

# **Appendix B**

## **Standard Operating Procedures and Best Management Practices Common to the Action Alternatives**

### **B.1 Water Quality**

#### **B.1.1 Water Quality Impacts from Deconstruction/Construction and Restoration Activities**

Short-term effects on water quality from deconstruction, construction and restoration activities associated with dam removal alternatives, fish ladder construction associated with fish passage alternatives, and restoration activities associated with Klamath Basin Restoration Agreement (KBRA) implementation (i.e., Phase 1 and 2 Fisheries Restoration Plans, the Agency Lake and Barnes Ranches Project, and the Wood River Wetland Restoration Project), would occur. These effects would include increased sediment and turbidity from deconstruction and/or construction activities (e.g., clearing/grading/excavating, demolition and debris disposal, material delivery and storage, revegetation) and inorganic and organic contaminants from hazardous materials associated with construction equipment (i.e., fuels, oils, lubricants) entering nearby or adjacent water bodies.

For all deconstruction and/or construction related activities and restoration projects impacts could be mitigated through the implementation of standard pollution prevention measures as part of project design specifications and standard construction practices. Briefly, these measures would include the following:

- Storm water erosion and sediment control measures for all deconstruction and/or construction activities;
- Proper control of non-stormwater discharges; and,
- Hazardous spill prevention and response measures.

##### ***B.1.1.1 Storm Water Pollution Prevention Plan***

A Storm Water Pollution Prevention Plan (SWPPP) would be prepared and implemented during and after deconstruction and/or construction activities and would include an erosion control and restoration plan for each construction site, a water quality monitoring plan, a hazardous materials management plan, and post-construction best management practices (BMPs). The SWPPP would be prepared by a Qualified SWPPP Developer and

submitted prior to project initiation and as part of project permitting. The SWPPP would be implemented by the Qualified SWPPP Developer or a Qualified SWPPP Practitioner. All BMPs would be maintained until areas disturbed during deconstruction and/or construction have been adequately revegetated and stabilized. For restoration activities associated with KBRA implementation, specific BMPs should be addressed in the project-level National Environmental Policy Act (NEPA) evaluations conducted for each project.

***B.1.1.2 Measures to Minimize Disturbance from Instream Construction***

Other measures to minimize disturbance associated with instream construction activities are presented below. Measures are excerpted from Measures to Minimize Disturbance from Construction, on page IX-50 of the California Department of Fish and Game (CDFG) Manual.

- If the stream channel is seasonally dry between June 15 and November 1, construction will occur during this dry period.
- Debris, soil, silt, excessive bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, resulting from projected related activities, shall be prevented from contaminating the soil and/or entering the waters of the State. Any of these materials, placed within or where they may enter a stream or lake, by the applicant or any party working under contract, or with permission of the applicant, shall be removed immediately. During project activities, all trash that may attract potential predators of salmonids will be properly contained, removed from the work site, and disposed of daily.
- Where feasible, the construction shall occur from the bank, or on a temporary pad underlain with filter fabric.
- No mechanized equipment (e.g. internal combustion hand tools), will enter wetted channels.
- Use of heavy equipment shall be avoided in a channel bottom with rocky or cobbled substrate. If access to the work site requires crossing a rocky or cobbled substrate, a rubber tire loader/backhoe is the preferred vehicle. Only after this option has been determined infeasible will the use of tracked vehicles be considered. The amount of time this equipment is stationed, working, or traveling within the creek bed shall be minimized. When heavy equipment is used, woody debris and vegetation on banks and in the channel shall not be disturbed if outside of the project's scope.
- All mechanized equipment working in the stream channel or within 25 feet of a wetted channel shall have a double containment system for diesel and oil fluids. Hydraulic fluids in mechanical equipment working within the stream channel shall not contain organophosphate esters. Vegetable based hydraulic fluids are preferred.

- The use or storage of petroleum-powered equipment shall be accomplished in a manner to prevent the potential release of petroleum materials into waters of the state (Fish and Game Code 5650).
- Areas for fuel storage, refueling, and servicing of construction equipment must be located in an upland location.
- Prior to use, clean all equipment to remove external oil, grease, dirt, or mud. Wash sites must be located in upland locations so wash water does not flow into the stream channel or adjacent wetlands.
- All construction equipment must be in good working condition, showing no signs of fuel or oil leaks. Prior to construction, all mechanical equipment shall be thoroughly inspected and evaluated for the potential of fluid leakage. All questionable motor oil, coolant, transmission fluid, and hydraulic fluid hoses, fitting, and seals shall be replaced. The contractor shall document in writing all hoses, fittings, and seals replaced and shall keep this documentation until the completion of operations. All mechanical equipment shall be inspected on a daily basis to ensure there are no motor oil, transmission fluid, hydraulic fluid, or coolant leaks. All leaks shall be repaired in the equipment staging area or other suitable location prior to resumption of construction activity.
- Oil absorbent and spill containment materials shall be located on site when mechanical equipment is in operation with 100 feet of the proposed watercourse crossings. If a spill occurs, no additional work shall commence in-channel until (1) the mechanical equipment is inspected by the contractor, and the leak has been repaired, (2) the spill has been contained, and (3) CDFG and National Oceanic and Atmospheric Administration (NOAA) Fisheries Service are contacted and have evaluated the impacts of the spill.

***B.1.1.3 Measures to Minimize Degradation of Water Quality during Deconstruction, Construction and Restoration Activities***

Construction or maintenance activities for the projects covered under this Program may result in temporary increases in turbidity levels in the stream. In general, these activities must not result in significant increases in turbidity levels beyond the naturally occurring, background conditions. The following measures would be implemented to reduce the potential for impacts to water quality during and post-construction:

- General Erosion Control During Construction:
  - When appropriate, isolate the construction area from flowing water until project materials are installed and erosion protection is in place.
  - Effective erosion control measures shall be in place at all times during construction. Do not start construction until all temporary control devices (straw bales with sterile, weed free straw, silt fences, etc.) are in place downslope or downstream of project site within the riparian area. The devices shall be properly installed at all location where the likelihood of sediment input exists. These devices shall be in place during and after construction activities for the purposes of minimizing fine sediment and sediment/water slurry input to flowing water and of detaining sediment-laden water on site. If

continued erosion is likely to occur after construction is completed, then appropriate erosion prevention measures shall be implemented and maintained until erosion has subsided. Erosion control devices such as coir rolls or erosion control blankets will not contain plastic netting of a mesh size that would entrain reptiles (esp. snakes) and amphibians.

- Sediment shall be removed from sediment controls once it has reached one-third of the exposed height of the control. Whenever straw bales are used, they shall be staked and dug into the ground 12 cm and only sterile, weed free straw shall be utilized. Catch basins shall be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.
  - Sediment-laden water created by construction activity shall be filtered before it leaves the right-of-way or enters the stream network or an aquatic resource area.
  - The contractor/project applicant is required to inspect and repair/maintain all practices prior to and after any storm event, at 24 hour intervals during extended storm events, and a minimum of every two weeks until all erosion control measures have been completed.
- Guidelines for Temporary Stockpiling:
    - Minimize temporary stockpiling of material. Stockpile excavated material in areas where it cannot enter the stream channel. Prior to start of construction; determine if such sites are available at or near the project location. If nearby sites are unavailable, determine location where material will be deposited. Establish locations to deposit spoils well away from watercourses with the potential to deliver sediment into streams supporting, or historically supporting populations of listed salmonids. Spoils shall be contoured to disperse runoff and stabilized with mulch and (native) vegetation. Use devices such as plastic sheeting held down with rocks or sandbags over stockpiles, silt fences, or berms of hay bales, to minimize movement of exposed or stockpiled soils.
    - If feasible, conserve topsoil for reuse at project location or use in other areas. End haul spoils away from watercourses as soon as possible to minimize potential sediment delivery.
- Minimizing Potential Scour:
    - When needed, utilize instream grade control structures to control channel scour, sediment routing, and headwall cutting.
    - For relief culverts or structures, if a pipe or structure that empties into a stream is installed, an energy dissipater shall be installed to reduce bed and bank scour. This does not apply to culverts in fish bearing streams.
    - The toe of rock slope protection used for streambank stabilization shall be placed below bed scour to ensure stability.
- Post Construction Erosion Control:
    - Immediately after project completion and before close of seasonal work window, stabilize all exposed soil with mulch, seeding, and/or placement of

erosion control blankets. Remove all artificial erosion control devices after the project area has fully stabilized. All exposed soil present in and around the project site shall be stabilized within 7 days. Erosion control devices such as coir rolls or erosion control blankets will not contain plastic netting of a mesh size that would entrain reptiles (esp. snakes) and amphibians.

- All bare and/or disturbed slopes (> 10' x 10' of bare mineral soil) will be treated with erosion control measures such as hay bales, netting, fiber rolls, and hydroseed as permanent erosion control measures.
- Where straw, mulch, or slash is used as erosion control on bare mineral soil, the minimum coverage shall be 95 percent with a minimum depth of two inches.
- When seeding is used as an erosion control measure, only natives will be used. Sterile (without seeds), weed-free straw, free of exotic weeds, is required when hay bales are used as an erosion control measure.

### **B.1.2 Land Management Related Water Quality Effects**

Adjacent forest, agricultural and urban land use practices may cause temperature extremes, increase turbidity, increase nutrients, suspended solids or toxics, alter salinity and reduce dissolved oxygen. The following best management practices can help reduce effects on water quality due to adjacent land management practices:

- Install fencing to keep livestock out of riparian areas.
- Irrigation tailwater reduction and/or capture projects to manage pasture runoff and reduce nutrient load.
- Construct tailwater wetlands and infiltration ponds to capture runoff from roads, development, farms, and irrigation return flows.
- Enhance the extent and function of wetlands and wet meadows.
- Conduct appropriate shade restoration activities where streamside shading has been reduced by anthropogenic activities.
- Improve upland water infiltration through road decommissioning, reduced soil compaction, direct seeding activities, increasing native vegetation cover.
- Minimize surface water withdrawals (increases stream flow) through implementation of irrigation efficiencies, quantify legal withdrawals, identify and eliminate illegal withdrawals, lease of water rights and purchase of water rights that would not impact agriculture production.

The Proposed Action would include the transfer of PacifiCorp land surrounding the Four Facilities (Parcel B lands) to a state agency. This agency would install fencing around these lands for the purposes of land management. It would prevent cattle access but would allow wildlife to pass. The fence would meet CDFG requirements for wildlife-friendly fencing.

## **B.2 Aquatic Resources**

The best management practices described below are likely to avoid adverse effects to fish and other aquatic resources that could be potentially caused by KBRA fish habitat restoration activities.

### **B.2.1 Effects on Fish Access and Passage**

Road crossings (bridges and culverts), barriers (diversion dams), and unscreened water diversions are causing barriers to spawning and rearing habitat and interrupting adult and juvenile fish passage in many streams within watersheds. Removing barriers addressed limiting and causal factors such as loss of habitat quantity, habitat fragmentation, decreased habitat refugia and diversity, and increased density-dependent mortality from concentrating populations into small habitat units.

- Install bridges or appropriately sized culverts and dish screens consistent with the newest standards and guidelines. Effectively maintain culverts, screens and other instream structures.
- Remove, modify, or replace dams, culverts, diversions, and weirs that prevent or restrict access to salmon, trout, or sucker habitat and/or cause loss of habitat connectivity.
- Construct bypass channels for passage around diversion dams.
- Construct bolder weirs and roughened channels to provide passage a diversions or culverts.
- Establish and provide fish passage flows (eliminate low flow barriers).
- Reduce artificial flow fluctuations to allow or reduce volitional or voluntary movement to other suitable habitats.

### **B.2.2 Effects on Fish Migration, Spawning and Incubation and Juvenile Rearing**

Removal of large woody debris, ditching, diking, bank armoring and gravel removal has the potential to eliminate connectivity between rivers and side channels and off-channel waters, increased speed and volume of stream flows, simplified channel structure, and degraded estuarine and nearshore habitat. The following best management practices can reduce the effects to fish migration, spawning, and incubation and juvenile rearing:

- Restore or reconnect off-channel habitats, disconnected oxbows and wetlands, including spring improvement, enhancement, and reconnection.
- Restore and/or reconnect side-channel habitats, islands, spawning channels, and reconnect back channels to increase large woody debris (LWD) deposition, channel complexity, and riparian areas.
- Re-slope vertical banks and establish wetland habitats by connecting the floodplain with the channel.
- Create diverse channel patterns to enhance water circulation through floodplain gravels.

- Add high quality spawning gravel to channel through a supplementation program.
- Use dike setbacks, removal, breaching, sloping, and/or channel reconnection to connect the channel with the floodplain.
- Increase flood-prone areas to reduce lateral scour and flow volume in main channel and protect or improve existing spawning habitats.
- Restore and reconnect wetlands and floodplains to the riverine system where appropriate.
- Decommission or relocate roads, low-priority dikes, bridges, and culverts to enhance floodplain connectivity.
- Implement setback levees recharge floodplain habitats.
- Identify, protect, and re-establish ground-water sources.
- Remove or replace existing bank stabilization structures (rip rap) and replace with bioengineered structures that allow habitat forming processes.
- Replace invasive or non-native vegetation with native vegetation
- Create or redesign pools, riffles and other habitat features
- Influence or redirect stream flows to reduce erosive forces on stream banks or stream-beds
- Installation of deflectors, barbs and vanes
- Add LWD and place in-channel engineered log jams. Add key pieces of wood to stabilize banks, provide hiding cover, and reestablish natural channel geomorphology.
- Improve riparian habitats by planting native vegetation with the potential to contribute to future LWD recruitment.
- Increase the density, maturity, and appropriate species composition of woody vegetation in riparian buffers for long-term recruitment of LWD.
- Install instream structures such as boulders and rock weirs to increase short-term pool formation and long-term habitat diversity.
- Add rock weirs or boulders to increase channel roughness.
- Install habitat boulders.
- Install instream structures to slow water velocities and increase gravel retention.

### **B.2.3 Effects on Riparian Areas as Fish Habitat**

Riparian areas provide critical habitat elements and functions essential to many fish and wildlife life stages, such as shade, large woody debris, organic nutrients, stream bank stabilization, control of sediments, and filtration of nutrients and pollutants. Much has been removed or altered through logging, grazing, farming and land development. This has eliminated and degraded spawning and rearing habitat for salmonids and suckers and diminished water quantity and quality. The following best management practices can reduce the effects to riparian areas:

#### ***B.2.3.1 Minimizing Disturbance***

- Install and maintain fencing to prevent livestock access to riparian zones and Streams.

- Manual removal of noxious weeds and replace them with native vegetation (no herbicides).
- Retain as many trees and brush as feasible, emphasizing shade producing and bank stabilizing trees and brush.
- Install Alternative Stock Water Systems or provide off-site watering opportunities.
- Use project designs and access points that minimize riparian disturbance without affecting less stable areas, which may increase the risk of channel instability.
- Prior to construction, determine locations and equipment access points that minimize riparian disturbance. Avoid entering unstable areas. Use project designs and access points that minimize riparian disturbance without affecting less stable areas, which may increase the risk of channel instability.
- Minimize soil compaction by using equipment with a greater reach or that exerts less pressure per square inch on the ground, resulting in less overall area disturbed or less compaction of disturbed areas.
- If riparian vegetation is to be removed with chainsaws, consider using saws currently available that operate with vegetable-based bar oil.
- While encouraged, removal of exotic invasive riparian vegetation in a stream with high temperatures must be done in a manner to avoid creation of additional temperature loading to fish bearing streams. If a stream has a seven day moving average daily maximum (7DMADM) temperature greater than 17.8 Celsius (C) in a coho and steelhead stream or greater than 18.5 C in a steelhead only stream, and vegetation management would reduce overstory shade canopy to the wetted channel, then the practice will not be allowed.

#### ***B.2.3.2 Revegetation and Success Criteria***

- Any stream bank area left barren of vegetation as a result of the implementation or maintenance of the practices shall be restored to a natural state by seeding, replanting, or other agreed upon means with native trees, shrubs, and/or grasses prior to November 15 of the project year. Barren areas shall typically be planted with a combination of willow stakes, native shrubs and trees and/or erosion control grass mixes.
- Native plant species shall be used for revegetation of disturbed and compacted areas. The species used shall be specific to the project vicinity or the region of the state where the project is located, and comprise a diverse community structure (plantings shall include both woody and herbaceous species).
- For projects where re-vegetation is implemented to compensate for riparian vegetation impacted by project construction, a re-vegetation monitoring report will be required after 5 years to document success. Success is defined as 80 percent survival of plantings or 80 percent ground cover for broadcast planting of seed after a period of 3 years. If revegetation efforts will be passive (i.e. natural regeneration), success will be defined as total cover of woody and herbaceous material equal to or greater than pre-project conditions. If at the end of five years, the vegetation has not successfully been re-established, the applicant will be responsible for replacement planting, additional watering, weeding, invasive



exotic eradication, or any other practice, to achieve these requirements. If success is not achieved within the first 5 years, the project applicant will need to prepare a follow-up report in an additional 5 years. This requirement will proceed in 5-year increments until success is achieved.

- All plastic exclusion netting placed around plantings will be removed and recycled after 3 years.
- Restore and reconnect wetlands and floodplains to the riverine system.

#### **B.2.4 Effects of Increased Sediment on Fish**

Surrounding land management can cause decreased stability of substrate, banks and channels; high levels of fine sediment; high likelihood of landslides; and increased turbidity. Forest and agricultural practices contribute substantial quantities of sediment to streams and estuaries which can ultimately impact water quality and create effects to fish. The following best management practices can reduce sediment and the effects it can have on fish:

- Remove, reconstruct or upgrade roads that are vulnerable to failure due to design or location.
- Implement a road maintenance schedule to prevent and mitigate sediment impacts.
- Implement road maintenance and decommissioning plans.
- Upgrade stream crossings, culverts and road drainage systems.
- Reconnect floodplains through dike removal or breaching.
- Implement in-channel projects that address geologic processes such as deep-seated slope failure, toe erosion, or landslides.
- Construct infiltration and tailwater ponds to capture runoff from roads, development, farms and irrigation return flow.
- Re-establish natural riparian vegetation to restore a more natural delivery and routing of sediment.

#### **B.2.5 Effects of Stream Flows on Salmonid Life Stages**

Low flow conditions can affect salmonid life stages. The problem could be caused by water withdrawals, forest and agricultural practices (e.g., diking, and draining), extent of impervious surfaces, hydropower and reservoir operation, and/or alteration of groundwater recharge areas. The following best management practices can reduce the effects of stream flows on salmonid life stages:

- Installation and maintenance of stream gages/measuring devices.
- Improve baseline instream flows via water efficiency improvements.
- Restore wetlands, reconnect and revegetate floodplains.
- Restore hydrologic connectivity and increase floodwater storage capacity between streams and wetlands and/or floodplains.
- Remove and relocate dikes, levees and other structures.

- Install Alternative Stock Water Systems or provide off-site watering opportunities.
- Reduce diversion amount through irrigation tailwater reduction and/or capture.

### **B.2.6 Effects of Dewatering Activities on Fish**

Project activities authorized under the KBRA may require dewatering activities. Dewatering may not be appropriate for some projects that will result in only minor input of sediment, such as placing logs with hand crews, or installing boulder clusters. Dewatering can result in the temporary loss of aquatic habitat, and the stranding, displacement, or crushing of fish and amphibian species. Increased turbidity may occur from disturbance of the channel bed. The following are general dewatering guidelines and can help reduce potential impacts on fish, for projects that do require dewatering of a stream/creek.

- In those specific cases where it is deemed necessary to work in a flowing stream/creek, the work area shall be isolated and all the flowing water shall be temporarily diverted around the work site to maintain downstream flows during construction.
- Exclude fish from reentering the work area by blocking the stream channel above and below the work area with fine-meshed net or screens. Mesh will be no greater than 1/8 inch diameter. The bottom of the seine must be completely secured to the channel bed to prevent fish from reentering the work area. Exclusion screening must be placed in areas of low water velocity to minimize fish impingement. Screens must be checked periodically and cleaned of debris to permit free flow of water. Block nets shall be placed and maintained throughout the construction period at the upper and lower extent of the areas where fish will be removed. Block net mesh shall be sized to ensure salmonids upstream or downstream do not enter the areas proposed for dewatering between passes with the electrofisher or seine.
- Prior to dewatering, determine the best means to bypass flow through the work area to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates. Bypass stream flow around the work area, but maintain the stream flow to channel below the construction site.
- Coordinate project site dewatering with a qualified biologist to perform fish and amphibian relocation activities. The qualified biologist(s) will possess a valid State of California Scientific Collection Permit as issued by the California Department of Fish and Game and will be familiar with the life history and identification of listed salmonids and listed amphibians within the action area.
- Prior to dewatering a construction site, qualified individuals will capture and relocate fish and amphibians to avoid direct mortality and minimize take. This is especially important if listed species are present within the project site.
- Minimize the length of the dewatered stream channel and duration of dewatering.
- Any temporary dam or other artificial obstruction constructed shall only be built from materials such as sandbags or clean gravel which will cause little or no siltation. Visqueen shall be placed over sandbags used for construction of

cofferdams construction to minimize water seepage into the construction areas. The visqueen shall be firmly anchored to the streambed to minimize water seepage. Cofferdams and the stream diversion systems shall remain in place and fully functional throughout the construction period.

- When coffer dams with bypass pipes are installed, debris racks will be placed at the bypass pipe inlet. Bypass pipes will be monitored a minimum of two times per day, seven days a week, during the construction period. All accumulated debris shall be removed by the contractor or project applicant.
- Bypass pipe diameter will be sized to accommodate, at a minimum, twice the summer baseflow.
- The work area may need to be periodically pumped dry of seepage. Place pumps in flat areas, well away from the stream channel. Secure pumps by tying off to a tree or stake in place to prevent movement by vibration. Refuel in an area well away from the stream channel and place fuel absorbent mats under pump while refueling. Pump intakes shall be covered with 1/8 inch mesh to prevent potential entrainment of fish or amphibians that failed to be removed. Check intake periodically for impingement of fish or amphibians.
- If pumping is necessary to dewater the work site, procedures for pumped water shall include requiring a temporary siltation basin for treatment of all water prior to entering any waterway and not allowing oil or other greasy substances originating from the contractor or project applicants operations to enter or be placed where they could a wetted channel. Projects will adhere to CDFG's "Fish Screening Criteria" (2000).
- Discharge wastewater from construction area to an upland location where it will not drain sediment-laden water back to the stream channel.
- When construction is completed, the flow diversion structure shall be removed as soon as possible in a manner that will allow flow to resume with the least disturbance to the substrate. Cofferdams will be removed so surface elevations of water impounded above the cofferdam will not be reduced at a rate greater than one inch per hour. This will minimize the risk of beaching and stranding of fish as the area upstream becomes dewatered.

### **B.2.7 Effects of Relocation Activities on Fish**

Project activities authorized under the KBRA may require relocation activities. The below best management practices can help reduce the impacts to fish from relocation activities, considering the difference types of relocation methods.

- Fish relocation and dewatering activities shall only occur between June 15 and November 1 of each year.
- All seining, electrofishing, and relocation activities shall be performed by a qualified fisheries biologist. The qualified fisheries biologist shall capture and relocate listed salmonids prior to construction of the water diversion structures (e.g., cofferdams). The qualified fisheries biologist shall note the number of salmonids observed in the affected area, the number and species of salmonids relocated, and the date and time of collection and relocation. The qualified

fisheries biologist shall have a minimum of three years field experience in the identification and capture of salmonids, including juvenile salmonids, considered in this Biological Assessment. The qualified biologist will adhere to the following requirements for capture and transport of salmonids:

- Determine the most efficient means for capturing fish. Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, fish may be concentrated by pumping-down the pool and then seining or dip netting fish.
- Notify NOAA Fisheries Service one week prior to capture and relocation of salmonids to
- Provide NOAA Fisheries Service an opportunity to attend (call Shari Anderson at 707-825-5186 or via email at [shari.anderson@noaa.gov](mailto:shari.anderson@noaa.gov)).
- Initial fish relocation efforts will be conducted several days prior to the start of construction. This provides the fisheries biologist an opportunity to return to the work area and perform additional electrofishing passes immediately prior to construction. In many instances, additional fish will be captured that eluded the previous day's efforts.
- In regions of California with high summer water temperatures, perform relocation activities during morning periods.
- Prior to capturing fish, determine the most appropriate release location(s). Consider the following when selecting release site(s):
  - Similar water temperature as capture location;
  - Ample habitat for captured fish; and,
  - Low likelihood of fish reentering work site or becoming impinged on exclusion net or screen.
- Periodically measure air and water temperatures. Cease activities when measured water temperatures exceed 17.8 C. Temperatures will be measured at the head of riffle tail of pool interface.

#### ***B.2.7.1 Relocation by Electrofishing***

The following methods shall be used is fish are relocated via electrofishing:

- All electrofishing will be conducted according to NOAA Fisheries Service *Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act (2000)*.
- The backpack electrofisher shall be set as follows when capturing fish: Voltage setting on the electrofisher shall not exceed 300 volts.

	<u>Initial</u>	<u>Maximum</u>
A) Voltage:	100 Volts	300 Volts
B) Duration:	500 $\mu$ s (microseconds)	5 ms (milliseconds)
C) Frequency:	30 Hertz	70 Hertz

- A minimum of three passes with the electrofisher shall be utilized to ensure maximum capture probability of salmonids within the area proposed for dewatering.
- No electrofishing shall occur if water conductivity is greater than 350 microSiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) or when instream water temperatures exceed 17.8°C. Water temperatures shall be measured at the pool/riffle interface. Only direct current (DC) shall be used.
- A minimum of one assistant shall aid the fisheries biologist by netting stunned fish and other aquatic vertebrates.

#### **B.2.7.2 Relocation by Seining**

The following methods shall be used if fish are removed with seines:

- A minimum of three passes with the seine shall be utilized to ensure maximum capture probability of salmonids within the area.
- All captured fish shall be processed and released prior to each subsequent pass with the seine.
- The seine mesh shall be adequately sized to ensure fish are not gilled during capture and relocation activities.

#### **B.2.7.3 Relocation of Salmonids**

The following methods shall be used during relocation activities associated with either method of capture (electrofishing or seining):

- Fish shall not be overcrowded into buckets; allowing approximately six cubic inches per 0+ individual and more for larger/older fish.
- Every effort shall be made not to mix 0+ salmonids with larger salmonids, or other potential predators, that may consume the smaller steelhead. Have at least two containers and segregate young-of-year (0+) fish from larger age-classes. Place larger amphibians, such as Pacific giant salamanders, in container with larger fish.
- Salmonid predators, such as sculpins (*Cottus sp.*) and Pacific-giant salamanders (*Dicamptodon ensatus*) collected and relocated during electrofishing or seining activities shall not be relocated so as to concentrate them in one area. Particular emphasis shall be placed on avoiding relocation of sculpins and Pacific-giant salamanders into the steelhead and coho salmon relocation pools. To minimize predation on salmonids, these species shall be distributed throughout the wetted portion of the stream so as to concentrate them in one area.
- All captured salmonids shall be relocated, preferably upstream, of the proposed construction project and placed in suitable habitat. Captured fish shall be placed into a pool, preferably with a depth of greater than two feet with available instream cover.
- All captured salmonids will be processed and released prior to conducting a subsequent electrofishing or seining pass.

- All native captured fish will be allowed to recover from electrofishing before being returned to the stream.
- Minimize handling of salmonids. However, when handling is necessary, always wet hands or nets prior to touching fish. Handlers will not wear N,N-Diethyl-meta-Toluamide (DEET) based insect repellants.
- Temporarily hold fish in cool, shaded, aerated water in a container with a lid. Provide aeration with a battery-powered external bubbler. Protect fish from jostling and noise and do not remove fish from this container until time of release.
- Place a thermometer in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature. If water temperature reaches or exceeds those allowed by CDFG and NOAA Fisheries Service, fish shall be released and rescue operations ceased.
- In areas where aquatic vertebrates are abundant, periodically cease capture, and release at predetermined locations.
- Visually identify species and estimate year-classes of fish at time of release. Count and record the number of fish captured. Avoid anesthetizing or measuring fish.
- If more than three percent of the steelhead or coho salmon captured are killed or injured, the project permittee shall contact NOAA Fisheries Service's biologist Shari Anderson at 707-825-5186 or via email at [shari.anderson@noaa.gov](mailto:shari.anderson@noaa.gov) and Gayle Garman or Michelle Gilroy at CDFG (707)-445-6493. The purpose of the contact is to allow the agencies a courtesy review of activities resulting in take and to determine if additional protective measures are required. All steelhead and coho mortalities must be retained, placed in an appropriately sized whirl-pak or zip-lock bag, labeled with the date and time of collection, fork length, location of capture, and frozen as soon as possible. Frozen samples must be retained until specific instructions are provided by NOAA Fisheries Service.

## **B.3 Terrestrial Resources**

### **B.3.1 Temporary Construction Impacts on Wetlands**

The Dam Removal Entity (DRE) or Hydropower Licensee would be required to reduce impacts on wetlands within construction areas for the Proposed Action, the Partial Facilities Removal Alternative, the Fish Passage at Four Dams Alternative, and the Fish Passage at Two Dams Alternative. To the extent possible, wetlands within 50 feet of any ground disturbance and construction-related activities (including staging and access roads) will be clearly marked and/or fenced to avoid impacts from construction equipment and vehicles. If new temporary access roads are required, grading will be conducted such that existing hydrology will be maintained.

To reduce potential impacts on water quality in wetlands during construction, the following construction best management practices will be implemented. These measures are discussed further in Section B.1, Water Quality.

- Pollution and erosion control measures will be implemented to prevent pollution caused by construction operations and to reduce contaminated stormwater runoff.
- Oil-absorbing floating booms will be kept onsite and the contractor will respond immediately to aquatic spills during construction.
- Vehicles and equipment will be kept in good repair, without leaks of hydraulic or lubricating fluids. If such leaks or drips do occur, they will be cleaned up immediately. Equipment maintenance and/or repair will be confined to one location at each project construction site. Runoff in this area will be controlled to prevent contamination of soils and water.
- Dust control measures will be implemented, including wetting disturbed soils.
- A SWPPP will be implemented to prevent construction materials (fuels, oils, and lubricants) from spilling or otherwise entering waterways or water bodies.

### **B.3.2 Impacts on Special-Status Amphibian and Reptile Species and their Habitat During Construction**

The DRE or Hydropower Licensee will implement actions to address the potential for mortality and disturbance of special-status amphibian and reptile species within construction areas for the Proposed Action, the Partial Facilities Removal Alternative, the Fish Passage at Four Dams Alternative, and the Fish Passage at Two Dams Alternative. Special-status amphibian and reptile species, such as western toad, northwestern pond turtle, California mountain kingsnake, and common kingsnake, could be present within construction areas and could be injured or killed.

The following measures would be required:

- **Biological Resources Awareness Training.** Before any ground-disturbing work (including vegetation clearing and grading) occurs in the construction area, a qualified biologist will conduct mandatory biological resources awareness training for all construction personnel and the construction foreman. This training will inform the crews about special-status species that could occur on site. The training will consist of a brief discussion of the biology and life history of the special-status species; how to identify each species, including all life stages; the habitat requirements of these species; their status; measures being taken for the protection of these species and their habitats; and actions to be taken if a species is found within the project area during construction activities. Identification cards will be issued to shift supervisors; these cards will have photos, descriptions, and actions to be taken upon sighting of special-status species during construction. Upon completion of the training, all employees will sign an acknowledgment form stating that they attended the training and understand all protection measures. An updated training will be given to new personnel and in the event that a change in special-status species occurs.
- **Protocol-level Wildlife Surveys.** Prior to construction, a biologist approved by the resource agencies (United State Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife, and/or CDFG will conduct protocol surveys to ensure no special-status animals are present within the area in which any construction activity would occur. If special-status amphibian or reptile species

are present, they will be captured and relocated to a suitable area in consultation with the resource agencies.

- **Exclusion Measures for Special-Status Wildlife.** Construction areas, including staging areas and access routes, will be fenced with orange plastic snow fencing to demarcate work areas. The approved biologist will confirm the location of the fenced area prior to habitat clearing, and the fencing will be maintained throughout the construction period. Additional exclusion fencing or other appropriate measures will be implemented in consultation with the resource agencies to prevent use of construction areas by special-status amphibian or reptile species during construction.

To prevent entrapment of wildlife that do enter construction areas during activities, all excavated, steep-walled holes or trenches in excess of 2 feet deep will be inspected by a biologist or construction personnel approved by the resource agencies at the start and end of each working day. If no animals are present during the evening inspection, plywood or similar materials will be used to immediately cover the trench, or it will be provided with one or more escape ramps set at no greater than 1,000 foot intervals and constructed of earth fill or wooden planks. Trenches and pipes will be inspected for entrapped wildlife each morning prior to onset of activity. Before such holes or trenches are filled, they will be thoroughly inspected for entrapped animals. Any animals so discovered will be allowed to escape voluntarily, without harassment, before activities resume, or removed from the trench or hole by a qualified biologist approved by the resource agencies and the animals will be allowed to escape unimpeded. A biologist approved by the resource agencies will be responsible for overseeing compliance with protective measures during clearing and construction activities within designated areas throughout the construction activities.

- **General Requirements for Construction Personnel** include the following:
  - The contractor will clearly delineate the construction limits and prohibit any construction-related traffic outside these boundaries.
  - Construction crews will be required to maintain a 20 m.p.h. speed limit on all unpaved roads to reduce the chance of wildlife being harmed if struck by construction equipment.
  - All food-related trash items such as wrappers, cans, bottles, and food scraps generated during construction, subsequent facility operation, or permitted operations and maintenance activities of existing facilities will be disposed of in closed containers only and removed at least once a week from the site. The identified sites for trash collection will be fenced to minimize access from wildlife.
  - No deliberate feeding of wildlife will be allowed.
  - No pets will be allowed on the project site.
  - No firearms will be allowed on the project site.
  - If vehicle or equipment maintenance is necessary, it will be performed in the designated staging areas.



- Any worker who inadvertently injures or kills a federally or state listed species, bald eagle, or golden eagle, or finds one dead, injured, or entrapped will immediately report the incident to the construction foreman or biological monitor. The construction foreman or monitor will notify the resource agencies within 24 hours of the incident.

### **B.3.3 Impacts on Birds, Including Special-Status Bird Species, During Construction**

The DRE or Hydropower Licensee will implement measures to address impacts on northern spotted owl, bald eagle, golden eagle, osprey, nesting great blue heron, willow flycatcher, and other special-status birds (as determined in consultation with the resource agencies) from disturbance during construction of the Proposed Action, the Partial Facilities Removal Alternative, the Fish Passage at Four Dams Alternative, and the Fish Passage at Two Dams Alternative.

#### ***B.3.3.1 Northern Spotted Owl***

USFWS endorsed protocol-level surveys for northern spotted owl will be conducted in all areas supporting suitable habitat that may be affected by construction, including along access roads and haul routes. If, during preconstruction surveys, an active nest of northern spotted owl is identified, the DRE or Hydropower Licensee will establish a restriction buffer in consultation with the resource agencies to ensure nests are not disturbed from construction. This would include evaluation of noise levels at the nesting site. See Mitigation Measure TER-2 in Section 3.5.4.4.

#### ***B.3.3.2 Bald Eagle***

Bald eagle nesting trees are known to exist within or near to construction areas, and bald eagles often use the same nests in multiple years.

Prior to construction, all necessary permits in compliance with the Bald and Golden Eagle Protection Action would be obtained. The following measures would be required to avoid or reduce impacts on bald eagle:

- Complete a two-year survey for eagle use patterns prior to construction activities. Surveys will be conducted by a qualified avian biologist and will include any facilities to be removed or modified to determine bird use patterns. Surveys will be conducted during the time of year most likely to detect eagle usage.
- Prior to construction, conduct at least one focused survey for bald eagle nests within 2 miles of construction areas, including along access roads and haul routes, during the early bald eagle breeding season (January 15 through February 28). Three additional surveys would be conducted; two between March 1 and April 1, and one after April 1. Additional survey visits would be conducted to determine if eagles are nesting within 2 miles of the construction area. Before commencing

construction activities during the early breeding season, at least one survey would be conducted within two weeks prior to beginning operations.

- Wherever possible, clearing, cutting, and grubbing activities shall be conducted outside the eagle breeding period (January 15 through August 15);
- If active nests are present within 2 miles of construction areas, a 0.5-mile restriction buffer would be established in consultation with the resource agencies to ensure nests are not disturbed. If active bald eagle nests are present within 0.5 miles of construction areas, construction activities would be halted until approval is obtained from the resource agencies to resume. If a nest is not within line of site of the project, meaning that trees or topographic features physically block the eagle's view of construction activities, the buffer could be reduced to 0.25 miles.

See Mitigation Measure TER-3 in Section 3.5.4.4.

### ***B.3.3.3 Golden Eagle***

Golden eagles are known to have historically nested in cliffs within the project area. Golden eagles are also known to nest within pine, juniper and oak trees.

The following measures would be required to avoid or reduce impacts on golden eagle:

- Complete a two-year survey for eagle use patterns prior to construction activities. Surveys will be conducted by a qualified avian biologist and will include any facilities to be removed or modified to determine bird use patterns. Surveys will be conducted during the time of year most likely to detect eagle usage.
- Prior to construction, at least one protocol survey for golden eagle nests would be conducted within 5 miles of construction areas, including along access roads and haul routes, during the breeding season (January through July). Before commencing construction activities during the early breeding season, at least one focused survey would be conducted within two weeks prior to beginning operations. Additional survey visits would be conducted to determine if eagles are nesting within 2 miles of the construction area.
- Wherever possible, clearing, cutting, and grubbing activities shall be conducted outside the eagle breeding period (January through July).
- If active nests are present within 2 miles of construction areas, a 1-mile restriction buffer would be established in consultation with the resource agencies to ensure nests are not disturbed. If active golden eagle nests are present within 1 mile of construction areas, construction activities would be halted until approval is obtained from the resource agencies to resume. If an active nest is not within line of site of the project, meaning that trees or topographic features physically block the eagle's view of construction activities, the buffer could be reduced to 0.5 miles.

See Mitigation Measure TER-3 in Section 3.5.4.4.

#### ***B.3.3.4 Osprey***

Known osprey nests are located within or near to construction areas. Some osprey nests are located on transmission line poles or other man-made platforms that would be removed during construction, or are located within areas where construction noise or human presence would cause disturbance to the birds. To avoid nesting disturbance, the nests located within or near to construction areas would be removed prior to the breeding season and replaced with nesting platforms following construction on a 1:1 basis. In addition, a search for osprey nests within 0.25 mile of construction areas, including along access roads and haul routes, would be conducted prior to beginning operations and during the breeding season, which begins in February. If active nests are present, a 0.25-mile restriction buffer would be established and delineated on maps and resource agencies would be consulted to obtain concurrence prior to conducting construction activities. See Mitigation Measure TER-2 in Section 3.5.4.4.

#### ***B.3.3.5 Willow Flycatcher***

Prior to construction during the nesting season of June 1-August 31, a focused survey for willow flycatcher would be conducted within construction areas, including along access roads and haul routes. The survey would follow the established protocol described in Bombay et al (2003). If active willow flycatcher nests are detected, a 0.5-mile restriction buffer would be established and delineated on maps and resource agencies would be consulted to obtain concurrence prior to conducting construction activities. See Mitigation Measure TER-2 in Section 3.5.4.4.

#### ***B.3.3.6 Other Migratory Birds***

The following measures would be required to avoid or reduce impacts on migratory birds from removal, destruction, or disturbance of active nests during construction:

- Removal or trimming of any trees or other vegetation for construction would be conducted outside of the nesting season (March 20 through August 20). This would include removal or trimming of trees along access roads and haul routes and within disposal sites.
- Where clearing, trimming, and grubbing work cannot occur outside the migratory bird nesting season, a qualified avian biologist will survey construction areas to determine if any migratory birds are present and nesting in those areas.
- For all raptors (other than eagles), inactive nests will be removed before nesting seasons begin, to the greatest extent practicable. For those nests where access is difficult, traffic cones or other deterrents in the nest platform to prevent nesting the year of construction. All deterrents will be removed as soon as possible after construction crews have passed to a point beyond the disturbance buffer for that species. See Mitigation Measure TER-2 (Section 3.5.4.4, Table 3.5-5).
- If an active nest is located, a restriction buffer in accordance with Mitigation Measure TER-2 (Section 3.5.4.4, Table 3.5-5) would be established and the

resource agencies would be consulted to obtain concurrence prior to conducting construction activities.

#### **B.3.4 Impacts on Special-Status Plant Species During Construction**

Special-status plants occurring in construction areas could be destroyed by heavy equipment. Prior to the implementation of construction activities, a botanist approved by the resource agencies would conduct protocol-level surveys within construction areas for special-status plants during the peak blooming season prior to start of construction. If any special-status plants occur within the construction areas, locations of these plants would be clearly marked and/or fenced to avoid impacts from construction equipment and vehicles where possible. If it is not possible to avoid impacts to special-status plants, Mitigation Measure TER-4 would be implemented to avoid or reduce impacts (Section 3.5.4.4).

#### **B.3.5 Impacts Related to Invasive Plants**

With implementation of the Proposed Action, the Partial Facilities Removal Alternative, the Fish Passage at Four Dams Alternative, and the Fish Passage at Two Dams Alternative, there would be potential for invasive plants to recolonize and infest disturbed areas, outcompeting native plants and adversely affecting wildlife habitat. To avoid or reduce this impact, construction vehicles and equipment would be cleaned with compressed water or air within a designated containment area to remove pathogens, invasive plant seeds, or plant parts and dispose of them in an appropriate disposal facility. The Habitat Restoration Plan (see Mitigation Measure TER-1 in Section 3.5.4.4) would include details for the installation of native plants to re-vegetate all areas disturbed during construction. Long-term maintenance and monitoring to control invasive species would be included.

#### **B.3.6 Impacts on Plants and Wildlife Related to Vegetation Management**

The structure and species composition of many forested stands have been altered through fire exclusion and past and on-going timber management. This includes mixed conifer forests, oak woodlands, and aspen. The alteration of these stands has resulted in the degradation of habitat for species associated with these vegetative communities. Additionally, many of these stands exhibit high amounts of surface and ladder fuels, increasing the potential for uncharacteristically severe wildfire. The following best management practices can reduce the effects on plants and wildlife related to vegetation management:

- Small diameter thinning of overstocked upland forests to promote development of structurally diverse stands with desired species composition and variable densities, and to reduce the risk of uncharacteristically severe wildfire.
- Prescribed burning in upland forested habitats to promote the development of understory growth and reduce the amount of small to medium diameter surface fuels.

- In oak stands, small diameter thinning (typically < 9” dbh) of dense oaks to promote the development of large structurally diverse oak trees.
- Removal of encroaching juniper (up to 15” dbh).
- Installing fencing around aspen stands to exclude livestock and allow for the
- Passive restoration of aspen trees combined with planting of native shrubs.

## **B.4 Public Health and Safety**

### **B.4.1 Structure Fencing**

Structures retained as part of the Partial Facilities Removal of Four Dams option would be fenced to prevent public access once decommissioning activities are completed.

### **B.4.2 Road Repair**

Road damage as a result of heavy vehicle traffic will be repaired once decommissioning activities are completed through in-lieu payments to Siskiyou and Klamath Counties or through direct repairs by the DRE as part of the decommissioning effort.

## **B.5 Air Quality**

### **B.5.1 Dust Control**

Soil stabilizers or erosion control fabrics must be applied to any inactive areas of the construction site.

Water must be applied to exposed surfaces at least three times daily.

Soil must remain moist during any equipment loading and unloading activities.

Haul roads must be covered in gravel with minimal silt content.

## **B.6 Cultural and Historic Resources**

### **B.6.1 Klamath Hydroelectric Project Historic Property Management Plan (HPMP)**

Implement the Klamath Hydroelectric Project HPMP that is part of PacifiCorp’s relicensing application to the Federal Energy Regulatory Commission (FERC); and prepare a Programmatic Agreement that includes protocols for the identification, evaluation, and protection, and resolution of adverse effects of historic properties along the Klamath River for areas beyond the FERC boundaries of the Klamath Hydroelectric

Project. The participants in the Programmatic Agreement will include Federal agencies, the Advisory Council on Historic Preservation, California and Oregon State Historic Preservation Office, land management agencies, Indian tribes, other interested parties, and other agencies that are proposing and/or implementing management plans for the river or along it related to the Klamath Hydroelectric Settlement Agreement. The lead Federal agency for the Programmatic Agreement will be determined by agreement among the participants.

## **B.7 Toxic and Hazardous Materials**

### **B.7.1 Health and Safety Plan**

Prepare and implement a worker Health and Safety Plan prior to the start of construction activities. The contractor will prepare a Health and Safety Plan that should, at a minimum, identify the following:

- All contaminants that could be encountered during excavation activities
- All appropriate worker, public health, and environmental protection equipment and procedures
- Emergency response procedures
- Most direct route to a hospital
- Site Safety Officer

The plan will require documentation that all workers have reviewed and signed the plan.

### **B.7.2 Asbestos Handling**

To mitigate the impacts regarding the abatement and disposal of asbestos and lead-based paint, prior to issuance of demolition permits, evidence shall be provided to the responsible federal agency that the demolition contract provides for a qualified asbestos and lead-based paint removal contractor/specialist to remove or otherwise abate asbestos and lead-based paint prior to or during demolition activities in accordance with federal, state, and local regulations. In addition, evidence shall be provided to the responsible federal agency that the demolition contract provides for construction contracts and/or land/building leases, provisions shall be included requiring continuous compliance with all applicable government regulations and conditions related to hazardous materials and waste management.

### **B.7.3 Hazardous Materials**

To mitigate the potential impact of encountering hazardous materials during construction and restoration, prior to initiation of deconstruction or construction activities, the contractor will be required to prepare a Hazardous Material Management Plan for review by the DRE. The purpose of this plan is to have an established plan of action if hazardous materials (e.g., asbestos and hazardous coatings requiring abatement) are

encountered during construction and to establish BMPs to reduce the potential for exposure to hazardous wastes. The plan will contain the following:

- Definition of a protocol for proper handling, transport, and disposal of hazardous materials (e.g., creosote-treated wood staves) if they are encountered during construction.
- Definition of a protocol for proper emergency procedures and handling, transport, and disposal of hazardous materials if an accidental spill occurs during construction.
- Establishment of BMPs to reduce the potential for spills of hazardous, toxic, and radioactive waste. Typical BMPs to reduce the potential for spills may include, but are not limited to:
  - Having a spill prevention and control plan with a designated supervisor to oversee and enforce proper spill prevention measures;
  - Providing spill response and prevention education for employees and subcontractors;
  - Stocking appropriate clean-up materials onsite near material storage, unloading and use areas;
  - Designating hazardous waste storage areas away from storm drains or watercourses;
  - Minimizing production or generation of hazardous materials on-site or substituting chemicals used on-site (e.g., herbicides during restoration) with less hazardous chemicals;
  - Designating areas for construction vehicle and equipment maintenance and fueling with appropriate control measures for runoff and runoff; and
  - Arranging for regular hazardous waste removal to minimize onsite storage.

#### **B.7.4 Herbicides Handling**

Some restoration activities may include the handling and use of herbicides. The following best management practices measures would be implemented to protect the health and safety of herbicide handlers and prevent impacts to water quality, aquatic and terrestrial species, and special status plants, and animals near the project site(s) from herbicide treatments:

- All weed treatment activities will comply with state and Federal laws and agency manuals, handbooks, and guidelines, including United States Environmental Protection Agency (USEPA) label restrictions. Application according to all herbicide labels.
- All weeds that are pulled or cut after bud stage will be bagged and properly disposed.
- The following minimization measures are required during mixing, loading, and disposal of herbicides:
  - All mixing of herbicides will occur at least 100 feet from surface waters or well heads.

- All hoses used to add dilution water to spray containers will be equipped with a device to prevent back-siphoning.
- Applicators will mix only those quantities of herbicides that can be reasonably used in a day.
- During mixing, mixers will wear a hard hat, goggles, or face shield, rubber gloves, rubber boots, and protective overalls.
- All empty containers will be triple rinsed and disposed of by spraying near the treatment site at rates that do not exceed those on the treatment site.
- All unused herbicides will be stored in a locked building in accordance with herbicide storage regulations.
- All empty and rinsed herbicide containers will be punctured and either burned or disposed of in a sanitary landfill.
- Any additional herbicide label requirements will be strictly followed during the mixing, loading, and disposal of herbicides.
- No 2,4-D ester formulations will be used.
- No carriers of adjuvants other than water will be used.
- Trained personnel would monitor weather conditions at spray sites during application. Herbicides will only be applied when no precipitation is imminent within 3 hours.
- A Pesticide Application Record will be completed daily, or as required. This will include general treatment areas, methods, and dates, and make this information available.
- Equipment will be calibrated often enough to ensure the proper amount of herbicides is applied.
- Application of any herbicides to treat weeds shall be performed by or directly supervised by a state licensed applicator.
- Mixing of herbicide will occur on a flat area more than 100 feet from streams, rivers, or lakes where accidental spills can be contained and removed before it contaminates waterbodies.
- Herbicide applicators shall be coordinated with permit holders within the project area, as appropriate.
- Adjacent landowners will be notified prior to treating weeds on public lands adjacent to private land boundaries.
- Only those quantities of herbicides necessary for the day will be transported to and from a treatment area.
- Water drafting equipment for filling spray tanks will have back siphoning prevention devices.
- Label directions and guidelines will be followed to reduce drift potential (nozzle size and pressure, additives). Equipment would be designed to deliver a median droplet diameter of 200- to 800-microns. This droplet size is large enough to avoid excessive drift while providing adequate coverage of target vegetation.
- Herbicides will only be applied when wind speeds are less than 8 miles per hour (mph).
- Spray detection cards will be used to demonstrate the adequacy of buffer zones. If cards indicate drift of herbicides is occurring into wetlands and streams, buffer zones widths and /or treatment methods would be revised.



- Non-hazardous dyes will be used as necessary to ensure uniform coverage. Signs will be posted at visible sites (campgrounds, trailheads, road intersections) to notify the public of herbicide application in the area.
- All chemicals will be applied in accordance with updated USEPA registration label requirements and restrictions, and applicable laws and policies.
- An Herbicide Emergency Spill Plan will be developed, including methods to report and clean up spills. Applicators will be required to be familiar with the plan and carry spill-containment and clean-up equipment.
- Only glyphosate (Rodeo®) will be used within 50 feet of streams/wetlands, where riparian or hydrophilic plants are present, and where surface material is obvious recent deposition of sediment of any diameter(s). Application will be limited to hand spraying and the use of wipers only.
- Only the minimum area necessary will be treated to control noxious weeds.
- A botanist shall evaluate sites for sensitive plant habitat prior to treatment and develop site-specific guidelines for herbicide application near sensitive plant populations during broadcast treatments.
- No chemical would be applied directly to sensitive plant species during spot treatments, and a 100-foot buffer would be maintained around known sensitive plant populations.
- Individuals who exhibit idiosyncratic responses such as hypersensitivity to natural and synthetic compounds will not be permitted to work on herbicide spray crews.
- Ensure all chemical storage, chemical mixing, and post-application equipment cleaning is completed in such a manner as to prevent the potential contamination of any Riparian Conservation Area (RCA), perennial or intermittent waterway, unprotected ephemeral waterway, or wetland.
- Evaluate the need to revegetate at treated sites. Use only certified noxious-weed free, native, seed mix or rootstock if revegetation is necessary for site restoration.
- When scheduling treatment activities, seasonal harvesting periods of wildlife, fish, and plants to accommodate the needs of the Tribes will be considered.
- A spill cleanup kit would be available whenever herbicides are transported or stored. All vehicles carrying herbicides shall have a standard spill kit.
- A spill contingency plan would be developed prior to all herbicide applications. Individuals involved in herbicide handling or application would be instructed on the spill contingency plan and spill control, containment, and cleanup procedures.
- Equipment used for transportation, storage, or application of chemicals shall be maintained in a leak proof condition.

#### ***B.7.4.1 Herbicide Spill Plan***

Procedures for mixing, loading, and disposing of herbicides will comply with the above measures and USEPA labels and regulations. A spill prevention plan and the following procedures for mixing, loading, and disposal of herbicides will accompany all herbicide spraying operations. A reportable herbicide spill is 1 pint of concentrate of herbicide and/or 5 gallons of mixed herbicide, even if these amounts can be contained and recovered by the weed field crew. Spills that can be contained and recovered will thereafter be applied in the field according to the label requirements for the herbicide. If

an herbicide spill occurs, the National Poison Control Center (1-800-222-1222) will be contacted as necessary. If there is a spill, it will be reported on approved forms. At a minimum, the following equipment and material will be available with vehicles or pack stock used to transport herbicides: (1) A shovel; (2) absorbent material or the equivalent; (3) plastic garbage bags or buckets; (4) rubber gloves and boots; (5) safety goggles; (6) protective clothing; and, (7) applicable Material Safety Data Sheets.

For supplemental information needed on hazards and reactions, Chemtrek will be called (1-800-424-9300). They are an information contact only; they are not used to report a spill (Example: if a truck carrying herbicides crashes and ignites, field crews may want to know if any special hazards exist from herbicide fumes, Chemtrek is the appropriate company to call).

## **B.8 Traffic and Transportation**

### **B.8.1 Roadway Signage and Dust Abatement**

Install signage, implement dust abatement, and perform proper construction traffic management at each deconstruction site and along Copco, Lakeview, and Topsy Grade/Ager-Beswick Roads.

### **B.8.2 Construction Signage**

Install construction signage onto OR66 at the entrance to J.C. Boyle Dam in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) advising motorists of slow turning vehicles and overall construction traffic in the area will mitigate significant traffic safety impacts.

### **B.8.3 Construction Signage**

If Copco Road is open and if the recreation sites are also open, install signage in accordance with MUTCD advising motorists of the presence of construction traffic in the area.

### **B.8.4 Roadway Signage**

Install signage, in accordance with MUTCD, at sharp turns along Copco Road and OR66 advising motorists and construction vehicle drivers to slow down and be advised of potential conflicts with bicycles, pedestrians and other vehicles.

### **B.8.5 Road Rehabilitation**

Grade to re-smooth ruts and washboard conditions created on Copco, Lakeview and Topsy Grade/Ager-Beswick Roads and at each deconstruction and construction site.

### **B.8.6 Pre Construction/Deconstruction Road Integrity Study**

Perform a structural integrity and load carrying capacity analysis to determine the load carrying capacity of the main access roads in the area of analysis. If it is determined these main access roads are necessary for heavy equipment to use and this analysis reveals the roads do not meet local, state, or federal standards for load carrying capacity, then these roads will be upgraded to fully meet those standards.

### **B.8.7 Post Construction/Deconstruction Road Integrity Study**

Perform a structural integrity and load carrying capacity analysis on the existing one-lane bridges at Iron Gate Dam and at J.C. Boyle Dam to aid deconstruction engineers in mitigating substantial road condition effects. If it is determined these bridges are necessary for heavy equipment to use and this analysis reveals the bridges do not meet local, state, or federal standards for load carrying capacity, then these bridges will be upgraded to fully meet those standards.

### **B.8.8 Impacts to Non-Surfaced Roads in Project Area**

Upon the completion of restoration activities, roads within the riparian zone damaged by the permitted activity shall be weather proofed according to measures as described in *Handbook for Forest and Ranch Roads* by Weaver and Hagans (1994) of Pacific Watershed Associates and in Part X of the CDFG Restoration Manual entitled “*Upslope Assessment and Restoration Practices*.” The following are some of the methods that may be applied to non-surfaced roads impacted by project activities implemented under this Program.

- Establish waterbreaks (e.g., waterbars and rolling dips) on all seasonal roads, skid trails, paths, and fire breaks by 15 October. Do not remove waterbreaks until 15 May.
- Maximum distance for waterbreaks shall not exceed the following standards; (1) for road or trail gradients less than 10%: 100 feet; (2) for road or trail gradients 11-25%: 75 feet; (3) for road or trail gradients 26-50%: 50 feet; (4) for road or trail gradients greater than 50%: 50 feet. Depending on site specific conditions more frequent intervals may be required to prevent road surface rilling and erosion.
- Locate waterbreaks to allow water to be discharged onto some form of vegetative cover, slash, rocks, or less erodible material. Do not discharge waterbreaks onto unconsolidated fill.
- Waterbreaks shall be cut diagonally a minimum of six inches into the firm roadbed, skid trail, or firebreak surface and shall have a continuous firm embankment of at least six inches in height immediately adjacent to the lower edge of the waterbreak cut.
- The maintenance period for waterbreaks and any other erosion control facilities shall occur after every major storm event for the first year after installation.

- Rolling-dips are preferred over waterbars. Waterbars shall only be used on unsurfaced roads where winter use (including use by bikes, horses, and hikers) will not occur.
- After the first year of installation, erosion control facilities shall be inspected prior to the winter period (15 October) after the first major storm event, and prior to the end of the winter period (15 May).
- Applicant will establish locations to deposit spoils well away from watercourses with the potential to delivery sediment into streams supporting, or historically supporting populations of listed salmonids. Spoils shall be contoured to disperse runoff and stabilized with mulch and (native) vegetation.
- No berms are allowed on the outside of the road edge.

## **B.9 General KBRA Best Management Practices**

### **B.9.1 Limits on Area of Disturbance for Individual Projects**

Stream dewatering limitations include a maximum 1000 foot length of stream that can be dewatered.

### **B.9.2 Upslope Disturbance (raw dirt, tree removal, canopy cover reduction)**

- The disturbance footprint for the project's staging areas may not exceed 0.25 acres.
- Overstory canopy cover over a linear distance of 125 ft may not be reduced by more 15-20 percent w/in 75 ft of a watercourse or lake transition zone as measured by a spherical densiometer.
- Native trees with defects, large snags > 16 inches (in) diameter at breast height (dbh) and 20 ft high, cavities, leaning toward the stream channel, nests, late seral characteristics, or > 36 in dbh will be retained. In limited cases removal will be permitted if trees/snags occur over culvert fill. No removal will occur without a site visit and written approval from the Department of Interior or its representative.
- Downed trees (logs) > 24 in dbh and 10 ft long will also be retained on upslope sites.
- The general construction season will be from June 15 to November 1. Restoration, construction, fish relocation, and dewatering activities within any wetted and/or flowing creek channel shall only occur within this window.

### **B.9.3 Buffer between Projects Implemented in the Same Year**

In a salmonid bearing stream, the Program will ensure maintenance of a 1500 ft downstream buffer from any other projects that increases suspended sediment concentration that are proposed for implementation that same year under the Program. In non-salmonid bearing reaches, the distance separating proposed projects that produce

suspended sediments must be 500 ft apart. Variances from the buffer between projects will be considered by NOAA Fisheries Service on a project-by-project basis.

#### **B.9.4 General Minimization Measures for All Applicable Project Types**

The following minimization measures, as they apply to a particular project, shall be incorporated into the project descriptions for individual projects under the Program.

- The general construction season shall be from June 15 to November 1. Restoration, construction, fish relocation, and dewatering activities within any wetted and/or flowing creek channel shall only occur within this window. As such, all non-revegetation associated earthmoving activities shall be complete by November 1. Revegetation outside of the active channel may continue beyond October 15, if necessary. Limited earthmoving associated with preparation of the site for revegetation may occur within the October 15 - November 15 timeframe, but only as necessary for revegetation efforts. Work beyond this time frame may be authorized following consultation with and approval of NOAA Fisheries Service and CDFG, provided it could be completed prior to first flows.
- Prior to construction, each contractor shall be provided with the specific protective measures to be followed during implementation of the project. In addition, a qualified biologist shall provide the construction crew with information on the listed species and State Fully Protected Species in the project area, the protection afforded the species by the Endangered Species Act, and guidance on those specific protection measures that must be implemented as part of the project.
- All activities that are likely to result in adverse aquatic impacts, including temporary impacts, shall proceed through a sequencing of impact reduction: avoidance, reduction in size of impact, and compensation (mitigation). Mitigation may be proposed to compensate for the adverse impacts to water of the United States. Mitigation shall generally be in kind, with no net loss of waters of the U.S. on a per project basis. Mitigation work shall proceed in advance or concurrently with project construction.
- Poured concrete shall be excluded from the wetted channel for a period of 30 days after it is poured. During that time the poured concrete shall be kept moist, and runoff from the concrete shall not be allowed to enter a live stream. Commercial sealants may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is dry and fully cured according to the manufacturers specifications.
- Herbicides may be applied to control established stands of non-native species. Herbicides must be applied to those species according to the registered label conditions. Herbicides must be applied directly to plants and may not be spread upon any water. Herbicide shall be tinted with a biodegradable dye to facilitate visual control of the spray.
- If the thalweg of the stream has been altered due to construction activities, efforts shall be undertaken to reestablish it to its original configuration. (*Note: Projects*

*that may include activities such the use of willow baffles which may alter the thalweg would still be allowed under the Program.)*

## **B.9.5 Minimization Measures for Specific Project Types**

### **B.9.5.1 Removal of Small Dams**

- Once a small dam has been removed, there will be a potential for sediment to mobilize downstream of the project site. Projects will 1) have a relatively small volume of sediment available for release, that when released by storm flows, are not likely to destroy downstream habitat or 2) are designed to remove sediment trapped by the dam down to the elevation of the target thalweg including design channel and floodplain dimensions. This can be accomplished by estimating the natural thalweg using an adequate longitudinal profile (see CDFG Manual Part XII Fish Passage Design and Implementation) and designing a natural shaped channel that provides the same hydraulic conditions and habitat for listed fish that is provided by the natural channel and has the capacity to carry flows up to the 2-year flood.
- All construction will take place out of the wetted channel either by implementing the project from the bank and out of the channel or by constructing coffer dams, removing aquatic species located within the project reach, and dewatering the channel.
- No more than 250 linear feet (125 feet on each side of the channel) of riparian vegetation will be removed during this process. All disturbed areas will be re-vegetated with native grasses, trees, and shrubs.
- All dewatering efforts associated with small dam removal will abide by the minimization measures for stream dewatering.
- Data Requirements and Analysis to be Provided:
  - A longitudinal profile of the stream channel thalweg for at least 20 channel widths upstream and downstream of the structure and long enough to establish the natural channel grade, whichever is farther, shall be used to determine the potential for channel degradation (as described in the CDFG Manual).
  - A minimum of five cross-sections; one downstream of the structure, three through the reservoir area upstream of the structure, and one upstream of the reservoir area outside of the influence of the structure - to characterize the channel morphology and quantify the stored sediment.
  - Sediment characterization within the reservoir and within a reference reach of a similar channel to determine the proportion of coarse sediment (>2mm) in the reservoir area and target sediment composition.
  - A survey of any downstream spawning areas that may be affected by sediment released by removal of the water control structure.

Projects will be deemed ineligible for the program if:

- 1) Sediments stored behind dam have a reasonable potential to contain environmental contaminants (dioxins, chlorinated pesticides, polychlorinated biphenyls (PCB's),

or mercury) beyond the freshwater probable effect levels (PELs) summarized in the NOAA Screening Quick Reference Table guidelines found at [http://response.restoration.noaa.gov/bookshelf/122\\_NEW-SQuiRTs.pdf](http://response.restoration.noaa.gov/bookshelf/122_NEW-SQuiRTs.pdf), or

- 2) The risk of significant loss or degradation of downstream spawning or rearing areas by sediment deposition is considered to be such that the project requires more detailed analysis. Sites should be considered to have a reasonable potential to contain contaminants of concern if they are downstream of historical contamination sources such as lumber or paper mills, industrial sites, or intensive agricultural production going back several decades (i.e. since chlorinated pesticides were legal to purchase and use).

In these cases, preliminary sediment sampling is advisable.

#### ***B.9.5.2 Creation of Off-Channel/Side Channel Habitat***

To reduce the impacts of turbidity the same measures used for instream habitat improvement projects will be required including:

- Any equipment work within the stream channel shall be performed in isolation from the flowing stream. If there is any flow when the work is done, the grantee shall construct coffer dams upstream and downstream of the excavation site and divert all flow from upstream of the upstream dam to downstream of the downstream dam. The coffer dams may be constructed from many different materials and methods to meet the objective, for example clean river gravel or sand bags, and may be sealed with sheet plastic. Foreign materials such as sand bags and any sheet plastic shall be removed from the stream upon project completion. In some cases, clean river gravel may be left in the stream, but the coffer dams must be breached to return the stream flow to its natural channel.
- If it is necessary to divert flow around the work site, either by pump or by gravity flow, the suction end of the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries Service criteria to prevent entrainment or impingement of small fish. Any turbid water pumped from the work site itself to maintain it in a dewatered state shall be disposed of in an upland location where it will not drain directly into any stream channel, or treated to filter suspended materials before flowing back into the stream.

Projects requiring extensive analysis may not be eligible for programmatic coverage, and would need to undergo separate consultation.

#### ***B.9.5.3 Developing Alternative Stockwater Supply***

- Only projects with existing diversions compliant with water laws will be considered. In addition, storage reservoirs will not be greater than 10 acre-feet in size. Flow measuring device installation and maintenance may be required for purposes of accurately measuring and managing pumping rate or bypass conditions set forth in this document or in the water right/use permit

- All pump intakes will be properly screened in accordance with NOAA Fisheries Service Southwest Region Fish Screening Criteria for Salmonids, as discussed and referenced in Appendix S of the Restoration Manual.
- Stockwater ponds and wells will be located outside of the riparian zone and are not likely to cause standing of juvenile salmonids during flood events.

#### **B.9.5.4 Tailwater Collection Ponds**

- Tailwater collection ponds that do not incorporate egress channels back to the creek will be located at least 100 feet from the active channel and are not likely to cause stranding of juvenile salmonids during flood events.

Water conservation projects that include water storage tanks and a Forbearance Agreement for the purpose of storing winter and early spring water for summer and fall use, require registration of water use pursuant to the Water Code §1228.3, and require consultation with CDFG and compliance. Diversions to fill storage facilities during the winter and spring months shall be made pursuant to a Small Domestic Use Appropriation (SDU) filed with the State Water Resources Control Board (SWRCB). CDFG and NOAA will review the appropriation of water to ensure fish and wildlife resources are protected.

#### **B.9.5.5 Piping Ditches**

- Only water conservation piping projects that result in a decrease in the diversion rate with a permitted instream dedication of the water saved are covered by this permit.
- Landowners will enter an agreement with NOAA or the United States Army Corps of Engineers (USACE) stating that they will maintain the pipe for 10 years.

#### **B.9.5.6 Fish Screens**

- All flows will be diverted around work areas as described below in *Requirements for Fish Relocation and Dewatering Activities*.
- Fish removal may be required at project sites and BMPs will be implemented as described below in *Requirements for Fish Relocation and Dewatering Activities*.
- Riparian disturbance will be minimized as described below in *Measures to Minimize Loss or Disturbance of Riparian Vegetation*.

#### **B.9.5.7 Headgates, Water Measuring Devices, and Re-profiling Ditches**

- The applicant must provide instream and ditch/pump hydraulic calculations showing there is sufficient head to divert maximum diversion flow and bypass flow at minimum stream flow considering head losses at flow measurement devices, fish screens, pipes, open ditches, headgates, etc.
- Measuring devices must be approved by the Department of Water Resources (DWR) for watersheds with DWR water master service. Otherwise, measuring devices must conform to the *2001 Bureau of Reclamation Water Measurement Manual* (Bureau of Reclamation [Reclamation] 2001) which can be found at ([http://www.usbr.gov/pmts/hydraulics\\_lab/pubs/wmm/index.htm](http://www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/index.htm)).



- Design drawings must show structural dimensions in plan, elevation, longitudinal profile, and cross-sectional views along with important component details.
- All flows will be diverted around work areas as described in Section II B. *Requirements for Fish Relocation and Dewatering Activities.*
- Fish removal may be required at project sites and BMPs are described in Section II B. *Requirements for Fish Relocation and Dewatering Activities.*
- Riparian disturbance will be minimized as described in Section II E. *Measures to Minimize Loss or Disturbance of Riparian Vegetation.*

#### **B.9.5.8 Water Conservation Projects**

- All water conservation projects included under this programmatic will require diverters to verify compliance with water rights – as conditioned by a small domestic use or livestock stockpond registration, appropriative water right, or a statement of riparian water use registered with the State Water Resource Control Board and reviewed for compliance with California Fish and Game Code by CDFG (which may require a Lake or Streambed Alteration Agreement and possibly, a California Environmental Quality Act (CEQA) analysis).
- Restrictions on water diversions from a stream or from hydrologically connected sources (such as springs or groundwater that would contribute to streamflow) are often site specific. Permitted diversions may have limits on or requirements for:
  - Season of diversion
  - Rates of diversion
  - Possible time-of-day restrictions (avoiding daytime peak in forest evapotranspiration and water temperature, or coordination with other users)
  - Fish screen requirements for direct diversions
  - Requirements for water storage during high flow periods for use in low flow periods
  - Flow or diversion monitoring and reporting.
- Restrictions are intended to protect instream flows beneficial to fish rearing, spawning, and movement as well as providing habitat native amphibians and other aquatic species.

#### **B.9.6 Engineering Requirements**

More complex project types covered by the Program will require a higher level of oversight (engineering review, etc.) and review by either NOAA Fisheries Service regulatory agency staff, agency engineers, or CDFG engineers. These project types will include:

- Fish passage at stream crossings
- Permanent removal of flashboard dam abutments and sills.
- Small dam removal
- Creation and/or connection of off channel habitat features

Specific requirements associated with these more complex project types include the following:

- For stream crossing and small dam projects, if the stream at the project location was **not** passable to or was not utilized by all life stages of all covered salmonids prior to the existence of the road crossing, the project shall pass the life stages and covered salmonid species that historically did pass there. Retrofit culverts shall meet the fish passage criteria for the passage needs of the listed species and life stages historically passing through the site prior to the existence of the road crossing according to NOAA Fisheries Service and CDFG stream crossing criteria.
- All designs for dam removal, off channel habitat features, and fish passage projects must be reviewed and authorized by NOAA Fisheries Service (or CDFG) engineers, ensuring the requirements have been met prior to commencement of work. Off channel habitat projects that reduce the potential for stranding using water control structures will be encouraged, but uncertainties in future stream flows and drought conditions cannot be predicted and may result in fish stranding in certain flow conditions.

### **B.9.7 Prohibited Activities**

Projects that include any of the following elements would not be authorized under this Program and would require separate consultation with NOAA Fisheries Service:

- Use of gabion baskets
- Use of cylindrical riprap (aqualogs)
- Chemically-treated timbers used for grade or channel stabilization structures, bulkheads or other instream structures
- Activity that substantially disrupts the movement of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the action area
- Projects that would completely eliminate a riffle/pool complex (*note: there may be some instances where a riffle/pool complex is affected/modified by a restoration project [i.e. a culvert removal that affects an existing pool]. These types of projects would be allowed under the Program*).

### **B.10 References**

Bureau of Reclamation (Reclamation). 2001. Water Measurement Manual. Accessed on August 9, 2011. Available at:

[http://www.usbr.gov/pmts/hydraulics\\_lab/pubs/wmm/index.htm](http://www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/index.htm).

California Department of Fish and Game (CDFG). 2000. Fish Screening Criteria. The Resources Agency. CDFG. Accessed August 11, 2011. Available at:

<http://iep.water.ca.gov/cvffrt/DFGCriteria2.htm>.

Leppig G. 2011. California Department of Fish and Game. Written communication with Jennifer Jones, CDM. February 3, 2011.

National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries Service). 2000. Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act. Accessed August 11, 2011. Available at:  
<http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf>

Weaver, W. and Hagans, D. 1994. Handbook for Forest and Ranch Roads: A Guide for planning, designing, constructing, reconstructing, maintaining and closing wildland roads. Accessed: August 11, 2011. Available at:  
[http://www.krisweb.com/biblio/gen\\_mcrd\\_weaveretal\\_1994\\_handbook.pdf](http://www.krisweb.com/biblio/gen_mcrd_weaveretal_1994_handbook.pdf)

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