APPENDIX D

PRESCRIPTIONS THAT APPLY TO BEEBE SPRING CREEK CULVERT REMOVAL AND HABITAT ENHANCEMENT

Appendix D: Prescriptions that apply to Beebe Springs Creek culvert removal and habitat enhancement (NMFS and USFWS 2008)

Covered Categories of Restoration Actions: These are the specific categories and sections of the 2008 BO that pertain to the removal of the road and culverts on Beebe Springs Creek and habitat enhancement restoration of Beebe Springs Creek. The numbering sequence from the BO is retained.

1. **Fish Passage**
   Description: The objective of passage barrier removal is to allow all life stages of salmonids access to historical habitats from which they have been excluded by non-functioning drainage structures (road, trail, and railroad crossings) and water impoundments (tide gates, temporary dams).

   c. **Culvert Removal**
      Description: Removal of unnecessary culverts to improve salmonid access and habitat functions. When circumstances permit, culvert removal is the preferred alternative.
      Conservation Measures: When there is a series of barriers that are proposed to be removed in a short period of time on one system, work will start at the most upstream barrier to minimize impacts to listed fish.

2. **Installation of Instream Structures**
   Description: Anthropogenic activities that have altered riparian habitats, such as splash damming and the removal of large wood and logjams, have reduced instream habitat complexity in many rivers.

   They have eliminated or reduced features like pools, hiding cover, and bed complexity. Salmonids need habitat complexity for rearing, feeding, and migrating. To improve habitat complexity where an identified need exists, the COE proposes to permit the following practices:

   a. **Placement of Woody Debris**
      Description: Large Woody Debris (LWD) can be placed in the channel, estuary, or marine environment either unanchored or anchored in place using rock, rebar, or wooden piles. The amount of rock used is limited to that needed to anchor the LWD. The use of metal cables will be limited to situations where no other technique will work.
      Conservation Measure: Large trees may be dislodged or felled for constructing in-stream habitat in areas where the following criteria are met: (1) Lack of instream LWD has been identified by a watershed analysis, reach assessment, or similar document as a limiting factor for the subject reach; and (2) Presence of an adequately stocked and healthy mature riparian forest; (3) Felling or tipping (or both) of trees into the water will not significantly impact stream shading; (4) Sufficient natural recruitment of native woody vegetation is expected and the threat of invasive vegetation filling created gaps is minimal or replanting with

native woody species is planned; (5) The LWD design aims at providing several years of in-stream habitat benefits; (6) The trees are not suitable habitat for listed terrestrial species. Whenever possible, rootwads will be used for in-stream habitat, too. Attempts will be made to procure and stockpile LWD to be used before felling live trees. Finally, felling trees may be most appropriate where stream access is limited for creating LWD jams.

4. **Side Channel/Off-Channel Habitat Restoration and Reconnection**
Description: Side channel habitats are generally small watered remnants of river meanders. They provide important spawning and rearing habitat for juveniles and refuge habitat during high flows. They are most common in floodplains that have been strongly glacially influenced leaving alluvial material in a flat valley floor. Off-channel habitat includes abandoned river channels, spring-flow channels, oxbows and flood swales. Off-channel habitat has been reduced by human activities in the floodplain including diking, removal of LWD, straightening of the channel, and bank armoring. Thus, there is a need in many Washington watersheds for off-channel restoration.

Restoration techniques covered by the Biological Assessment (BA) focus on the restoration or creation of self-sustaining off-channel habitat. Self-sustaining is not synonymous with maintaining a static condition. Self-sustaining means the restored or created habitat would not require major or periodic maintenance, but function naturally within the processes of the floodplain. However, up to two project adjustments, including adjusting the elevation of the created side channel habitat are included under this proposal. The long-term development of a restored side channel will depend on natural processes like floods and mainstem migration. Over time, the side channel may naturally get drier or be taken over by the main river flow.

The following off-channel restoration activities are covered under the BA:

- Creation of new side channel habitat. This approach would create self-sustaining side channels which are maintained through natural processes. Designs must demonstrate sufficient hydrology.
- Excavating pools and ponds in the historic floodplain/channel migration zone to create connected wetlands.
- Reconnecting existing side channels with a focus on restoring fish access and habitat forming processes (hydrology, riparian vegetation).
- ELJs, barbs and groins may be used to direct some flow through a side channel, see below General Conservation Measures 1.
- Restoration of existing side channels including one-time dredging and an up to two times project adjustment including adjusting the elevation of the created side channel habitat.

Conservation Measures:

1. All side channel and pool habitat work will occur in isolation from waters occupied by listed fish species until project completion, at which time a final opening may be made by excavation to waters occupied by listed fish or water will be allowed to return into the area.
2. Side channel habitat will be constructed to prevent fish stranding by providing a continual positive grade to the intersecting waters of the US or a year around water connection.

General Prescriptions: These are general prescriptions of the 2008 BO.

General Prescriptions that Apply to all Proposed Restoration Activities:

No in-water activities are permitted in bull trout spawning and rearing areas in eastern Washington.

1. Pre-Construction/Surveying

1. All organic material that has to be cleared for access will remain on site.
2. The removal of riparian vegetation for access will be minimized and estimated in the Specific Project Information Form (SPIF) at the time the COE seeks to conduct the action.
3. The number of temporary access roads will be minimized and roads will be designed to avoid adverse effects like creating excessive erosion.
4. Temporary access-ways across slopes greater than 30 percent will be avoided. If temporary access needs to cross slopes greater than 30 percent it will be indicated in the SPIF.
5. No permanent access-ways will be built. All temporary access-ways will be removed (including gravel surfaces) and planted after project completion.
6. New temporary stream crossings will avoid potential spawning habitat (i.e. pool tailouts) and pools to the maximum extent possible. They will minimize sedimentation impacts by using best management practices like mats and boards to cross a stream. Best management practices will be listed by each applicant in a SPIF. After project completion temporary stream crossing will be abandoned and the stream channel restored where necessary.
7. Boundaries of clearing limits associated with site access and construction will be marked to avoid or minimize disturbance of riparian vegetation, wetlands, and other sensitive sites.
8. A Pollution and Erosion Control Plan, commensurate with the size of the project, must be prepared and carried out to prevent pollution caused by surveying or construction operations.
9. A supply of emergency erosion control materials will be on hand and temporary erosion controls will be installed and maintained in place until site restoration is complete.

2. General

1. Work windows will be applied to avoid and minimize impacts to listed salmonids or forage fish.
2. Electrofishing is not proposed in the vicinity of redds from which fry may not have emerged, or in areas where adult salmonids may be holding prior to spawning.
3. Sandbags may be placed to temporarily keep fish out of work areas. Sandbags will be removed after completion of project.
4. Temporary roads in wet or flooded areas will be abandoned and restored by the end of the in-water work period.
5. Existing roadways or travel paths will be used whenever possible.
6. Any large wood, native vegetation, weed-free topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration.
7. When construction is finished, the construction area will be cleaned up and rehabilitated (replanted and reseeded) as necessary to renew ecosystem processes that form and maintain productive fish habitats.
8. Work below the OHWL or mean lower low tide line will be completed during preferred in-water work windows, when listed salmonids or forage fish are least likely to be present in the action area. Exceptions will be requested in the SPIF.
9. If listed fish are likely to be present, the project sponsor will assess what is less impacting to fish, isolation of the in-water work area or work in the wet, see below "6. Isolation of Work Site".
10. Prepare a Work Area Isolation Plan for all work below the bankfull elevation requiring flow diversion or isolation. Include the sequencing and schedule of dewatering and rewatering activities, plan view of all isolation elements, as well as a list of equipment and materials to adequately provide appropriate redundancy of all key plan functions (e.g., an operational, properly sized backup pump and/or generator). This standard material does not need to be submitted with a SPIF. However, it needs to be available to the Services at their request.
11. Any water intakes used for the project, including pumps used to dewater the work isolation area, will have a fish screen installed, operated and maintained according to NMFS' fish screen criteria (NMFS 1997; NMFS 2008).
12. The site will be stabilized during any significant break in work.
13. Project operations will cease under high flow conditions that may inundate the project area, except as necessary to avoid or minimize resource damage.
14. All discharge water created by construction (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) will be treated to avoid negative water quality and quantity impacts. Removal of fines may be accomplished with bioswales; concrete washout with altered ph, may be infiltrated.

3. Equipment

1. Heavy equipment will be limited to that with the least adverse effects on the environment (e.g., minimally-sized, low ground pressure equipment).
2. When not in use, vehicles and equipment that contain oil, fuel, and/or chemicals will be stored in a staging area located at least 150 feet from the COE' jurisdictional boundary of wetlands and waterbodies. If possible staging is located at least 300 feet away from the COE's jurisdictional boundary of wetlands and waterbodies, and on impervious surfaces to prevent spills from reaching ground water. Where moving equipment daily at least 150 feet of waterbodies would create unacceptable levels of disturbance (multiple stream crossings, multiple passes over sensitive vegetation) a closer staging location with an adequate spill prevention plan may be proposed.
3. When conducting in-water or bank work, hydraulic lines will be filled with vegetable oil for the duration of the project to minimize impacts of potential spills and leaks.
4. Spill prevention & clean-up kits will be on site when heavy equipment is operating within 25 feet of the water.
5. To the extent feasible, work requiring use of heavy equipment will be completed by working from the top of the bank.
6. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities around the water.
7. Equipment will cross the stream in the wet only under the following conditions:
   a. equipment is free of external petroleum-based products, soil and debris has been removed from the drive mechanisms and undercarriage; and
   b. substrate is bedrock or coarse; and
   c. in soft bottom streams mats or logs are used to drive across to minimize compaction; and
   d. stream crossings will be performed at right angle if possible; and
   e. no stream crossings will be performed at spawning sites when spawners are present or eggs or alevins could be in the gravel; and
   f. the number of crossings will be minimized

4. Planting and Erosion Control

1. Within seven calendar days of project completion, any disturbed bank and riparian areas shall be protected using native vegetation or other erosion control measures as appropriate. For erosion control, sterile grasses may be used in lieu of native seed mixes.
2. If native riparian vegetation has to be disturbed it will be replanted with native herbaceous and/or woody vegetation after project completion. Planting will be completed between October 1 and April 15 of the year following construction. Plantings will be maintained as necessary for three years to ensure 50 percent herbaceous and/or 70 percent woody cover in year three, whatever is applicable. For all areas greater than 0.5 acres, a final monitoring report will be submitted to the COE in year three. Failure to achieve the 50 percent herbaceous and 70 percent woody cover in year three will require the applicant to submit a plan with follow up measures to achieve standards or reasons to modify standards.
3. Fencing will be installed as necessary to prevent access to revegetated sites by livestock, beavers or unauthorized persons. Beaver fencing will be installed around individual plants where necessary.

5. Water Quality

1. Landward erosion control methods shall be used to prevent silt-laden water from entering waters of the United States. These may include, but are not limited to, straw bales, filter fabric, temporary sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or immediate mulching of exposed areas.
2. Wastewater from project activities and water removed from within the work area shall be routed to an area landward of the OHWL in an upland disposal site to allow removal of fine sediment and other contaminants prior to being discharged to the waters of the United States.
3. All waste material such as construction debris, silt, excess dirt, or overburden resulting from this project will generally be deposited above the limits of flood water in an upland disposal site. However, material from pushup dikes may be used to restore microtopography, e.g. filling drainage channels.
4. If high flow or high tide conditions that may cause siltation are encountered during this project, work shall stop until the flow subsides.
5. Measures shall be taken to ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into waters of the US.
6. A spill prevention plan will be prepared for every project that utilizes motorized equipment or vehicles. Plan will be available to Service by request.
7. An erosion control plan will be prepared for every project that results in ground disturbance. Plan will be available to Service by request.

6. Isolation of Work Site

To reduce impacts to listed fish and water quality, major habitat restoration projects would be performed in isolation from flowing waters whenever possible. Examples of activities that may be done in the water include placing wood and rock structures that require very little in-water excavation, small scale work in systems with sand or coarser grained substrate and work in rock bottom systems. The choice and rational on whether or not to isolate the worksite needs to be included in the SPIF. The focus needs to be on minimization of impacts on water quality, listed salmonids and forage fish. If worksite isolation and fish capture and removal is the least impacting method, the applicant will follow procedures outlined in Appendix D

When working in the wet some turbidity monitoring may be required, subject to discussions between applicant and the Services. Turbidity monitoring generally is required when working in streams with more than 40 percent fines (silt/clay) in the substrate. Turbidity will be monitored only when turbidity generating work takes place, for example, pulling the culvert in the wet, reintroducing water. The applicant will measure the duration and extent of the turbidity plume (visible turbidity above background) generated. The data will be submitted to the Services.

Measurements of concentration preferably in mg/l are very helpful for the Services. Turbidity measurements are used by the Services to develop procedures to minimize turbidity and estimate take for future projects. If you can provide turbidity measurements in mg/l (NTUs are also less helpful for purposes of comparison with literature values) the Services will greatly appreciate your data.

General Prescriptions that Apply to some of the Proposed Restoration Actions

Bank stabilization, Redirection of Flow, Riparian Invasive Plant Removal and small scale Nutrient Enhancement are frequently associated with restoration actions proposed under this programmatic. For example, riparian enhancements often require some level of bank treatment and invasive plant removal; the installation of LWD often is associated with nutrient enhancement. Neither riparian invasive plant removal nor nutrient enhancement are regulated by the COE. However, if they are part of a project otherwise covered by this programmatic, they should follow the guidelines below:

1. **Installation of Bank Stabilization Features:**

Description: In many riparian areas anthropogenic activities have led to streambank degradation and accelerated erosion. This usually leads to lack of cover, growth of invasive plants, reduction in pool habitat, and increased fine sediment input and accumulation, which all negatively affect salmonids. Projects that improve riparian habitat conditions for salmonids, such as riparian plantings or side channel construction/reactivation, may utilize the bank stabilization techniques listed below. For a detailed description of each technique refer to Integrated Streambank Protection Guidelines (Cramer et al. 2003).

All restoration/enhancement projects that employ bank stabilization need to have restoration as their primary purpose and need to address the cause of the habitat degradation. Streambank stabilization can not be the only proposed component, but rather a conservation measure applied to help a primary action like removal of bank protection and installation of riparian revegetation to succeed.

a. **Bank Protection Engineered Log Jams**: The goal of bank protection ELJs is to protect a section of natural stream bank that may be vulnerable to accelerated erosion resulting from project activities or existing infrastructure that have altered the natural stream flow. Bank protection ELJs can be placed intermittently as a series of flow defectors or as a continuous revetment (Herrera 2006b). Examples in the Pacific Northwest include the Elwha River in Washington and Johnson Creek in Portland, Oregon.

b. **Groins/Spur Dikes:** Groins are large roughness elements that project from the bank into the channel. Different from barbs, groins extend above the high-flow water-surface elevation. Usually they are constructed in a series to provide continuous bankline roughness.
Groins must be constructed exclusively from wood with minimal anchor rock. Constructing less permanent (compared to rock) wood groins will ensure that in the long-term the groins do not interfere with natural river dynamics and provide maximal habitat.

c. **Barbs/Vanes/Bendway Weirs:** Barbs, vanes, and bendway weirs are low-elevation structures that project from a bank into the channel. They are angled upstream to redirect flow away from the bank. They increase channel roughness and reduce water velocity near the bank. Barbs have to be constructed from wood with minimal anchor rock. Wooden barbs within the active river channel may be used to allow soft bank treatments such as reshaping and native plantings to mature. Constructing less permanent (compared to rock) wood groins will ensure that in the long-term the groins do not interfere with natural river dynamics and provide maximal habitat.

d. **Rootwad Toes:** Rootwad toes are structural features that prevent erosion at the toe of a streambank. The toe refers to that portion of the steambank that extends from the channel bottom up to the lower limit of vegetation. Rootwad toes can provide the foundation for soft upper-bank treatments such as bank reshaping and soil reinforcement. Rootwad toes provide better fish habitat and have a shorter life span than rock toes.

e. **Bank Reshaping:** Reducing the angle of the bank slope without changing the location of its toe. However, the toe may be reinforced with rootwads or coir logs.

f. **Soil Reinforcement/Soil Pillows:** Soil layers or lifts encapsulated within natural materials. Often the lifts are used to form a series of stepped terraces along the bank which then are planted with woody vegetation.

g. **Coir Logs:** Coir (coconut fiber) logs are long, sausage-shaped bundles of bound-together coir. They are commonly used as a temporary measure to stabilize the bank toe while riparian vegetation grows.

2. In-Channel Nutrient Supplementation

Description: Salmon and anadromous trout runs in most of the rivers in Washington State are significantly reduced compared to historic levels. This has resulted in a reduction of marine-derived nutrients that feeds the food chain including juvenile salmonids. To provide more nutrients up to historic levels the COE proposes to permit nutrient supplementation. Salmon carcasses or carcass analogs will be obtained from non-stream sources, generally hatcheries, to distribute in stream systems that have below-historic numbers of salmon carcasses. Distribution of carcasses will follow WDFW technical guidance (the WDFW protocol and guidelines document describes the application of fertilizer however, that action is not covered by this PBA). Distribution of carcasses will occur within the current anadromous zone of a watershed or within areas historically accessible to anadromous fish. Carcasses or analogs will be deployed randomly throughout riparian and stream areas by placing individual or several carcasses

on the ground, in the water, or wedging into accumulated wood. Work may entail use of trucks and hand crews.

Conservation Measures:

a. WDFW's technical guidance document "Protocols and Guidelines for Distributing Salmonid Carcasses, Salmon Carcass Analogs, and Delayed Release Fertilizers to Enhance Stream Productivity in Washington State(Saldi-Caromile et al. 2004) will be followed.
b. The revised Co-managers Salmonid Disease Control Policy (NWIFC and WDFW July 2006) Section 2.4.5. Carcass Transfer Requirements will be followed.
c. Nutrient enhancement will be covered only, if a recovery document, watershed plan, or best available science identifies nutrient deficiency as one of the limiting factors.
d. Salmon carcass deployment will not be conducted in areas where documented grizzly bear sightings have occurred within the last 4 weeks.

3. Riparian Invasive Plant Removal

Description: Functioning riparian corridors provide many essential benefits to salmonids including shade and recruitment of LWD. In many areas in Washington State riparian corridors have been disrupted by anthropogenic activities and subsequently taken over by non-native invasive vegetation. To re-establish native vegetation the COE proposes to permit treatment of invasive plant infestations in riparian areas using biological controls, mechanical methods, and chemical herbicides. The following five herbicides are proposed under this action category: Clopyralid, Glyphosate, Imazapyr, Metsulfuron, and Sulfometuron.

Clopyralid is a relatively new and very selective herbicide. It is toxic to some members of only three plant families: the composites (Compositae), the legumes (Fabaceae), and the buckwheats (Polygonaceae). Clopyralid is very effective against knapweeds, hawkweeds, and Canada thistle at applications rates of 0.10 to 0.375 pounds per acre. Clopyralid is a WSSA Group 4 herbicide. Its selectivity makes it an attractive alternate herbicide on sites with non-target species that are sensitive to other herbicides.

Glyphosate is a non-selective, broad-spectrum herbicide that is labeled for a wide variety of uses. It is absorbed by leaves and translocated throughout the plant, and disrupts the photosynthetic process. The herbicide affects a wide variety of plants, including grasses and many broadleaf species, and has the potential to eliminate desirable as well as undesirable vegetation. Glyphosate is a WSSA Group 9 herbicide. Some plant selectivity can be achieved by using a wick applicator to directly apply glyphosate to the target plant, thereby avoiding desirable vegetation.

Imazapyr is used for pre- and post-emergent control of annual and perennial grasses and broadleaf weeds, brush, vines, and many deciduous trees. Imazapyr is absorbed by the leaves and through the root system, disrupting amino acid biosynthesis. Effects may not be seen for two weeks. Complete plant kill may take several weeks. Imazapyr is a WSSA Group 2 herbicide. It can be used in ground broadcast, spot and localized, cut stump, frill and girdle,

and tree injection applications at 0.5 to 1.5 lbs active ingredient per acre per year not to exceed 1.5 lbs per acre per year. The imazapyr formulation of Arsenal® herbicide is registered for use in non-crop sites for selective and total weed control.

Metsulfuron methyl is used for the control of brush and certain woody plants, annual and perennial broadleaf weeds, and annual grasses. Metsulfuron methyl is absorbed through the roots and foliage and inhibits cell division in the roots and shoots. Metsulfuron methyl is a WSSA Group 2 herbicide. Application should be made before or during active growth periods at a rate of 0.33 to 2.0 ounces per acre.

Sulfometuron methyl is a non-selective herbicide used primarily to control broadleaf weeds and grasses. Its primary use is for noxious weed control. Sulfometuron methyl is WSSA Group 2 herbicide. Application rates for most plants range from 0.023 to 0.38 ounces per acre.

Treatment of an invasive plant site may include one or more of the following treatment methods: Stem injection; squirt with backpack or hand-held sprayers, squirt bottles, wicking or wiping. Application with sprayers mounted on or towed by trucks is not proposed. A combination of treatments may occur to achieve effective control or eradication of an invasive plant species at many sites. All herbicide applications will comply with label instructions, and may be further restricted as stated below. Treatment methods were selected due to their low potential for adversely affecting aquatic species, while facilitating riparian restoration through invasive plant control. Herbicides were selected due to their low toxicity to aquatic species and application methods were selected for their low potential for contaminating soils, thereby minimizing the risk of herbicides leaching to streams. Methods, tools, and project design criteria are summarized in Table 1, and subsequently discussed in more detail.

Table 1: Summary of methods, tools, and conservation measures for invasive plant treatment

Methods	Tools	Conservation Measures
Manual & Mechanical Treatment	Various tools listed below	- Minimize work from channel - Minimize ground disturbance - All methods allowed to bankfull of perennial streams, and in intermittent/ephemeral streams - Hand pulling allowed to emergent plants
Hand pulling	Non-motorized tools (weed wrenches, etc)	
Seed clipping	String trimmer or hand-held blade	- Transport only daily fuel supply for chainsaws and string trimmers to project site - Do not fuel chainsaws and string trimmers within 100 feet of water
Stabbing	Shovel, hoe, or similar hand tool	
Girdling	Chainsaw, axe, or similar hand-held tool.	
Cutting	String trimmer or hand-held blade	
Solarization	Plastic, geotextile, cardboard, or similar ground cover material	
Herbicide Treatment	Selective application techniques for clopyralid, aquatic labeled glyphosate, imazapyr (aquatic and non-aquatic labeled), metsulfuron methyl, sulfometuron methyl	- Only daily quantities of herbicide transported to project site - Do not apply herbicides if rain is predicted within 24 hours - Emergent treatment restricted to knotweed with aquatic labeled glyphosate - No treatment of submerged aquatic plants - Spill prevention, cleaning, and storage requirements

		- Use only LI 700, Agri-Dex, or an equivalent when adding surfactants to formulations
Stem injection	Appropriate syringes/injectors	- Knotweed applicators will be familiar with appropriate methods - Knotweed injection will use only aquatic labeled glyphosate (up to 100 percent concentration) - Emergent knotweed stems > 0.75 inches will be injected
Cut-stump and Hack & squirt	Backpack or hand-held sprayers, squirt bottles, and wiping applicators (brush, fabric, etc) Axe, hatchet, machete, drill, chainsaw, or other hand-held tool. Squirt bottles, backpack sprayer, or other hand-held spray bottle. Also tree injector and pellet gun.	- Herbicides to be used are imazapyr, metsulfuron methyl, and glyphosate - Application with aquatic glyphosate and aquatic imazapyr allowed to water's edge, and bankfull level for metsulfuron methyl, non-aquatic imazapyr
Wicking, wiping	Sponge, wick, or similar absorbent material	- Herbicides to be used are clopyralid, aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl - Application with aquatic glyphosate and aquatic imazapyr allowed to water's edge, and to bankfull level for clopyralid, and sulfometuron methyl
Spot spray	Backpack, hand-pumped, or hand-held spray bottles	- Herbicides to be used are clopyralid, aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl - Spray of aquatic glyphosate, metsulfuron, and sulfometuron allowed to bankfull level. Hand-held spray application (no backpack spray) of aquatic glyphosate, imazapyr metsulfuron, and sulfometuron allowed within intermittent or ephemeral channels - No spray of clopyralid within 15 feet of perennial (flowing water in summer) stream bankfull level. - No spray of clopyralid in intermittent/ephemeral streams - Hand-held spray application (no backpack spray) of aquatic glyphosate and aquatic imazapyr to 15 feet of waters' edge in perennial channels - Drift minimized by 200-800 µm droplet size, and wind speeds consistent with label or local agency requirements, whichever is less
Biological Control	Insects, parasites, or pathogens	- State and U.S. Animal & Plant Health Inspections Service approved - Agents with direct adverse effects to non-target organisms not used
Site Restoration		
Site preparation	Rakes, shovels, hoes, and similar non-motorized hand tools.	- Minimize ground disturbance by clearing only area necessary for effective planting
Planting & seeding	Rakes, shovels, hoes, and similar non-motorized hand tools.	

1. Manual and Mechanical
    a. Hand Pulling – Uprooting is performed either by hand or using hand (non-motorized) tools. Generally appropriate for non-rhizome forming, tap-rooted species or species which produce only from seed. Treatment occurs when plant growth stage and soil conditions allow, and prior to seed-set for annual species. Hand pulling of emergent invasive plants is included.
    b. Seed Clipping – Seed heads are cut, bagged, and removed from the area. The remainder of plant is left intact, but is likely to be treated with another method.

c. Stabbing – Some invasive plants can be severely weakened or killed by severing or injuring the carbohydrate storage structure at the base of the plant. Depending on species, this structure may be a root corm, storage rhizome, or taproot. Can be accomplished with shovel, hoe, or similar hand tool.
d. Girdling – A strip of bark is removed around the base of susceptible woody species. The vascular cambium, or inner bark, which translocates carbohydrates between roots and leaves, is removed
e. Cutting – Removal of the above-ground portion of an invasive plant by cutting with chainsaw, handsaw, pruning shears, or similar hand held device. Also includes mowing or cutting with a string-trimmer type machine, which does not have wheels or contact the ground.
f. Solar deprevation (ground cover) – Invasive plant infestations may be covered with plastic, geotextile, cardboard, or other ground cover material to kill the plant and roots, or reduce plant vigor prior to treatment with another method.

2. Herbicide Treatments
    a. Do not apply herbicides in areas where listed plants may be present. Botanical surveys must be conducted in locations that could support listed plants before any vegetation treatment (including manual and mechanical) is conducted.
    b. Stem Injection – Stems of actively growing species are injected with herbicide, usually near the base of the plant.
    c. Cut-Stump – Herbicide is applied by spray, squirt, wicking, or wiping to the stump of a plant (usually a shrub or tree) shortly after the shoot or trunk is cut down.
    d. Wicking & Wiping – Use a sponge or wick to wipe herbicide onto foliage, stems, or trunk. Use of wicking and wiping method reduces the possibility affecting non-target plants.
    e. Spot Application – Herbicide is directly sprayed onto target plants only, and spraying of desirable, non-target vegetation is avoided. Includes backpack and hand-pumped spray or squirt bottles, which can target very small plants or parts of plants (foliage, stems, or trunk).
    f. Hack & Squirt – Woody species are cut using a saw or axe, or drilled; herbicide is then immediately applied to the cut with a backpack sprayer, squirt bottle, syringe, or similar equipment.
3. Biological Controls
    a. Biological control is the inoculation of an infestation site with insects, parasites, or pathogens that specifically target the invasive plant species of concern. Treatment of invasive plant infestations with biological controls is a gradual process requiring several years to reach full effectiveness. Subsequent treatment with other methods may also occur.
    b. Site preparation and competitive planting and seeding
        i. Invasive plant infestation sites treated using one or more of the above stated methods may be revegetated by planting cuttings, seedlings, or seeding.
        ii. Site preparation can involve removal of litter and duff layer suitable to allow proper soil to seed/root contact. This will be accomplished by scuffing or scalping micro-sites (generally less than 1 square meter) with hand tools within the larger planting/seeding site.

Method Specific Prescriptions

1. Manual and Mechanical Methods
    a. Minimize treating invasive plants on streambanks when listed aquatic species are present, or likely to be present.
    b. Use the least ground-disturbing method that results in effective invasive plant treatment.
2. Fuel handling
    a. Transport no more than a one day supply of fuel for chainsaws and string-trimmers into riparian areas.
    b. Fueling of chainsaws and string-trimmers will not occur within 100 feet of surface waters.
3. Herbicides General Criteria
    a. Only daily-use quantities of herbicides will be transported to the project site.
    b. Use only LI 700®, Agri-Dex®, or an equivalent when adding surfactants to formulations.
    c. Do not apply herbicides if precipitation is predicted within 24 hours.
    d. Only herbicide application methods for plants emergent from water are stem injection, wicking or wiping, and hand-held spray bottle application of glyphosate to knotweed. No application to submerged aquatic vegetation with any herbicide is included.
    e. Areas used for mixing herbicides will be placed where an accidental spill will not run into surface waters or result in groundwater contamination. Impervious material will be placed beneath mixing areas in such a manner as to contain any spills associated with mixing refilling.
    f. Equipment cleaning and storage and disposal of rinsates and containers will follow all applicable state and Federal laws.
4. Knotweed stem-injection
    a. Individuals will be familiar with proper glyphosate stem-injection methodology prior to treatment.
    b. Only aquatic glyphosate formulations will be used. The formulation can be used at up to 100 percent concentration for the stem injection method. The formulation will be diluted to 50 percent or less active ingredient when applied directly to fresh stem cuts using wicking or wiping, and up to the percentage allowed by label instructions when applied to foliage using low pressure hand-held spot spray applicators.
    c. Larger emergent knotweed can be treated with glyphosate by stem injection, and smaller emergent knotweed by wicking/wiping and spot spray with hand-held sprayers. Wicking or wiping and hand-held spray bottle application of glyphosate allowed to emergent knotweed plants less than 4 to 5 feet tall, and usually smaller.
    d. Emergent plants with stems over 0.75 inch in diameter will be treated by stem injection.
    e. Most knotweed patches are expected to have overland access. However, some sites may only be reached by water travel, either by wading or inflatable raft (or kayak). The following measures will be used to reduce the risk of a spill during water transport:

i. No more than 2.5 gallons of glyphosate will be transported per person or raft, and typically it will be one gallon or less.
ii. Glyphosate will be carried in 1 gallon or smaller plastic containers. The containers will be wrapped in plastic bags and then sealed in a dry-bag. If transported by water craft, the dry-bag will be secured to the watercraft.

5. Cut-stump and hack & squirt
   a. Herbicides to be used are imazapyr, metsulfuron methyl, and aquatic labeled glyphosate.
   b. Application with aquatic labeled glyphosate and aquatic labeled imazapyr allowed to waters' edge, and to bankfull level for metsulfuron methyl and imazapyr not labeled for aquatic use.
6. Wicking and wiping
   a. Herbicides to be used are clopyralid, aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl.
   b. For perennial streams, wicking and wiping application with aquatic labeled glyphosate and aquatic labeled imazapyr is allowed to waters' edge, and to bankfull level for clopyralid, imazapyr (not aquatic labeled), metsulfuron methyl, and sulfometuron methyl.
   c. For intermittent and ephemeral channels, clopyralid, aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl can be applied to all dry portions of the channel.
7. Spot application
   a. Herbicides to be used are clopyralid, aquatic glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl.
   b. Do not spot spray clopyralid within 15 feet of the bankfull level of perennial streams.
   c. Do not spot spray clopyralid within intermittent or ephemeral channels.
   d. Spot spray using aquatic labeled glyphosate and aquatic labeled imazapyr allowed to within 15 feet of the edge of water with hand-held, hand-pump spray or squirt bottles (no backpack sprayers).
   e. Spot spray using metsulfuron methyl, and sulfometuron methyl allowed to bankfull level of perennial streams with backpack sprayers, hand-pump sprayers, and squirt bottles.
   f. Spot spray of aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl within dry intermittent and ephemeral channels allowed only with hand-held, hand-pumped sprayers and squirt bottles (no backpack sprayers). Excluding backpack spot spray is a conservation measure intended to minimize overspray within channels, and subsequent "first flush" exposures to aquatic resources, while still allowing full efficacy of the treatment.
   g. For foliar backpack spray applications, use only low pressure sprayers producing droplet sizes between 200 and 800 microns to minimize drift.
   h. Backpack spray activities will only occur during conditions with low drift potential, defined as wind velocities greater than two and less than 10 mph, or as stated on herbicide label.
8. Biological Controls
   a. All biological controls used will be U.S. Animal and Plant Health Inspection Service and state approved.

b. Agents demonstrated to have direct negative effects on non-target organisms will not be released.

9. Site Preparation and Competitive Planting and Seeding
   a. Minimize ground disturbance by clearing only the area necessary for effective planting.
10. Extent of Treatment
   a. Within each sixth field Hydrologic Unit Code (HUC) containing listed aquatic species, no more than 10 percent of the total riparian area, measured as adjacent stream length, will be treated within any one year period. This includes 10 percent of flowing streams, and 10 percent of intermittent streams, measured separately.

Table 2 summarizes conservation measures to minimize effects of herbicide application to water quality.

Table 2: Summary of conservation measures to minimize effects to water quality and listed salmonids

Herbicide	Perennial/flowing channels		Dry intermittent and ephemeral channels, and ditches	
	Spot spray	Hand/select	Spot spray	Hand/select
Clopyralid	15 feet from bankfull	bankfull	Bankfull	allowed through channel/ditch
Glyphosate (aquatic)	[1]15 feet from edge of water	edge of water	allowed through channel/ditch	allowed through channel/ditch
Imazapyr	bankfull	bankfull	allowed through channel/ditch	allowed through channel/ditch
Imazapyr (aquatic)	15 feet from edge of water	edge of water	allowed through channel/ditch	allowed through channel/ditch
Metsulfuron methyl	bankfull	bankfull	allowed through channel/ditch	allowed through channel/ditch
Sulfometuron methyl	bankfull	bankfull	allowed through channel/ditch	allowed through channel/ditch

General Prescriptions for Herbicide Use

1. When consistent with label instructions, use water when diluting herbicides prior to application.
2. A spill cleanup kit will be available whenever herbicides are used, transported, or stored.
3. A certified/licensed pesticide applicator will oversee all herbicide application projects.
4. In riparian areas, use only surfactants or adjuvants that do not contain any ingredients on EPA's List 1 or 2, where listing indicates a chemical is of toxicological concern, or is potentially toxic with a high priority for testing

Excluded Activities

- Application with sprayers mounted on or towed by trucks is not proposed.
- Treatment of submerged aquatic plants is not proposed.

4. Prescriptions Specific to Bull Trout

BT1. In bull trout local population areas (spawning and early rearing areas), in-water work will only occur during the watershed-specific timing windows identified in Appendix C – WDFW's *Gold and Fish Pamphlet* (WDFW 1999) or more up-to-date, USFWS-approved information. For information on local population areas, refer to the "Key Habitat for Bull Trout Recovery" maps in the *Draft Recovery Plan for the Coastal-Puget Sound Distinct Population Segment of Bull Trout* or to Appendix D: Table 1.
BT2. Fish passage structures will not be installed and barriers will not be removed in locations where there are concerns for impacts to bull trout populations from exotic or non-native species.

BT3. In-water work will only occur during the timing windows identified in Appendix C, when the in-water restoration activity occurs in the following water bodies: the Duwamish Waterway, Lake Union and the Ship Canal, Lake Washington, Sammamish Basin, Columbia River Mainstem or in marine nearshore and estuarine areas.

5. Prescriptions Specific to Non-Fish Species

The proposed action includes activity or species-specific (or both) measures and practices relating to effects of restoration actions on several terrestrial plant and animal species managed by the USFWS. These measures were designed to ensure that the underlying restoration activities will have either no affect or will be unlikely to adversely affect those species such that those species need not be addressed in formal consultation. The relevant effect determinations for those species are addressed by letter of concurrence under separate cover. This document lists those species and describes the protective measures and practices in Appendix F, below.

<u>Implementation Process</u>

1. For each project carried-out under this restoration program, the applicant will fill out a SPIF and submit to the COE.
2. The COE will review each project to ensure that the project meets the description and any other criteria of the proposed activity category such that any adverse effects to ESA-listed species and their designated critical habitats are within the range of effects considered in the Opinion.
3. If the COE determines that the proposed action does not quite meet all of the criteria outlined in the action categories, but all adverse effects to ESA-listed species and their designated critical habitats are within the range of effects considered in the Opinion, the COE will inform the Services about the exception in a Memorandum to the Services and provide rationale for how the action meets the intent and results of the of the restoration activity as described for this programmatic consultation. If the Services disagree with the COE determination, the project will need to go through individual consultation.
4. The COE will forward all SPIFs and copies of necessary project plans (*i.e.*, pollution and erosion control, temporary access routes, and stormwater management), to the appropriate NMFS and USFWS field offices for review.
5. The Services will review and approve a SPIF electronically, if warranted, within 30 days.

6. After project completion the applicant will report required sediment monitoring data (extent and duration of plume) to the COE.
7. The COE will prepare an annual monitoring report by evolutionary significant unit (ESU) or Interim Recovery Unit (IRU) for take tracking purposes. The monitoring report will include:
    a. The number of permits that were issued under each of the nine action categories.
    b. Projects/SPIF that were approved with minor deviations.
    c. The sum of all project extents (stream miles effected) by watershed.
    d. The turbidity monitoring data.
    e. A list of problems encountered and solutions.
8. The COE and the Services will conduct an annual coordination meeting to discuss the annual monitoring report and any actions that could improve conservation or make the program more efficient or more accountable.