

BIG SPRINGS ENHANCEMENT PROJECT
BIG SPRINGS CREEK, LEMHI COUNTY, IDAHO
PREFINAL (80% DESIGN) DRAWINGS

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SHEET INDEX

| # | NAME |
|----|---------------------------------|
| 1 | COVER SHEET |
| 2 | GENERAL NOTES-1 |
| 3 | GENERAL NOTES-2 |
| 4 | GENERAL NOTES-3 |
| 5 | HIP III CONSERVATION MEASURES-1 |
| 6 | HIP III CONSERVATION MEASURES-2 |
| 7 | HIP III CONSERVATION MEASURES-3 |
| 8 | EXISTING CONDITIONS |
| 9 | ACCESS AND STAGING |
| 10 | DEWATERING OVERVIEW |
| 11 | DEWATERING ZONE 1 |
| 12 | DEWATERING ZONE 2 |
| 13 | DEWATERING DETAILS |
| 14 | PROPOSED CONDITIONS |
| 15 | CUT/FILL |
| 16 | QUANTITIES-1 |
| 17 | QUANTITIES-2 |
| 18 | GRADING PLAN-1 |
| 19 | GRADING PLAN-2 |
| 20 | GRADING PLAN-3 |
| 21 | CHANNEL PLAN AND PROFILE - 1 |
| 22 | CHANNEL PLAN AND PROFILE - 2 |
| 23 | CHANNEL PLAN AND PROFILE - 3 |
| 24 | CHANNEL PLAN AND PROFILE - 4 |
| 25 | CHANNEL PLAN AND PROFILE - 5 |
| 26 | CHANNEL PLAN AND PROFILE - 6 |
| 27 | CHANNEL PLAN AND PROFILE - 7 |
| 28 | CHANNEL PLAN AND PROFILE - 8 |
| 29 | CHANNEL PLAN AND PROFILE - 9 |
| 30 | CHANNEL PLAN AND PROFILE - 10 |
| 31 | CHANNEL PLAN AND PROFILE - 11 |
| 32 | CHANNEL SECTIONS-1 |
| 33 | CHANNEL SECTIONS-2 |
| 34 | CHANNEL SECTIONS-3 |
| 35 | CHANNEL SECTIONS-4 |
| 36 | CHANNEL SECTIONS-5 |
| 37 | CHANNEL SECTIONS-6 |
| 38 | CHANNEL SECTIONS-7 |
| 39 | CHANNEL SECTIONS-8 |
| 40 | CHANNEL SECTIONS-9 |
| 41 | BANK TREATMENT DETAILS |
| 42 | PLWWF & WILLOW CLUMP DETAILS |
| 43 | PLANTING PLAN |
| 44 | PLANTING NOTES |

PROJECT GOAL:

Improve bank, channel and riparian conditions to address shade and habitat in areas where existing channel geometry and riparian vegetation is impaired.

PROJECT OBJECTIVES:

- Maximize short-term and long-term riparian and shade conditions to address established shade targets
- Reduce the channel width to a more appropriate geometry (Big Springs Creek ~15 feet)
- Improve thermal refuge by increasing the frequency and magnitude of self-maintaining pools

DESIGN COMPONENTS:

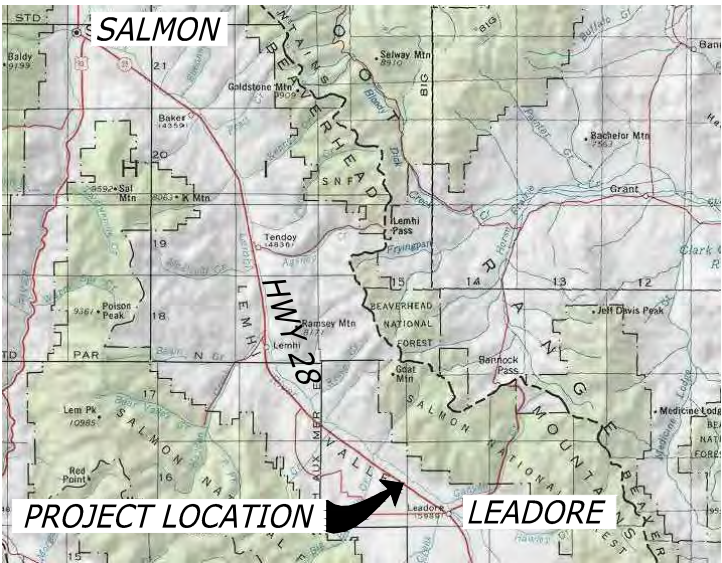
- Relocate stream segments to utilize existing mature riparian vegetation where feasible and appropriate to create immediate increases in shade conditions.
- Excavate pools and force tight constrictions to narrow and deepen the channel.
- Create constrictions and/or place structure allowing the channel to maintain excavated pools.

GENERAL NOTES:

- Project coordinate system is NAD83 Idaho State Planes, Central Zone, US Foot (ID83-CF).
- Topographic mapping within stream banks of the project area is based on ground surveys performed by Rio ASE and IMA. Topographic information outside of the stream banks is based on 2010 LiDAR (Reclamation).
- Existing underground utility locations have not been completely identified and may not be shown on these plans. The contractor is responsible to locate utilities prior to construction and protect utilities during construction. The telephone number for the Idaho utilities underground location center is 800-342-1585.
- Access to the project site is from Highway 28, 2.5 miles northwest of Leadore, ID (Hwy 29 and Hwy 28 intersection), and from there as shown on the Drawings.
- Aerial photography - 2010 LiDAR and BING, 2010.

SITE SUMMARY:

T.17N, R.26E, SEC.19
LEMHI COUNTY, ID
LAT/LONG - 44°42'12" N 113°23'50" W



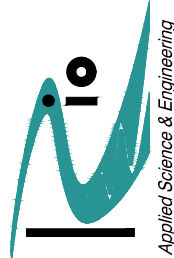
Lemhi



Regional
LAND TRUST



Upper Salmon Basin
WATERSHED PROGRAM



Big Springs Enhancement Project
Prefinal (80% Design) Drawings
for the Lemhi Regional Land Trust
Big Springs Creek, Lemhi County, Idaho
Project: 014-101-001-01

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CONSTRUCTION

Date: 06/10/17
Designed: JLF
Drawn: JLF
Checked: JY/KS/BPA
Approved: LRLT

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1

Sheet 1 of 44

DESCRIPTION OF WORK

- ## PROJECT ROLES

- ## GENERAL CONSTRUCTION SEQUENCE


- ## WORK SCHEDULE

- LOCATION**

- ## USE OF SITE

CONTRACTORS USE OF PREMISES

- ## EQUIPMENT

- 
- Applied Science & Engineering



**INTERMOUNTAIN
AQUATICS INC.**
ENVIRONMENTAL CONSULTING & HABITAT RESTORATION

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2

Sheet 2 of 44

SPECIAL PROCEDURES

IN-STREAM WORK

- In-stream work is allowed in Big Springs Creek for this project based on the in-water work modification dates obtained from the Contracting Agency as specified in the permit documents.
- Idaho Department of Environmental Quality and HIP III turbidity criteria shall be strictly adhered to while completing all instream work. (See ection 3.2 Turbidity Monitoring)
- Cofferdams, flow diversion structures and bypass channels shall be installed at all locations indicated on the Drawings or at locations shown on the approved “Cofferdam and Flow Diversion Plan.” Some aspects of the project may not require the use of a cofferdam to complete the work.
- Dewatering within cofferdams shall be performed to the extent necessary to construct the project as shown on these plans, as determined by the contractor. Dewatering shall be performed as necessary by the Contractor to maintain a work area at the location of large wood structure construction activities such that water is no deeper than the diameter of the log(s) on the lowest layer of the structure, and at the location of channel construction activities such that water is shallow enough to allow the Contracting Officer to easily inspect finished elevations of the work. Discharge from dewatering within specific work areas shall be routed to floodplain areas so as to allow the removal of fine sediments or other contaminants prior to reentering the river. All pumps used by the contractor for dewatering shall have screened intakes that meet Idaho Fish and Game specifications and National Marine Fisheries Service Anadromous Salmonid Passage Facility Design Criteria (NMFS, 2011).

TURBIDITY MONITORING

- Turbidity monitoring is required as part of this project and shall be completed by the Contractor in accordance with Idaho DEQ and HIP III Conservation Measures. The Contractor shall comply with all requirements for turbidity as set forth in the permit documents and follow the protocols outlined below.
 - Take a background turbidity sample using a recently-calibrated turbidimeter in accordance with manufacturer's instructions, or measure turbidity with a visual turbidity observation (Figure 1). Turbidity should be measured every 2 hours while in-water work is being implemented or more often if sediment disturbance varies greatly. Turbidity does not need to be monitored when working in the dewatered sections unless a visible plume is evident. The background samples should be taken at a relatively undisturbed location approximately 100 feet upstream from the project area. Record the observation, location (latitude/longitude), and time before monitoring at the downstream point, known as the measurement compliance point.
 - Take a second sample, immediately after each upstream sample, at the measurement compliance point, approximately 100 feet downstream from the project area. Record the downstream observation, location, and time.
 - Compare the upstream and downstream samples. If observed or measured turbidity downstream is more than upstream observation or measurement (> 10%), the activity must be modified to reduce turbidity. If visual estimates are used, an obvious difference between upstream and downstream observations shall bear the assumption of a (> 10%) difference. Mark “Yes” or “No” on your datasheet. Continue to monitor every 2 hours as long as instream activity continues.
 - If exceedances occur for more than two consecutive monitoring intervals (after 4 hours), the activity must stop until the turbidity level returns to background, and the EC lead must be notified within 48 hours. The EC lead shall document the reasons for the exceedance and corrective measures taken then notify the local NMFS branch chief and/or USFWS field supervisor and seek recommendations.
 - If at any time, monitoring, inspections, or observations show that the turbidity controls are ineffective, immediately mobilize work crews to repair, replace, or reinforce controls as necessary.
 - Any exceedance of the turbidity standard must be reported to the Idaho Falls DEQ regional office within 24 hours. Copies of turbidity monitoring records or logs must be available to DEQ upon request. The log must include background measurements (in NTUs); down-current measurements, comparison of background and down-current monitoring as a numeric value (in NTUs), and latitude/longitude, time and date for each sampling event. Monitoring records or logs must describe all exceedances and subsequent actions taken to correct the violations, including monitoring and the effectiveness of the action(s) taken.

TEMPORARY UTILITIES

TEMPORARY ELECTRIC

- Electric power is not available at the site.
- If temporary power is necessary to operate pumps, Contractor shall provide all generators, and other electrical equipment and facilities for obtaining and distributing power on the site.
- All generators shall be placed outside of the ordinary high water line with appropriate spill prevention and containment measures.

TEMPORARY WATER

- Potable water is not available to the Contractor at the site. The Contractor shall be responsible for supplying potable water for all employees at the site.
- The Contractor may use water from Big Springs for dust control, if a temporary water right has been obtained for dust abatement.

TEMPORARY SANITATION FACILITIES

- Contractor shall provide and maintain temporary sanitation facilities (e.g., “port-a-potties”) for use by the construction and observation crews for the duration of the construction and revegetation activities.

TEMPORARY FIRST AID FACILITIES

- Contractor shall provide first aid equipment and supplies onsite for employees.
- Contractor shall have an emergency action plan and instruct employees what to do in case of a workplace injury.
- Contractor shall review the plan with each employee and have the plan available onsite at all times.

TEMPORARY FIRE PROTECTION

- The Contractor shall conduct operations in a manner that is fire-safe for the work area and adjacent areas. Proper fire extinguishers shall be installed on all equipment and maintained by the Contractor. The premise shall be maintained clear of rubbish, debris, or other material constituting a potential fire hazard.
- Where significant or continued noncompliance with fire safety is noted, the Contracting Officer reserves the right to stop the work at no extra cost due to extension of time pending remedial action. Furthermore, the Contractor shall be responsible for, and reimburse the Sponsor as appropriate, any fines or penalties levied by the Fire District.

TEMPORARY FUEL STORAGE

- All stationary temporary fuel storage shall be located in the Construction Staging Area.
- Fuel storage vessels shall be inspected prior to site delivery for leaks or damage. Leaky storage tanks will not be permitted on site.
- Secondary containment will be required for all on site fuel storage vessels. Secondary containment structures will provide storage capacity in the amount of 110% of the volume of the largest primary container stored within.
- At the conclusion of project construction, any leaked fuel or contaminated rainwater within the secondary containment structure will be properly collected and legally disposed of at an offsite location.

ACCESS AND STAGING

REGULATORY REQUIREMENTS

- The Contractor must comply with applicable local regulations for haul routes over public highways, roads, or bridges. The Contractor must investigate the condition of available public and private roads for clearances, restrictions, bridge-load limits, bond requirements, and other limitations that affect or may affect access and transportation operations to and from the site.
- Contractor must meet jurisdictional conditions for use of existing roadways and haul routes; including seasonal or other limitations or restrictions, payment of excess size and weight fees, and posting of bonds conditioned upon repair of damage.

SITE CONDITIONS

- Access to the site is limited and the Contractor shall only use equipment access, haul routes, parking and staging areas shown on the Drawings.
- There is an existing bridge crossing Big Springs Creek. The Contractor will be responsible for assessing the condition and load bearing capacity of the existing structure to determine if it is sufficient for site access. The Contractor is responsible for any structural damages and/or upgrades or modifications to the existing crossing to safely access the site.
- Unavailability of transportation facilities or limitations thereon shall not become a basis for claims for damages or extension of time for completion of work.

TEMPORARY ACCESS AND DEWATERING ROADS

- Access Roads:
 - All temporary access roads are depicted in the Drawings. Contractor may not deviate from these locations without prior approval from the Contracting Officer.
 - Establish access road for access from public roads to the work area, of a width and load-bearing capacity to provide unimpeded traffic for construction purposes.
 - Wetlands shall be protected wherever access roads traverse wetland communities and shall be restored to their original grade and condition. Protect wetlands by stripping wetland sod and stock piling adjacent to the access road. If the Contractor determines that the access route will become too rutted out to restore original grades, lay down non-woven geo-textile road fabric and a minimum of 1' of wood chips (aka. Hog fuel). All materials used to protect wetlands shall be removed at project completion and wetland areas returned to pre-existing conditions. Wood chips may be distributed throughout upland disturbed areas and all fabric shall be disposed of by the Contractor.
 - Minimize soil disturbance along all access routes .
- Maintain roadways, temporary staging, storage areas and temporary access roads in a sound, reasonably serviceable condition until completion and acceptance of all work under this contract.
- All access routes shall be restored to their original condition.



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NOTES - 2

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3

Sheet 3 of 44

ACCESS AND STAGING CONTINUED...

4. Temporary Bridge & Stream Crossing
- a) All work along Big Springs Creek shall be accessed via two temporary bridges crossing the excavated bypass channels.

b) Contractor shall submit a temporary bridge plan detailing means and methods for placement of two temporary bridges at the locations identified on the Drawings. The plan shall detail construction materials used for temporary abutments (such as ecology blocks), no piers will be allowed. No crossings of the active channel shall be required for the installation and placement of the two proposed bridges.

c) Contractor shall furnish a structurally sound bridge for the temporary crossing. The bridge shall have a minimum single span of 20 feet.

(1) The Contractor is solely responsible for supplying a structurally sound bridge including temporary abutments, structural support members, and bridge deck capable of supporting all equipment, machinery, and material deliveries that will cross the actively flowing river.

(2) The Contractor shall inspect and maintain the bridge and all associated components daily from the time of installation to the time of removal. The Contractor shall remove and replace any bridge components that become unfit or unsafe for use at no additional cost to the Contracting Agency.

d) Bridge shall have a minimum clearance of 1 foot from the 1.25-year water surface elevation (the 1.25-year WSE at the specified locations are called out on the drawings) to the low chord.

e) Temporary ramps shall be constructed as deemed necessary by the Contractor to safely access and utilize the bridge deck.

f) The bridge shall be removed immediately following completion and final inspection.

FENCES & GATES

1. The Contractor is responsible for protecting existing fences and gates in the project area.
2. Property Owner require that gates remain closed and fence lines secure and operational throughout the construction period.
3. The Contractor may only remove sections of fencing or gates necessary for completion of the project and that are approved by the Contracting Officer. All sections removed shall be repaired or replaced with equal or better material in their original locations or in a location as directed by the Contracting Officer at no extra cost to the Sponsor.

CONSTRUCTION STAGING AREA

1. Contractor shall park all equipment, vehicles, materials, fuel, portable sanitation facilities, etc. on the sod in the construction staging area, do not strip.
2. All equipment and vehicles shall be stored in the staging area nightly.
3. To prep the staging area for seeding, Contractor shall disc the staging area to address compaction and prep the seed bed by removing all stones and dirt clods greater than 2”.

BORROW SOURCES

1. Contractor shall strip the sod and topsoil layer (5”-10”) within the borrow source areas and stock pile for reclamation. To reclaim, Contractor shall top dress the borrow areas with stockpiled topsoil and then sod. If deemed necessary, Contractor shall disc the Borrow Source to prep the seed bed and remove all stones and dirt clods greater than 2”.

TEMPORARY ENVIRONMENTAL CONTROLS

REGULATORY REQUIREMENTS

1. Contractor shall be responsible for compliance with all Federal, State, and local laws and regulations and shall be expected to maintain copies of all required permits on site for inspection and review.
2. Contractor shall conform to most stringent requirement in cases of conflict between specifications and regulatory requirements.
3. Contracting Officer may stop any construction activity in violation of Federal, State, or local laws and additional expenses resulting from work stoppage will be responsibility of Contractor.
4. Contractor will be responsible for producing implementing, adhering to, and maintaining a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the regulations and guidelines set forth and subject to approval by the State of Idaho.

DUST CONTROL

1. Contractor shall provide all labor, equipment, and materials to control dust on all access roads several times per day to prevent dust nuisance or damage to persons, property, or activities, including, but not limited to crops, orchards, cultivated fields, wildlife habitats, dwellings and residences, agricultural activities, recreational activities, traffic, and similar conditions.
2. Contractor shall be responsible for damages resulting from dust originating from Contractor operations.

AIR POLLUTION CONTROL

1. Utilize reasonably available methods and devices to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.
2. Do not operate equipment and vehicles that show excessive exhaust gas emissions until corrective repairs or adjustments reduce such emissions to acceptable levels.

NOISE CONTROL

1. Do not exceed 80 decibels (daytime), as measured at noise-sensitive areas such as residences and schools during the hours of 7:00 a.m. to 7:00 p.m. Do not exceed noise levels of 65 decibels (nighttime) during the hours of 7:00 p.m. to 7:00 a.m.
2. Provide specialty mufflers for continuously running generators, pumps, and other stationary equipment to meet the decibel requirements above.
3. Compression brakes are not allowed.
4. Perform operations producing high-intensity impact noise only weekdays during the hours of 7:00 a.m. to 7:00 p.m.

WATER POLLUTION CONTROL

1. Perform construction activities by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes into streams, flowing or dry watercourses, lakes, wetlands, reservoirs, or underground water sources. Such pollutants and wastes include, but are not restricted to refuse, garbage, cement, sanitary waste, industrial waste, hazardous materials, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution.

SURVEYING

1. Initial construction staking will be provided by the Sponsor. The Contractor shall provide all additional surveying tasks necessary for construction. This includes, but is not limited to: locate survey control and reference points, establish horizontal and vertical control, place grading stakes, identify and stake the channel centerline, identify all major and minor work components, and periodically verify locations and elevations of all construction items. AutoCAD files for the design are available upon request.
2. Contractor shall be responsible for reporting any elevation or horizontal discrepancies to the Contracting Officer for clarification. Minor adjustments to suit field conditions are anticipated, and it shall be the responsibility of the Engineer to make decisions regarding these adjustments.
3. Topographic survey is provided by the Sponsor and shown on the Drawings. An electronic version of the topographic survey information, in AutoCAD format, is available to the Contractor upon request. The Drawings reflect LiDAR and survey data collected in October 2016 but do not include all utilities, surface features, structures, and other items that may be encountered at the Project Site. It is the Contractor's responsibility to check existing conditions prior to bidding or commencing work.
4. Control points identified on the Drawings shall be used for all ties to spatial and elevation data listed in the Drawings.
5. All dimensions on the drawings are in units of feet and decimals, unless otherwise specified.

RECORD DRAWINGS AND FINAL SITE REVIEW

GENERAL

1. Throughout the progress of the Work, maintain an accurate record of changes in the Contract Documents.
2. Prior to commencing demobilization, the Contractor shall review all construction elements with the Contracting Officer, who will give approval or provide a written list of final items to be corrected.
3. Final site review approval is contingent on the successful completion of: construction of design elements, cleaning of the site, removal of all construction access roads, ruts and staging areas, restoration of areas disturbed by construction activities, and other tasks as outlined in these specifications and on the Drawings.

RECORD DOCUMENTS

1. Contractor's set: Secure from the Contracting Agency one complete set of Contract Documents for use as the Contractor's Set of Record Documents. Label immediately as “RECORD DOCUMENTS-CONTRACTOR'S SET.” Use this set to record all changes in the Work as they occur on a daily basis.
2. Maintain the Contractor's set of Record Documents protected from deterioration and from loss and damage until completion of the Work. In the event of loss or damage use whatever means necessary to again secure and record the data.
3. At project completion verify the accuracy and completeness of the Contractor's set and submit Record Documents to the Contracting Officer.

FINAL CLEANUP

1. Complete the following cleanup tasks before requesting inspection for completion for the entire Project or a portion of the Project.

a) Clean the Project Site and grounds in areas disturbed by construction activities of rubbish, waste materials, litter, and foreign substances. Remove all waste from the property, do not burn, bury, or otherwise dispose of trash on the project site.

b) Remove construction equipment, tools, machinery, and surplus material from the site. Where extra materials of value remain after completion, coordinate with the Contracting Officer on where to leave them on the project site.

c) Prepare all areas disturbed by construction activities that are above ordinary high water for seeding specifications outlined in this document.

d) Leftover woody material, wood and other native organics may be broken and broadcast over the restored area as approved by the Contracting Officer.

e) Contracting Officer shall provide final approval of site cleanup prior to demobilization.



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NOTES - 3

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4

Sheet 4 of 44

Work Area Isolation & Fish Salvage

Any work area within the wetted channel will be isolated from the active stream whenever ESA listed fish are reasonably certain to be present, or if the work area is less than 300-feet upstream from known spawning habitats. Work area isolation & fish salvage activities are considered incidental to construction-related activities and shall occur during the state-recommended in-water work windows. When work area isolation is required, design plans will include all isolation elements, fish release areas, and, when a pump is used to dewater the isolation area and fish are present, a fish screen that meets NMFS's fish screen criteria (NMFS 2011, or most current). Work area isolation and fish capture activities will occur during periods of the coolest air and water temperatures possible, normally early in the morning versus late in the day, and during conditions appropriate to minimize stress and death of species present.

- National Marine Fisheries Service. 2011. Anadromous Slmonid Passage Facility Design. Northwest Region. Available online at:
<http://www.nwr.noaa.gov/salmon-hydropower/ferc/upload/fish-passage-design.pdf>

For salvage operations in known bull trout spawning and rearing habitat, electrofishing shall only occur from May 1 to July 31. No electrofishing will occur in any bull trout occupied habitat after August 15. Bull trout are very temperature sensitive and generally should not be electrofished or otherwise handled when temperatures exceed 15 degrees Celsius. Salvage activities should take place during periods of the coolest air and water temperatures possible, normally early in the morning versus late in the day, and during conditions appropriate to minimize stress to fish species present.

Salvage operations will follow the ordering, methodologies, and conservation measures specified below in Steps 1 through 6. Steps 1 and 2 will be implemented for all projects where work area isolation is necessary according to conditions above. Electrofishing (Step 3) can be implemented to ensure all fish have been removed following Steps 1 and 2, or when other means of fish capture may not be feasible or effective. Dewatering and rewatering (Steps 4 and 5) will be implemented unless wetted instream work is deemed to be minimally harmful to fish, and is beneficial to other aquatic species. Dewatering will not be conducted in areas known to be occupied by lamprey, unless lampreys are salvaged using guidance set forth in USFWS 2010

- U.S. Fish and Wildlife Service. 2010. Best Management Practices to Minimize Adverse Effects to Pacific Lamprey. Available online at:
<http://www.fws.gov/pacific/fisheries/sphabcon/lamprey/pdf/best%20management%20practices%20for%20pacific%20lamprey%20april%202010%20version.pdf>

- Isolate.
 - Block nets will be installed at upstream and downstream locations and maintained in a secured position to exclude fish from entering the project area.
 - Block nets will be secured to the stream channel bed and banks until fish capture and transport activities are complete. Block nets may be left in place for the duration of the project to exclude fish.
 - If block nets remain in place more than one day, the nets will be monitored at least daily to ensure they are secured to the banks and free of organic accumulation. If the project is within bull trout spawning and rearing habitat, the block nets must be checked every 4 hours for fish impingement on the net. Less frequent intervals must be approved through a variance request.
 - Nets will be monitored hourly anytime there is instream disturbance.
- Salvage. As described below, fish trapped within the isolated work area will be captured to minimize the risk of injury, then released at a safe site:
 - Remove as many fish as possible prior to dewatering.
 - During dewatering, any remaining fish will be collected by hand or dip nets.
 - Seines with a mesh size to ensure capture of the residing ESA-listed fish will be used.
 - Minnow traps will be left in place overnight and used in conjunction with seining.
 - If buckets are used to transport fish:
 - The time fish are in a transport bucket will be limited, and will be released as quickly as possible;
 - The number of fish within a bucket will be limited based on size, and fish will be of relatively comparable size to minimize predation;
 - Aerators for buckets will be used or the bucket water will be frequently changed with cold clear water at 15 minute or more frequent intervals.

- Buckets will be kept in shaded areas or will be covered by a canopy in exposed areas.
 - Dead fish will not be stored in transport buckets but will be left on the streambank to avoid mortality counting errors.
 - As rapidly as possible (especially for temperature-sensitive bull trout), fish will be released in an area that provides adequate cover and flow refuge. Upstream release is generally preferred, but fish released downstream will be sufficiently outside of the influence of construction.
 - Salvage will be supervised by a qualified fisheries biologist experienced with work area isolation and competent to ensure the safe handling of all fish.
- Electrofishing. Electrofishing will be used only after other salvage methods have been employed or when other means of fish capture are determined to not be feasible or effective. If electrofishing will be used to capture fish for salvage, the salvage operation will be led by an experienced fisheries biologist and the following guidelines will be followed: the NMFS's electrofishing guidelines (NMFS 2000).
 - Initial Site Surveys and Equipment Settings
 - In order to avoid contact with spawning adults or active redds, researchers must conduct a careful visual survey of the area to be sampled before beginning electrofishing.
 - Prior to the start of sampling at a new location, water temperature and conductivity measurements shall be taken to evaluate electrofisher settings and adjustments. No electrofishing should occur when water temperatures are above 18°C or are expected to rise above this temperature prior to concl uding the electrofishing survey. In addition, studies by NMFS scientists indicate that no electrofishing should occur in California coastal basins when conductivity is above 350 µS/cm.
 - Whenever possible, a block net should be placed below the area being sampled to capture stunned fish that may drift downstream.
 - Equipment must be in good working condition and operators should go through the manufacturer's preseason checks, adhere to all provisions, and record major maintenance work in a logbook.
 - Each electrofishing session must start with all settings (voltage, pulse width, and pulse rate) set to the minimums needed to capture fish. These settings should be gradually increased only to the point where fish are immobilized and captured, and generally not allowed to exceed conductivity-based maxima. Only direct current (DC) or pulsed direct current (PDC) should be used.
 - If conductivity is less than 100 MS, voltage ranges from 900 to 1100 will be used.
 - For conductivity ranges between 100 to 300 MS, voltage ranges will be 500 to 800.
 - For conductivity greater than 300 MS, voltage will be less than 400.
 - Electrofishing Technique
 - Sampling should begin using straight DC. The power needs to remain on until the fish is netted when using straight DC. If fish capture is unsuccessful with initial low voltage, gradually increase voltage settings with straight DC.
 - If fish capture is not successful with the use of straight DC, then set the electrofisher to lower voltages with PDC. If fish capture is unsuccessful with low voltages, increase pulse width, voltage, and pulse frequency (duration, amplitude, and frequency).
 - Electrofishing should be performed in a manner that minimizes harm to the fish. Stream segments should be sampled systematically, moving the anode continuously in a herringbone pattern (where feasible) through the water. Care should be taken when fishing in areas with high fish concentrations, structure (e.g., wood, undercut banks) and in shallow waters where most backpack electrofishing for juvenile salmonids occurs. Voltage gradients may be high when electrodes are in shallow water where boundary layers (water surface and substrate) tend to intensify the electrical field.
 - Do not electrofish in one location for an extended period (e.g., undercut banks) and regularly check block nets for immobilized fish.
 - Fish should not make contact with the anode. The zone of potential injury for fish is 0.5 m from the anode.
 - Electrofishing crews should be generally observant of the condition of the fish and change or terminate sampling when experiencing problems with fish recovery time, banding, injury, mortality, or other indications of fish stress.
 - Netters should not allow the fish to remain in the electrical field any longer than necessary by removing stunned fish from the water immediately after netting.
 - Sample Processing and Recordkeeping

- Fish should be processed as soon as possible after capture to minimize stress. This may require a larger crew size.
 - All sampling procedures must have a protocol for protecting held fish. Samplers must be aware of the conditions in the containers holding fish; air pumps, water transfers, etc., should be used as necessary to maintain safe conditions. Also, large fish should be kept separate from smaller prey-sized fish to avoid predation during containment.
 - Use of an approved anesthetic can reduce fish stress and is recommended, particularly if additional handling of fish is required (e.g., length and weight measurements, scale samples, fin clips, tagging).
 - Fish should be handled properly (e.g., wetting measuring boards, not overcrowding fish in buckets, etc.).
 - Fish should be observed for general condition and injuries (e.g., increased recovery time, dark bands, visually observable spinal injuries). Each fish should be completely revived before releasing at the location of capture. A plan for achieving efficient return to appropriate habitat should be developed before each sampling session. Also, every attempt should be made to process and release ESA-listed specimens first.
 - Pertinent water quality (e.g., conductivity and temperature) and sampling notes (e.g., shocker settings, fish condition/injuries/mortalities) should be recorded in a logbook to improve technique and help train new operators. It is important to note that records of injuries or mortalities pertain to the entire electrofishing survey, including the fish sample work-up.
 - The anode will not intentionally contact fish.
 - Electrofishing shall not be conducted when the water conditions are turbid and visibility is poor. This condition may be experienced when the sampler cannot see the stream bottom in one foot of water.
 - If mortality or obvious injury (defined as dark bands on the body, spinal deformations, de-scaling of 25% or more of body, and torpidity or inability to maintain upright attitude after sufficient recovery time) occurs during electrofishing, operations will be immediately discontinued, machine settings, water temperature, and conductivity checked, and procedures adjusted or electrofishing postponed in order to reduce mortality.
- Dewater. Dewatering, when necessary, will be conducted over a sufficient period of time to allow species to naturally migrate out of the work area and will be limited to the shortest linear extent practicable.
 - Diversion around the construction site may be accomplished with a cofferdam and a by-pass culvert or pipe, or a lined, non-erodible diversion ditch. Where gravity feed is not possible, a pump may be used, but must be operated in such a way as to avoid repetitive dewatering and rewatering of the site. Impoundment behind the cofferdam must occur slowly through the transition, while constant flow is delivered to the downstream reaches.
 - All pumps will have fish screens to avoid juvenile fish impingement or entrainment, and will be operated in accordance with NMFS's current fish screen criteria (NMFS 2011 , or most recent version). If the pumping rate exceeds 3 cubic feet per second (cfs), a NMFS Hydro fish passage review will be necessary.
 - Dissipation of flow energy at the bypass outflow will be provided to prevent damage to riparian vegetation and/or stream channel.
 - Safe re-entry of fish into the stream channel will be provided, preferably into pool habitat with cover, if the diversion allows for downstream fish passage.
 - Seepage water will be pumped to a temporary storage and treatment site or into upland areas to allow water to percolate through soil or to filter through vegetation prior to reentering the stream channel.
 - Salvage Notice. Monitoring and recording of fish presence, handling, and mortality must occur for the duration of the isolation, salvage, electrofishing, dewatering, and rewatering operations. Once operations are completed, a salvage report will document procedures used, any fish injuries or deaths (including numbers of fish affected), and causes of any deaths.



Applied Science & Engineering



INTERMOUNTAIN
AQUATICS INC.
ENVIRONMENTAL CONSULTING • HABITAT RESTORATION

Big Springs Enhancement Project

Prefinal (80% Design) Drawings

for the Lemhi Regional Land Trust

Big Springs Creek, Lemhi County, Idaho

Project: 014-101-001-01

DRAFT-
NOT FOR
CONSTRUCTION

Date: 06/10/17

Designed: JLF

Drawn: JLF

Checked: JY/KS/BPA

Approved: LRLT

Drawing Name

HIP III

CONSERVATION
MEASURES - 2

Drawing No.

6

Sheet 6 of 44

Construction and Post-Construction Conservation Measures .

1. Fish passage. Fish passage will be provided for any adult or juvenile fish likely to be present in the project area during construction, unless passage did not exist before construction, or the stream is naturally impassable at the time of construction. If the provision of temporary fish passage during construction will increase negative effects on ESA-listed species or their habitat, a variance can be requested from the NMFS Branch Chief and the USFWS Field Office Supervisor. Pertinent information, such as the species affected, length of stream reach affected, proposed time for the passage barrier, and alternatives considered will be included in the variance request.
2. Construction and discharge water. a) Surface water may be diverted to meet construction needs, but only if developed sources are unavailable or inadequate. b) Diversions will not exceed 10% of the available flow. c) All construction discharge water will be collected and treated using the best available technology suitable for site conditions. d) Treatments to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present will be provided.
3. Minimize time and extent of disturbance. Earthwork (including drilling, excavation, dredging, filling and compacting) in which mechanized equipment is utilized instream channels, riparian areas, and wetlands will be completed as quickly as possible. Mechanized equipment will be used instreams only when project specialists believe that such actions are the only reasonable alternative for implementation, or would result in less sediment in the stream channel or damage (short- or long-term) to the overall aquatic and riparian ecosystem relative to other alternatives. To the extent feasible, mechanized equipment will work from the top of the bank, unless work from another location would result in less habitat disturbance.
4. Cessation of work. Project operations will cease under the following conditions: a) High flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage; b) When allowable water quality impacts, as defined by the state CWA section 401 water quality certification or HIP III Turbidity Monitoring Protocol, have been exceeded; or c) When "incidental take" limitations have been reached or exceeded.
5. Site restoration. When construction is complete: a) All streambanks, soils, and vegetation will be cleaned up and restored as necessary using stockpiled large wood, topsoil, and native channel material. b) All project-related waste will be removed. c) All temporary access roads, crossings, and staging areas will be obliterated. When necessary for revegetation and infiltration of water, compacted areas of soil will be loosened. All disturbed areas will be rehabilitated in a manner that results in similar or improved conditions relative to pre-project conditions. This will be achieved through redistribution of stockpiled materials, seeding, and/or planting with local native seed mixes or plants.
6. Revegetation. Long-term soil stabilization of disturbed sites will be accomplished with reestablishment of native vegetation using the following criteria: a) Planting and seeding will occur prior to or at the beginning of the first growing season after construction. b) An appropriate mix of species that will achieve establishment, shade, and erosion control objectives, preferably forb, grass, shrub, or tree species native to the project area or region and appropriate to the site will be used. c) Vegetation, such as willow, sedge and rush mats, will be salvaged from disturbed or abandoned floodplains, stream channels, or wetlands. d) Invasive species will not be used. e) Short-term stabilization measures may include the use of non-native sterile seed mix (when native seeds are not available), weed-free certified straw, jute matting, and other similar techniques. f) Surface fertilizer will not be applied within 50 feet of any stream channel, waterbody, or wetland. g) Fencing will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons. h) Re-establishment of vegetation in disturbed areas will achieve at least 70% of pre-project conditions within 3 years. i) Invasive plants will be removed or controlled until native plant species are well-established (typically 3 years post-construction).
7. Site access. The project sponsor will retain the right of reasonable access to the site in order to monitor the success of the project over its life.
8. Implementation monitoring. Project sponsor staff or their designated representative will provide implementation monitoring by filling out the Project Completion Form (PCF) to ensure compliance with the applicable BiOp, including: a) General conservation measures are adequately followed. b) Effects to listed species are not greater than predicted and incidental take limitations are not exceeded. c) Turbidity monitoring shall be conducted in accordance with the HIP III turbidity monitoring protocol and recorded in the PCF.
9. CWA section 401 water quality certification. The project sponsor or designated representative will complete and record water quality observations to ensure that in-water work is not degrading water quality. During construction, CWA section 401 water quality certification provisions provided by the Oregon Department of Environmental Quality, Washington Department of Ecology, or Idaho Department of Environmental Quality will be followed.

Staged Rewatering Plan.

- When appropriate, the project sponsor shall implement a staged rewatering plan for projects that involve introducing streamflow into recently excavated channels under the 2a) Improve Secondary Channel and Wetland Habitat Activity category or 2f) Channel Reconstruction categories.
- a. Pre-wash the newly-excavated channel before rewatering. Turbid wash water will be detained and pumped to the floodplain, rather than discharging to fish-bearing waters.
- b. Prepare new channel for water by installing seine at upstream end to prevent fish from moving downstream into new channel until 2/3 of total streamflow is available in that channel. Starting in the early morning, introduce 1/3 of the flow into the new channel over a period of 1-2 hours.
- c. Perform monitoring according to HIP III Turbidity Monitoring Protocol.
- i. If turbidity exceeds 10% of background, modify the activity to reduce turbidity. In this case, this may mean decreasing the amount of flow entering the new channel and/or correcting any other issues causing turbidity (e.g., correct a bank that is sloughing, install or correct a BMP, etc.).
- ii. Monitor every 2 hours as long as the instream activity is occurring.
- iii. If exceedances occur for more than 2 monitoring intervals in a row (4 hours), then the activity must stop until turbidity reaches background levels. This means that the contractor may have to plug off water supply to the new meander until turbidity is within acceptable levels.
- iv. Once turbidity is within 10% of background levels, move on to the next re-watering stage.
- d. Prepare to introduce the second 1/3 of the flow (up to a total of 2/3) to the new channel by installing seine at upstream end of old channel in order to prevent fish from moving into a partially-dewatered channel. Introduce the second 1/3 of the flow over the next 1-2 hours. Salvage fish from the old channel at this time, so that the old channel is fish-free before dropping below 1/3 of the flow. Note: the fish will be temporarily blocked from moving downstream into either channel until 2/3 of the flow has been transitioned to the new channel. This blockage to downstream fish passage is expected to persist for roughly 12 to 14 hours, but fish will still be able to volitionally move out of the channel in the downstream direction. Perform monitoring as in #3 above.
- e. After the second 1/3 of flow is introduced over 2 hours, and turbidity is within 10% of the background level, remove seine nets from the new channel, and allow fish to move downstream back into the channel.
- f. Introduce the final 1/3 of flow. Once 100% of the flow is in the new channel, install plug to block flow into the old channel and remove seines from the old channel.



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| Date: | 06/10/17 |
| Designed: | JJF |
| Drawn: | JJF |
| Checked: | JY/KS/BPA |
| Approved: | LRLT |
| Drawing Name | HIP III CONSERVATION MEASURES - 3 |
| Drawing No. | 7 |
| Sheet | 7 of 44 |