. Isolation barriers will be used to isolate the work area to minimize the possibility of sediment releases if deemed necessary by contract staff, this is dependent upon the degree of insetting of the piling. Therefore, the timing and work isolation methods have been designed to reduce the potential for direct "take" (harm or harassment).

The habitat conditions in the subject watershed are currently impaired by land-uses resulting from land-use conversions. As described in Section 6.2.6, the proposed project would maintain or improve all indicators, including those that are **At Risk** and **Not Properly Functioning**. Many indicators will demonstrate a localized long-term improvement as a result of LWD inputs, hardened bank decommissioning, an upgrade of in-water structures, and riparian enhancement activities.

7.2 Indirect Effects

Indirect effects of the project are those caused by or resulting from the proposed action, are later in time, and are certain to occur. Activities such as streambank vegetation removal can result in temperature changes, simplification in habitat, and reduction in food sources for fish. However, riparian vegetation removal associated with this project is very limited and nearly all existing riparian vegetation is of poor quality. Within the action area, vegetation removal is from a small enough area that it should not impact food sources for fish. Rather, vegetation plantings will greatly improve native food sources for fish. The restoration work plantings will also greatly improve the functioning of the new riparian zone by reducing bank width in places, improving bank stability, and providing complex fish habitat and vegetation cover through creation of pools and riffles in response to the LWD, boulders and other bank modifications. Additionally, the boulders and trees will begin to create higher quality pool and riffle habitat within the action area when elevated flows allow hydraulics to rearrange sediments.

As stated in section 5 critical habitat has been designated for bull trout in the Metolius and its tributaries including Lake Creek. The proposed stream restoration will improve all essential elements of critical habitat. The project is designed to increase habitat complexity which will improve cover for the fish, and will help lower stream temperatures for rearing. Having a good riparian vegetation zone will help filter fine sediments out of the channel to improve spawning gravels for any salmonids initially and perhaps bull trout in the future if temperatures decrease enough. The improved vegetation and cleaner gravels will also improve natural macroinvertebrate numbers. Large woody debris will also help the stream better interact with its floodplain as flood storage capacity is increased. This may also lead to side channel and other back water development. All these actions of the stream restoration would improve the environmental baseline.

7.3 Interrelated and Interdependent Effects

The actions described above do not represent a new level of service over the access bridge, or require new roads to be built. This project is focused on stream restoration and riparian restoration in particular, and the banks are proposed to be worked on to bring them closer to a more natural state. The only infrastructure change that will occur will be to sink a plastic waterline below the stream bed surface level that presently is exposed on the stream bottom as it crosses the Creek.

7.4 Estimating Take

There is no anticipated direct take of Columbia River DPS ESU bull trout associated with construction of the project. The temperature of Lake Creek during the later part of the summer is well beyond temperature comfort zones of the bull trout. The temperatures would prove lethal if bull trout were held in them for extended periods such as rearing in this portion of the creek. When the pond is dewatered, electrofishing will make sure there is no lethal take associated with pond removal. At present, the creek is most likely to be a conduit to Suttle Lake outside the in-water period as bull trout start repopulating lost habitat as that habitat improves. Take associated with the stream renovation, if it occurs at all, will be incidental and related to construction activities impacting in-stream habitat and the minor disturbance of poor quality riparian vegetation.

Based upon historical bull trout findings the potential for direct take is very low. Only two fish have been seen in the past few years on the entire Lake Creek system. One juvenile spotted while snorkeling in another fork of the creek and another by hook and line near the project area. The time of year the bull trout was angled is not known but expected to be early in the spring or another time when creek temperatures are much cooler. For the proposed action, the possibility of a direct take is very remote to non existent during the in-water work period. Based on other electrofishing research conducted by NOAA Fisheries (National Marine Fisheries Service), the general guidelines for lethal take by electrofishing are a lethal take of 5%. For this project, an extremely conservative estimated take is 1% non-lethal take of Columbia River DPS ESU bull trout.

7.5 Cumulative Effects

Additional projects within the watershed are anticipated as population growth continues in the region. Associated road and commercial development, as well as maintenance and upgrading of the existing infrastructure, are therefore likely in the foreseeable future for this watershed. The influence of these activities cannot be quantified in this document, but have been incorporated qualitatively in the environmental baseline for the impacted watershed. For the foreseeable future, non-Federal actions within the watershed are expected to continue at their current rates. Private development, particularly residential and recreational development, and forest management practices within private lands adjacent to and upstream from the action area are expected to continue into the future.

7.6 Summary of Effects to Columbia River DPS Bull Trout ESU

Short-term and long term direct effects to bull trout may be evident due to the construction in-water and around the riparian corridor of the stream. However, BMP's can be implemented from the beginning of the construction activity to reduce the direct effects on bull trout. In addition, it is thought that due to the seasonally low flow and detrimental stream temperatures, there will be no bull trout in the creek surrounding the construction site.

Indirect effects will prove to stabilize the banks and provide better habitat. There is no anticipated take of Columbia River DPS ESU bull trout associated with the construction project. Finally, cumulative effects will be present in the project area due to additional variables such as roads, and residential and commercial development.

8.0 INTERDEPENDENT AND INTERRELATED ACTIONS

This project includes a number of elements that are interdependent actions, that is; actions having no independent utility apart from the proposed action [50 CFR §402-02]. Interdependent actions associated with the project include the pond infilling and wetland creation. There are no known interrelated actions associated with this project. Interrelated actions are part of a larger action and depend on the larger action for their justification [50 CFR §402-02].

9.0 FINDING OF EFFECT

After evaluating the potential effects (Table 2), Pacific Habitat Services concludes that the proposed actions described for the Lake Creek Restoration Project would result in a more than negligible probability of "take" for Columbia River DPS ESU bull trout. This species is most likely not present at the project site, and the proposed action will not "hinder the attainment of relevant functioning indicators" as defined in *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996). However, since two fish have been found within the system in recent years, we make a determination of **may affect, likely to adversely affect** with regard to this ESU. During the in-water work period, water temperatures are expected to be too warm to support bull trout in the project or action area. However if fish are occasionally using the creek, then temporary sediment affects would constitute "take" of habitat within the stream. Most likely, with the conservation measures proposed sediment and turbidity inputs will be minimized and will not impact bull trout residing in the Metolius one mile downstream of the project.

This proposed action **may affect, but would not likely adversely modify** the proposed critical habitat of the Columbia River DPS ESU bull trout. The proposed conservation measures would limit any potential project-related effects to the project vicinity. Any impacts would be temporary and would not result in any net decrease in function of the existing riparian habitat. This project is a habitat restoration project and will greatly improve critical habitat at the project site. Only short term temporary inputs of fine sediments will occur due to some in water construction.

Due to this finding of effect, UDWC is requesting initiation of formal consultation and conferencing in accordance with Section 7 of the ESA.

9.1. Take Statement Request

Due to the finding of effect, a request is being made for a take statement for Columbia River DPS ESU bull trout.

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Appendix A

Figures