Request for Proposals for a Cultural Resource Inventory for the Sandy Creek Whole Watershed Restoration Project – Phase 1

Requested by:
Rushal Sedlemyer

Coquille Watershed Association
390 N. Central Blvd.
Coquille, OR 97423

Published January 28, 2022
Request for Proposals for a Cultural Resource Inventory for the Sandy Creek Whole Watershed Restoration Project – Phase 1

Bidders shall submit their proposal pursuant to the provisions of this solicitation as a single PDF document to: rsedlemyer@coquillewatershed.org

Subject line: Cultural Resource Inventory Sandy Creek Restoration

SOLICITATION CLOSING
March 15, 2022 at 4:00pm
(LATE PROPOSALS WILL NOT BE ACCEPTED)

Bidders are solely responsible for ensuring that the Coquille Watershed Association (CoqWA) receives the proposal. Bidders shall familiarize themselves with this entire RFP Document.

An optional pre-proposal site visit will be held on February 24, 2022
Meet at the CoqWA office at 10:00 am
390 N. Central Blvd Coquille, OR 97423
Group will drive separately to project site near Remote, OR
It is required to RSVP at least 48 hours before the site visit.

Tour will follow all Covid-19 guidelines and rules—one meeting outdoors, staying socially distanced, no carpooling permitted among different parties, and masks required if within 6ft of one another.

Call Rushal Sedlemyer at 541-294-0857 or email rsedlemyer@coquillewatershed.org to RSVP

All questions and comments about this solicitation shall be directed IN WRITING to Rushal Sedlemyer, CoqWA Restoration Project Manager
Email to: rsedlemyer@coquillewatershed.org
INVITATION TO BID

Notice is hereby given pursuant to this Request for Proposals (“RFP”) that sealed proposals (a “Proposal”) for the Sandy Creek Whole Watershed Restoration Project – Phase 1 (“Project”). The selected contractor will perform cultural resource background research and field inventories, and prepare a historic property identification report of the Sandy Creek Whole Watershed Restoration Project – Phase 1 Area of Potential Effect (APE). The report will satisfy the historic property identification set forth under Section 106 of the National Historic Preservation Act (NHPA) and the reporting requirements of the Oregon SHPO. The Contractor will initiate consultation on the Project undertaking with the Oregon State Historic Preservation Officer and affected Indian Tribes.

Work will start approximately March 28, 2022 and a draft report will be due April 25, 2022, with a final report submitted by May 27, 2022. Monitoring of sites during project implementation may be required.

The contract documents (including special provisions and specifications) are available online at www.coquillewatershed.org/contracting or requested via email: rsedlemyer@coquillewatershed.org. Those receiving this RFP who wish to submit a Proposal (in each case, a “Bidder”) shall furnish labor, materials and equipment necessary for completion of work in accordance with the specifications provided in the Proposal Prospectus.

Deadline: **March 15, 2022 by 4:00pm.** Proposals received after this date and time will not be considered. Proposals shall be emailed to the CoqWA Project Manager, Rushal Sedlemyer at: rsedlemyer@coquillewatershed.org

Subject line: Cultural Resource Inventory Sandy Creek Restoration

Included in this Request for Proposals (RFP) is:

**Exhibit A:** Proposal Prospectus that includes project background, scope of work, requirements for Bidders, and proposal instructions (required bid forms and the bid review rubric are included as separate documents)

**Exhibit B:** Project maps

**Exhibit C:** Additional photos

**Exhibit D:** Project specifications and example designs
EXHIBIT A: PROPOSAL PROSPECTUS

LOCATION: Sandy Creek is located near Remote, Oregon. From Coquille, turn left onto Hwy 42 and stay on Hwy 42 for 25 miles. Then turn left onto Sandy Creek Rd. just before the Sandy Creek Covered Bridge. Specific project locations are within:

- TWN 29 RNG 10 SECT 22
- TWN 29 RNG 10 SECT 14
- TWN 29 RNG 10 SECT 11
- TWN 29 RNG 10 SECT 2

OPTIONAL SITE TOUR: February 24, 2022. RSVP by February 22, 2022

PROPOSAL DEADLINE: March 15, 2022 at 4:00pm.

APPROXIMATE START: March 28, 2022

COMPLETE: May 27, 2022

MONITORING: Between the dates of July through September 2022 and July through September 2023

PROJECT BACKGROUND:
This project will restore channel complexity and floodplain connection in Sandy Creek, a 12,000-acre drainage to the Middle Fork Coquille River (MFCR) near Remote, OR in Coos County. The MFCR has the potential to provide year-round rearing habitat for coho and Chinook salmon, steelhead, coastal cutthroat trout, and Pacific lamprey but lack of spawning and rearing habitat in tributaries continues to be a critical watershed issue. Historically, Sandy Creek was clear-cut and subjected to stream cleaning. As a result, most of Sandy Creek and its major fish bearing tributaries have large sections of bedrock substrate, disconnected floodplains, lack sufficient large wood structures (LWD), and spawning gravel. To address these limiting factors, CoqWA, Coos Bay BLM, ODFW, Hancock Forest Management, Coos County Roads Dept., and a private landowner are working towards a shared goal of improving spawning and rearing habitat for native fish in the Sandy Creek Basin. Phase 1 project components include placing large wood and boulders in constructed formations into Sandy Creek in high priority reaches. Specifically, we propose a total of 42 sites for habitat enhancement in the mainstem of Sandy Creek and one tributary on BLM and private property. Log and boulder structures will be placed at 37 sites and 5 sites will be just log jams.

The contractor hired for project implementation will be responsible for harvesting 120 onsite BLM trees (see attached maps in Exhibit B for harvest locations) with rootwads attached and placing half instream on public land and half instream on private land. Harvesting trees sourced on BLM land will need to abide by federal guidelines. An estimated 35 trees can be tipped onsite in the Riparian

Proposal Prospectus & Instructions
Sandy Creek Whole Watershed Restoration Project – Coquille Watershed Association
Management Area (RMA), but will need clearance from the Oregon Department of Forestry (ODF). The implementation contractor will construct 33 log and boulder structures in the mainstem of Sandy Creek during the 2022 and 2023 in-water-work-period (IWWP). On average, these sites will need 9 logs each with at least 4 of these logs having rootwads. The mainstem sites will need between 12-15 boulders each within the 1.0-1.5 cy size range. Most of these sites will use excavator methods for log and boulder placements. One site on BLM will require use of cable yarding methods to pull over trees, move them downslope and install them into place. Two sites will need a mix of excavator and cable yarder and a few sites will need a mix of exactor and tree tipping methods.

The implementation contractor will also construct 9 log jams in a key tributary of Sandy Creek during the 2022 and 2023 IWWP. These sites include a mix of placing logs with an excavator, a tree puller where access is more challenging, and tipping trees in the nearby riparian area. These sites will need an average of 8 logs with at least 3 of these logs having rootwads. Four of these sites will need boulders with an average of 6 boulders for each site and at least 0.5 cy in size. The line puller will cause little disturbance since it will be used from the road. Any of the sites that utilize mechanized access routes will be decompacted after use, and seeded and mulched for erosion control.

**SCOPE OF WORK:**
The contractor will conduct NHPA Section 106 historic property identification and reporting for the Project.

**Period of Performance:** March 28, 2022 through May 27, 2022

This task order consists of archeological investigations including pedestrian survey and subsurface probing of multiple locations within T29S R10W Sections 22, 14, 11, and 2. The planned instream restoration project activity will occur on both private and federal lands that require investigations to determine the projects potential to affect cultural resources. This task order would involve some level of inventory and investigation for restoration locations that has not been formally surveyed. Restoration locations and a summary of proposed work will be provided, including GIS information. All pedestrian inventory, subsurface probing and results of excavation and evaluation will be summarized into one comprehensive report. Site monitoring and site records generated under this task order will be included as appendices to the report.

1) Prepare a cultural resource identification strategy of the Area of Potential Effect (APE):
Based on the nature and location of existing cultural resources in nearby analogous environmental settings and review of archaeological and historical documents pertinent to the APE, and consideration of the geomorphological processes that may affect the preservation and discoverability of cultural resources in the APE. Background research will include but is not limited to; Oregon SHPO database (OARRA), Cultural Resource Survey Reports, Comprehensive Plan Studies, published books, historical maps and journal articles, the National Register of Historic Places, and any county or local site inventory. This review will also include, when possible, information gathered from other professionals in the pertinent disciplines, vocational archaeologists and historians, and local residents of the...
project area in question. The Contractor is expected to possess a current and thorough knowledge of cultural resources projects and data syntheses relevant to understanding the types, character, densities, research importance, and integrity of cultural resource site types known/expected within the project area.

2) Survey for cultural resources in the APE: The APE of this Project will be the mechanized access routes for each site (42 sites in total). The level of disturbance will vary for each site depending on the large wood and boulder installation method. The APE is approximately 1.84 stream miles and disturbance at each site will be an average of 0.25 acres, estimating about 10.5 acres for the APE.

The survey will use appropriate techniques to locate, identify, inventory, record and map cultural, archaeological, and historic resources occurring in the project area according to Oregon SHPO standards. The intensity of field surveys will be keyed to ranked probability zones (high, medium, low) of possible cultural resources occurrence based on paleo-environmental data, the occurrence of known sites, historic development, land use patterns and other pertinent information. Surveys in these ranked zones will adhere to standards set forth in the guidelines promulgated by the Oregon SHPO and Section 106 of the National Historic Preservation Act.

High probability areas (HPAs) will be identified based on information collected during the background research related to where archaeological sites have previously been recorded within environmental settings similar to the APE, as well as a consideration of previous land-use and disturbance, and sedimentary and geomorphological processes.

All site and survey locations will be recorded by GPS and submitted as GIS files. In instances where surveys cannot be recorded by GPS, all survey areas will be drawn on a USGS Quad map at a scale appropriate to the size of the survey and digitized into a GIS. All submitted GIS shapefiles or feature classes shall contain completed tabular data and meet the Secretary of the Interior’s standards for historic preservation.

All cultural resources identified in the APE will be documented according to the Oregon SHPO standards. Artifacts located on the surface will be inventoried and recorded in the field but not collected. To the extent possible, all cultural resource finds will be identified as to type, material, function, and cultural and chronological association. All cultural and historically significant discoveries will be flagged with red and black striped flagging tape.

3) Subsurface probing is recommended at this time but may not be required at all restoration locations or access routes. The Contractor will evaluate whether the APE is likely to contain intact buried archaeological deposits. If present, the contractor will identify places in the APE that have high probability for the presence of buried cultural deposits. Because the intent of the CoqWA is to avoid damage to sites and isolates of cultural or historic
significance, the extent of subsurface probing will be decided by Contractor consultation with affected Indian tribes.

4) Monitoring of cultural resources may or may not be required during project implementation (installing large wood and boulders).

5) Prepare a standard cultural resource report for Section 106 review by the BLM and Oregon SHPO for compliance with Section 106 of the NHPA. A draft report presenting the methods, findings and recommendations of the entire project will be prepared and submitted to the BLM, CoqWA and affected Indian Tribes for review and comments. Contractor will recommend how to avoid, monitor, or mitigate potential impacts from project activity to identified potential historic properties. Extent of monitoring will be dependent upon survey findings and recommendations discussed in consultation with the affected Tribes and landowners. The draft report will also contain copies of the Master Site File forms and any applicable forms, along with a survey log sheet and GIS shapefiles. Following the review of the draft document and receipt of comments, a final report will be submitted to the CoqWA within two weeks. In addition to the final report on the project, the contractor will provide status reports and invoices to CoqWA documenting the progress of the cultural resource assessment. These reports will include information on survey findings, scheduling, potential problems and other pertinent information.

6) Inadvertent Discovery

Use of Existing Information:
The Contractor may use the existing data and reports. The following reports are available and will be provided (via electronic copy) to prospective Bidders upon request:
   a. LiDAR information—access via DOGAMI
   b. OWEB Restoration Grant Application
   c. GIS information

EXAMINATION OF SITE, PROPOSAL DOCUMENTS, PERMITS, ETC.:
Before submitting a Proposal, each Bidder shall be responsible for: (i) becoming fully acquainted with the project restoration locations (Site) and the conditions relating to the work, in order to understand fully the facilities, difficulties, and restrictions attending the execution of the Work; (ii) carefully examining each component of the Proposal Documents and any other available supporting data, in order to become thoroughly familiar with all of the requirements; and (iii) obtaining for itself, at its own cost and expense, copies of all agency and association guidelines and standards cited in the proposed Contract and necessary to perform the Work; (iv) obtain a Cultural Resource Use Permit (CRUP) from OR/WA BLM State Office (BLM_OR_CRUP@blm.gov); (v) and obtain a Fieldwork Authorization from BLM Coos Bay District Office; (vi) principle investigator meets criteria for qualified archeologist per ORS 390.235

Proposal Prospectus & Instructions
Sandy Creek Whole Watershed Restoration Project – Coquille Watershed Association
(https://www.oregon.gov/oprd/OH/pages/projectreviewresources.aspx). No failure or omission of any Bidder to receive or examine any such information or to visit the Site and become acquainted with the conditions existing at the Site shall in any way relieve such Bidder from obligations with respect to its Proposal, any Contract entered into with such Bidder, or the Work, and the submission of a Bid shall be taken as *prima facie* evidence of compliance by the submitting Bidder with the requirements of this paragraph.

**SELECTION AND EVALUATION CRITERIA:**
Proposals will be evaluated by a Selection Committee that, after a review of written proposals, may choose to also conduct a personal interview. Selection Committee will include at minimum Coquille Indian Tribe Tribal Historic Preservation Officer and CoqWA Project Manager. Proposal evaluation will be based on the ability of the Bidder to meet the specifications for the tasks described in this RFP in a timely fashion. Selection will also be based on the ability of the Bidder to work in a cooperative manner with CoqWA staff and project partners on the Project. CoqWA will generally not disclose the status of any award until the appropriate authority at CoqWA has approved the award of a Contract. Normally, the awarding of a Contract or Proposal rejection will occur within 10 calendar days after Proposal opening. If the selected Bidder and CoqWA agree, this deadline may be extended, but CoqWA reserves the right: (i) to award multiple Contracts for parts of the Work; (ii) to consider such criteria as it may deem appropriate with respect to the Project; (iii) to reject any or all Proposals; and/or (iv) not to proceed with the Work and/or the Project (or any part thereof); all in the exercise of its sole and absolute discretion. CoqWA will provide a written notice of its intent to award a Contract to the successful Bidder(s) (in each case, a “Notice of Intent to Award Contract”), and any submittals required to be submitted to CoqWA within a certain number of days after award is made will count from the day that the Notice of Intent to Award Contract is given. The actual award shall, however, be dependent on full execution of the Contract(s) and submission by the successful Bidder(s) of all other required documents.

**EVIDENCE OF RESPONSIBILITY:**
Upon the request of CoqWA, a Bidder whose Proposal is under consideration for the award of a Contract shall submit promptly to CoqWA satisfactory evidence showing the Bidder’s financial resources, construction experience, and organization available for the performance of the Work.

**RIGHT TO AWARD OR REJECT:**
This RFP does not obligate CoqWA to award a contract, CoqWA reserves the right to reject any and all proposals and to further amend or refine a proposal and negotiate a contract with one of the proposers. CoqWA reserves the right to offer a contract to other than the lowest cost bidder based on other evaluation criteria.

**CONTRACT REQUIREMENTS:**
It is the desire of CoqWA to enter into a contract that includes all of the services necessary to achieve the goal of the project, whether or not those services are specifically outlined or described in this RFP. This project does include federal funds; therefore, the selected firm must be able to comply with any specific federal provisions and regulations that may apply to such a federally
funded contract and may be required to sign certain assurances related to applicable federal or state laws.

**WAIVER OF INFORMALITIES:**
CoqWA reserves the right to waive minor informalities contained in proposals, when in the Association’s sole judgment; it is in the best interest of the Association to do so. CoqWA reserves the right to waive minor informalities in the Proposals received. CoqWA may also reject any Proposal not in compliance with all prescribed requirements, including the requirement to demonstrate the Bidder’s responsibility and may reject for good cause any or all Proposals upon a finding by CoqWA that it is in the public interest to do so, in accordance with OAR 137-049-0440.

**PROPOSAL ERRORS AND WITHDRAW:**
A Bidder may withdraw its Proposal at any time prior to the date and time that Proposals are due, by means of written notice which is given to CoqWA before the date and time that Proposals are due, at the address for submission of Proposals which is given above. A Bidder may also modify and/or resubmit its Proposal at any time prior to the date and time that Proposals are due.

**BIDDERS INTERESTED IN MORE THAN ONE PROPOSAL:**
No person, firm, or corporation shall be allowed to make, file, or be interested in more than one Proposal for the Work. However, a person, firm, or corporation which has submitted a sub-proposal to a Bidder, or which has quoted prices of materials to a Bidder, is not thereby disqualified from submitting a sub-proposal or quoting prices to other Bidders or making its own Proposal.

**COSTS INCURRED:**
CoqWA accepts no liability for any costs incurred by respondents in the preparation or presentation of proposals.

**INQUIRES:**
Questions concerning this request for proposals should be directed in writing to:
Restoration Project Manager – Rushal Sedlemyer, Email: rsedlemyer@coquillewatershed.org

Each Bidder shall promptly notify CoqWA of any discovered conflicts, ambiguities, or discrepancies in or between, or omissions from, the Proposal Documents. Bidders should note that questions received less than two calendar days prior to the date scheduled for opening of the Proposals may not be answered. Any interpretation or correction of the Proposal Documents will be made only by Addendum, and a copy of such Addendum will be sent directly to each Bidder. No oral interpretations of any provision in the Proposal Documents will be made to any Bidder.
CULTURAL RESOURCE INVENTORY MILESTONES

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<td>February 24, 2022</td>
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<td>Proposal due date:</td>
<td>March 15, 2022</td>
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<td>Anticipated opening of Proposals:</td>
<td>March 16, 2022</td>
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<td>Successful Bidder(s) to provide contract/all paperwork to CoqWA:</td>
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<td>Anticipated date to start survey:</td>
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<td>Draft report submission deadline:</td>
<td>April 25, 2022</td>
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<td>Final report submission deadline:</td>
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PROPOSAL INSTRUCTIONS: Proposals must be received on or before **4:00pm, on March 15, 2022**. Proposals shall be emailed the CoqWA Project Manager, Rushal Sedlemyer at rsedlemyer@coquillewatershed.org.

Subject line: Cultural Resource Inventory Sandy Creek Restoration

Proposals shall include, at a minimum, the following items:

A. **Proposal Form with Schedules 1-4 completed (provided separately).**

B. Please **provide a work plan** to accomplish the Project goals as described in the RFP, including a description of the work product, time estimates for each task, personnel to be assigned (where possible, individual staff members and titles should be provided), and costs, taking into account the proposed timeline for completion of the Work indicated in the RFP. The work plan should include a detailed, itemized budget justification including rates for personnel, travel, material and supplies purchases, equipment usage, etc. Budget justification should include unit amount, per unit cost, and total cost for each budget line item.

C. A list of equipment with size expected to be on the project (including proposed fire safety).

D. A written statement affirming your ability to undertake and complete specific phases of this work in a timely fashion from roughly March 28, 2022, through on or before May 27, 2022.

E. A signed statement that you can and shall provide the Insurance requirement as listed.

Proposals must not contain any erasures, interlineations, or other corrections unless each such correction is suitably authenticated by affixing in the margin immediately opposite the correction the surname or surnames of the person or persons signing the Proposal, in the named person’s own handwriting. In order for a Proposal to be considered responsive, it must contain all of the documents and information which are required by this RFP, with signatures and notarization as indicated, and it must: (i) cover the complete scope of work as defined in the RFP; (ii) not include any exclusions or qualifications and (iii) include additive, alternate, unit and lump sum costs as listed on the bid forms. Bid prices must (where applicable) be F.O.B. at the Site, with all transportation and handling charges paid by the Bidder.
EXHIBIT B: PROJECT MAPS

Sandy Creek Project Location

Legend
- SUBWAT_NAM
  - Sandy Creek
  - Streams

Created by: Banko Seyfmen
Restoration Project Manager
Date: 11/18/2021

Coquille Watershed Association

Proposal Prospectus & Instructions
Sandy Creek Whole Watershed Restoration Project – Coquille Watershed Association
Locations within the Sandy Creek Basin to harvest 120 BLM trees. Trees are marked.
EXHIBIT C: ADDITIONAL PHOTOS

Example LWD & boulder site on BLM land. This site can be accessed from an existing road and placed with an excavator.

Example LWD & boulder site on Hancock land. This site can be accessed from an existing road. Methods for this site will include cable yarding from the road and possibly tree tipping with ODF clearance.

Proposal Prospectus & Instructions
Sandy Creek Whole Watershed Restoration Project – Coquille Watershed Association
Example LWD & boulder site on Lancaster property. This site can be accessed from existing skid roads and placed with an excavator.

LWD site on the upper key tributary. Notice the existing LWD that we can build off of and mimic at other sites nearby.
LWD site on the upper key tributary looking upstream that will need cable yarder methods for placement. Notice existing trees and boulders to key into.
EXHIBIT D: PROJECT SPECIFICATIONS

I. Table showing site specific quantities and proposed installation methods

II. Example Constructed Log-Jam Designs
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<td>43.07</td>
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<td>BLM</td>
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<td>Upper</td>
<td>13_LWD</td>
<td>43.07</td>
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<td>BLM</td>
<td>6</td>
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<td>na</td>
<td>Cable Yard; install price includes all pieces in 180ft tree.</td>
</tr>
<tr>
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<td>Upper</td>
<td>14_LWD_RK</td>
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<td>Excavator and Cable Yard</td>
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<td>Upper</td>
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<td>Upper</td>
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<td>1.0</td>
<td>Excavator</td>
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<td>Upper</td>
<td>17_LWD_RK</td>
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<td>Upper</td>
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<td>Excavator. Tip 2-3 trees, purchase from Lancaster? On BLM, but borders Lancaster and John Jones property</td>
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<td>Zone</td>
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<td>Y Value</td>
<td>Density</td>
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<td>Lumber</td>
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<td>Notes</td>
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<td>Excavator; through new clearcut; newly used stream ford</td>
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<td>Excavator; through new clearcut; newly used stream ford</td>
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<td>Excavator; through new clearcut; newly used stream ford</td>
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<td>4</td>
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<td>15</td>
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<td>Excavator; through new clearcut; newly used stream ford</td>
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<td>9</td>
<td>4</td>
<td>24</td>
<td>15</td>
<td>1.0-1.5</td>
<td>Excavator; very close to Lone Rock on west side; through new clearcut</td>
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<td>Mid</td>
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<td>15</td>
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<td>Excavator; very close to Lone Rock on west side; through new clearcut</td>
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<td>Excavator; very close to Lone Rock on west side; through new clearcut</td>
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<td>Elevation</td>
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<td>1.0-1.5</td>
<td>Excavator; very close to Lone Rock on west side; through new clearcut</td>
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<td>15</td>
<td>1.0-1.5</td>
<td>Excavator; very close to Lone Rock on west side; through new clearcut</td>
</tr>
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<td>31_LWD_RK</td>
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<td>4</td>
<td>20-24</td>
<td>15</td>
<td>1.0-1.5</td>
<td>Excavator; up road on west side of creek</td>
</tr>
<tr>
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<td>Mainstem</td>
<td>Mid</td>
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<td>Excavator; up road on west side of creek</td>
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<td>1.0-1.5</td>
<td>Excavator; up road on west side of creek</td>
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<td>20-24</td>
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<td>1.0-1.5</td>
<td>Excavator; up road on west side of creek</td>
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<td>1.0-1.5</td>
<td>Excavator; up road on west side of creek</td>
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<td>20-24</td>
<td>15</td>
<td>1.0-1.5</td>
<td>Excavator; new clearcut; need to build downslope to stream; main road back on west side</td>
</tr>
<tr>
<td>Sandy Crk</td>
<td>Mainstem</td>
<td>Mid</td>
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<td>20-24</td>
<td>15</td>
<td>1.0-1.5</td>
<td>Excavator; new clearcut; need to build downslope to stream; main side</td>
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<tr>
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<td>39_LWD_RK</td>
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<td>20-24</td>
<td>15</td>
<td>1.0-1.5</td>
<td>Excavator; new clearcut; need to build downslope to stream; main road back on west side</td>
</tr>
<tr>
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<td>20-24</td>
<td>15</td>
<td>1.0-1.5</td>
<td>Excavator; new clearcut; need to build downslope to stream; main road back on west side</td>
</tr>
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<td>15</td>
<td>1.0-1.5</td>
<td>Excavator; new clearcut; need to build downslope to stream; main road back on west side</td>
</tr>
<tr>
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<tr>
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</tbody>
</table>
Sandy Creek
Example Constructed Log-jam Design
Top-view

Push rootwads Firmly into bank

2-20ft logs w. rootwad 14-20” Dbh
- On bottom
- rootwads upstream

0.5-1.5cy boulders for ballast
12-15 boulders

3-20ft logs, w. rootwad 14-20” Dbh
- On top
- cut to final length

Leaning Myrtle Trees

Sandy Creek streambank edge of Active Channel

Thalweg

~35% channel intrusion

Streamflow

shallow gravel bar
Sandy Creek

Example Constructed Log-jam Design

Top-view

Streamflow

Large Douglas Fir

This log on first floodplain low terrace

3-20ft logs w. rootwad
14-20” Dbh
-These logs on bottom

0.5-1.5cy boulders for Ballast
12-15 boulders

3-20ft logs w. rootwad
14-20” Dbh
-These logs on top

~35% channel intrusion

Thalweg

Sandy Creek streambank edge of Active Channel

Streamflow
Sandy Creek

Example Constructed Log-jam Design

Top view

- Existing boulders
- Streamflow
- 1-20ft log w. rootwad 14-20” Dbh -On bottom
- 4-20ft logs w. rootwad 14-20” Dbh -These logs on top
- ~40% channel intrusion
- 0.5-1.5cy boulders for Ballast 12-15 boulders
- Excavate shallow trench into streambank for log stems; allows for better angle from high bank
- Sandy Creek streambank edge of Active Channel

Thalweg
Sandy Creek
Example Constructed Log-jam Design

Top-view

- Streamflow
- Existing boulders
- 4-20 ft logs w. rootwad 14-20” Dbh
  - These logs on bottom
- Thalweg
- Low floodplain
- 0.5-1.5 cy boulders for ballast
  ~15 boulders
- ~50% channel intrusion
- Sandy Creek streambank edge of Active Channel
- Gravel/cobble
**Sandy Creek**

**Example Constructed Log-jam Design**

*Top-view*

- **3-20ft logs w. rootwad**
  - 14-20” Dbh
  - These logs on top

- **3-20ft logs w. rootwad**
  - 14-20” Dbh
  - These logs on bottom

- **0.5-1.5cy boulders for ballast**
  - ~15 boulders

- **Thalweg**

- **Riffle**

- **Low Floodplain gravel bar**

- **Myrtle Trees**

- **Sandy Creek streambank edge of Active Channel**

- **~45% channel intrusion**

- **~50% channel intrusion**