Appendix C: Restoration, Acquisition, and Combination Project Proposal

Restoration, Acquisition, and Combination Proposal

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Project Name</th>
<th>Sponsor</th>
</tr>
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<tbody>
<tr>
<td>16-2099</td>
<td>McCaw Reach Fish Habitat Restoration Project (Construction); Phase B</td>
<td>Walla Walla County Conservation District</td>
</tr>
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</table>

List all related projects previously funded or reviewed by RCO:

<table>
<thead>
<tr>
<th>Project # or Name</th>
<th>Status</th>
<th>Status of Prior Phase Deliverables and Relationship to Current Proposal?</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1895</td>
<td>Completed</td>
<td>Design to be used to construct this project</td>
</tr>
<tr>
<td>11-1580</td>
<td>Completed</td>
<td>Phase A installed on the upper limit of this project</td>
</tr>
<tr>
<td>07-1875</td>
<td>Completed</td>
<td>USFS TEAMs assessment of the Touchet River that include this reach of the river</td>
</tr>
</tbody>
</table>

If previous project was not funded, describe how the current proposal differs from the original. Submit this proposal as a PRISM attachment titled “Project Proposal.”

Project location. This project is within the Snake River Region, located on the main stem of the Touchet River MSA for Steelhead and in a Priority Restoration Reach (Touchet River, Middle MaSA). The project begins at River Mile 40.4 and continues upstream to River Mile 41.5

Brief project summary.

The project intends to increase fish habitat to a reach of the Touchet River. The project is located in the Touchet River Major spawning area and is located in a priority area for restoration, as identified in the Snake River Salmon Recovery Plan. The overall goals are to construct the project that was designed under project #14-1895, that will increase roughness elements, promote sediment storage and create a dynamic channel environment with complex side channels and large wood features.

1. Problems statement. Describe the problem including the source and scale.

The landowner has both banks of the river under contract as a conservation easement and the area has been planted with riparian trees under CREP. This project will reduce the potential that the river will migrate outside the easement boundary while encouraging movement within the existing floodplain of the conservation easement. This site is characterized by an over straightened channel with minimal roughness and complexity. Also, there is severe bank erosion of the south bank near the west end (12+00) of the project; the river is cutting into the adjacent agricultural field (outside of the conservation easement).

The result of these geomorphic characteristics has led to poor salmonid habitat. The river in this reach is a single shallow channel that is over widened with few pools, low cover and resting areas, and with a minimal potential to recruit or hold large wood

B. List the fish resources present at the site and targeted by your project.
Appendix C: Restoration, Acquisition, and Combination Project Proposal

<table>
<thead>
<tr>
<th>Species</th>
<th>Life History Present (egg, juvenile, adult)</th>
<th>Current Population Trend (decline, stable, rising)</th>
<th>ESA Coverage (Y/N)</th>
<th>Life History Target (egg, juvenile, adult)</th>
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</thead>
<tbody>
<tr>
<td>Mid Columbia River ESU Steelhead</td>
<td>Juvenile, adult</td>
<td>Rising</td>
<td>Y</td>
<td>Juvenile, adult</td>
</tr>
<tr>
<td>Columbia River DPS Bull Trout</td>
<td>Juvenile, adult</td>
<td>Stable</td>
<td>Y</td>
<td>Juvenile, adult</td>
</tr>
<tr>
<td>Mid Columbia River Chinook</td>
<td>Juvenile, adult</td>
<td>Rising</td>
<td>N</td>
<td>Juvenile, adult</td>
</tr>
</tbody>
</table>

C. Describe the limiting factors, and limiting life stages (by fish species) that your project expects to address.

The project, when constructed will provide Mid Columbia steelhead rearing habitat, bull trout wintering habitat, and non-listed Chinook passage and holding habitat. When construction is completed on this project, overall river channel complexity will be improved by increased bar development, pool establishment, and overall increase in stream length.

2. Project goals and objectives.

   A. What are your project’s goals?
      i. Increasing instream habitat complexity with addition of LWD structures
      ii. Increase stream channel length & sinuosity by activation of side channels
      iii. Restoring floodplain connectivity and function.

   B. What are your project’s objectives?

      Project Objective
      After assessing the site conditions we developed a series of goals for the project. These are:
      i. Increase channel complexity, promote retention of mobile wood, and increase local sediment deposition and sorting for adult Chinook passage and juvenile winter rearing, steelhead juvinell rearing and potential adult spawning, and all life stages of bull trout overwintering habitat, through the installation of 44 number of large woody debris structures and 11 engineered log jams sufficient to increase LWD key pieces to >2 pieces per bank full width.
      ii. Increase floodplain access and connectivity by 11 acres at a 3 year flow and increase side channel connectivity by 3000 feet at a 3 year flow for juvenile Chinook and steelhead over winter habitat through the placement of large wood.

What are the assumptions and constraints that could impact whether you achieve your objectives?

Project Risks

Risks associated with the project were examined to determine if there would be any negative impacts to existing infrastructure or other uses.
Infrastructure
The reach is located in a production agriculture area (figure 1), bordered to the North and South by fields with both banks of the river enrolled in the CREP program. There are several structures present in the reach, however due to distance from the river and site topography none are at significant risk. At the downstream end of the project Highway 124 crosses the Touchet River at the Bolles bridge. The project will be designed to minimize any impacts to the bridge.

Recreation
The Touchet River is used recreationally for fishing and swimming. These activities will not be affected by the project.

It was determined that the project would not have any significant impacts on the infrastructure or recreational uses of the project reach.

Hydrology
Hydrology for the reach of interest was examined and 2 gages were found for the site. The first is an active flow recording gage at RM 40.4 (Highway 124, just downstream of the project reach) and is operated for the Washington Flow Monitoring Network. The gage has a period of record from 2007- current. A typical daily discharge graph is shown below.

3. Project details.

Provide a narrative description of your proposed project. The discussion with members of the TAG identified several structure types and locations that would achieve the desired goals. Descriptions of the structures are included below with detail drawings of the structures and plan view of the structure placement included in the plan set (final design plan set included with application).

Structures

Box ELJ
The Box ELJ structure is intended to mimic a large debris jam. The structure is comprised of multiple layers of logs with rootwads attached. The layers are connected at the corners and ballast material is added to retain the structure at its desired placement. The structure is intended to collect and shed woody materials that are moving within the system. Additionally, small woody debris material (slash) can be added to the structure to increase the complexity. The first layer is buried in the streambed at an appropriate depth to avoid excessive scour and undermining of the structure. The structure is overexcavated horizontally to provide immediate pool habitat. Excavated materials are placed downstream (in the shadow) of the structure to promote natural bar formation. The Box ELJ structure is considered a channel forming structure and is placed at desired location to form center bars and promote side channel flow. The structures will provide pool habitat, high flow refuge, escapement cover, and will promote local deposition.

Bank ELJ
The Bank ELJ structure is intended to mimic a large debris jam. The structure is comprised of multiple layers of logs with rootwads attached and log poles. The layers are connected at the corners and ballast material is added to retain the structure at its desired location. The structure is intended to collect and shed
naturally occurring wood materials that are moving in the system. Additionally, small woody debris material (slash) can be added to the structure to increase the complexity. The first layer is buried in the streambed at an appropriate depth to avoid excessive scour and undermining of the structure. The structure is overexcavated horizontally to provide immediate pool habitat. Excavated materials are placed downstream (in the shadow) of the structure to promote natural bar formation. The structures are placed on the streambank with a portion of the structure excavated into the streambank. The structures will provide pool habitat, high flow refuge, escapement cover and will promote local deposition.

Bank LWD
The Bank LWD structure is intended to mimic a small debris jam. The structure is comprised of multiple logs with rootwads attached and log poles. The structure are connected at the log crossings and is anchored with log pilings or ballast. The structure is intended to collect and shed naturally occurring woody materials that are moving within the system. Additionally, small wood materials (slash) can be added to the structure to increase the complexity. The structures are placed near the bank line to mimic a naturally occurring fallen tree. Additional LWD members are placed around the main member to provide for the retention of mobile wood, increase the complexity and to provide for ballasting of the structure. The structures will provide pool habitat, high flow refuge, escapement cover and will promote local deposition.

Bank Roughness
The Bank Roughness structure is intended to reduce accelerated erosion of fine grained sediment and to provide for long term development of riparian vegetation. The structure is made up of multiple logs with rootwads attached. The LWD is placed in layers at opposing angles and anchored with log pilings or ballasted with anchor rock. Cobble from the excavation is placed on the stems of the structure. The fine grained soil bank is shaped at a 2:1 slope to provide a stable slope that will maintain riparian vegetation. The structure will provide pool habitat, high flow refuge, escapement cover and will promote local deposition. The structure will reduce the accelerated erosion of the fine grained materials.

Single LWD
The Single LWD structure is intended to provide pool development and high flow refuge and cover. The structures are comprised of a single log with attached rootwad. These structure are placed to utilize existing trees as anchorage.

A. Provide a scope of work. Included in this application are copies of the final design, design report, and project budget. The onsite engineer will be responsible for directing the installation of the components. The landowner will select the contractor to work with the engineer. The Walla Walla County Conservation District will be responsible for permits, construction management, bill processing, and change orders. The following tasks are for preparation and completion of McCaw 16-2099:

i. Finalize designs for McCaw 16-2099 December 2016- January 2017
Appendix C: Restoration, Acquisition, and Combination Project Proposal

ii. Pre-Project-Permitting and Cultural Resources December 2016-March 2017
iii. Contractor selection April 2017-May 2017
iv. Pre-construction activities including contractor/landowner/CD site visit. April 2017
v. Out of water activities: materials staging, general site prep, construction staking, June 2017.
vii. Remove and dispose of Black Mulch that is over or within 5 feet of bank (Phase A and B projects), can be combined with riparian planting timing. Oct 15, 2017-December 2017
ix.x. Final Reporting July 1, 2018

B. Explain how you determined your cost estimates. Cost estimates (engineer’s estimate) were developed by the design engineer (Lance Horning). They are based on his experience of local conditions.

C. Describe the design or acquisition alternatives that you considered to achieve your project’s objectives. The design report addresses this question.

D. How have lessons learned from completed projects or monitoring studies informed your project? WWCCD has two other completed project in this reach (1) McCaw Phase A 14-1895 and (2) Touchet River Mile 42.5 Habitat Enhancement #07-1527. Both projects are functioning as anticipated and designed. This project is very similar in objectives.

E. Describe the long-term stewardship and maintenance obligations for the project or acquired land. Stewardship obligations are in place for the Inland Empire Action Coalition conservation easement area. Stewardship outside of the conservation easement and for instream structures will be monitored by WWCCD to assure it is properly functioning. Any further components will be installed and only after consultation with SRSRB and the design engineer.

4. Context within the local recovery plan.
Discuss how this project fits within your regional recovery plan and/or local lead entity’s strategy to restore or protect salmonid habitat

Project Objective
• This project is identified through the Snake River Salmon Recovery Plan and in the Three Year Work Plan as a priority reach and specifically addresses limiting factors identified.

Limiting Factors Addressed
• Large Woody Debris – The project will install about 200 log/rootwad stems over the length of the project.
• Channel Confinement – The project will connect side channels and floodplain; some of the side channel will be active 12 months of the year and some will be active only during high flows.
• Temperature – This project will help reduce water temperature by developing pools, offering localized shade from the woody debris, and accessing the floodplain with
activation of the side-channels. Previously damaged/destroyed riparian buffers will be replanted (after bank stabilization is completed). These new and existing riparian plantings will continue to grow and shade the river.

A. Explain why it is important to do this project now instead of later. This project has been a target since 2009 when the Bair geomorphic assessment was done. Productive farmland is being lost at a significant rate.

B. If your project is a part of a larger overall project or strategy, describe the goal of the overall strategy, explain individual sequencing steps, and which of these steps is included in this application for funding. This project is the second and last phase of a restoration project on the McCaw property.

5. How does your project consider and accommodate the anticipated effects of climate change on salmon recovery? This project addresses limiting factors that are related to reducing effect of climate change on salmon recovery by:
   - Large Woody Debris – The project will install about 200 log/rootwad stems over the length of the project.
   - Channel Confinement – The project will connect side channels and floodplain; some of the side channel will be active 12 months of the year and some will be active only during high flows.
   - Temperature – This project will help reduce water temperature by developing pools, offering localized shade from the woody debris, and accessing the floodplain with activation of the side-channels. Previously damaged/destroyed riparian buffers will be replanted (after bank stabilization is completed). These new and existing riparian plantings will continue to grow and shade the river.

6. Project Proponents and Partners. Please answer the following questions about your organization and others involved in the project.
   A. Describe your experience managing this type of project. WWCCD has two other completed project in this reach (1) McCaw Phase A 14-1895 and (2) Touchet River Mile 42.5 Habitat Enhancement #07-1527. Both projects are functioning as anticipated and designed. WWCD has extensive experience in many stream restoration projects, extending back 15 years.
   C. List project partners and their role and contribution to the project. Partner funding is being sought from WDOE Floodplains By Design and FEMA Pre-Disaster Mitigation. RTT Design Review Team has been instrumental in contributing to the design approach of the project. The landowner is investing time and possibly materials toward the project.
   D. Stakeholder outreach. There is no known opposition to this project. City of Waitsburg has given a letter of support for the project.
Supplemental Questions

Restoration Project Supplemental Questions

Answer the following supplemental questions:

A. Will you complete, or have you already completed, a preliminary design, final design, and design report (per Appendix D) before construction?
   Yes
   i. If no, please describe your design process and list all pre-construction deliverables you will submit to RCO for review. Including riparian planting plans.

B. Will a licensed professional engineer design your project?
   Yes

C. If not, please describe the qualifications of your design team. If this project includes measures to stabilize an eroding stream bank, explain why bank stabilization there is necessary to accomplish habitat recovery. Bank stability is secondary to meet objectives of addressing limiting factors by:
   i. Increase channel complexity,
   ii. Promote retention of mobile wood,
   iii. Increase local sediment deposition,
   iv. Increase floodplain and side channel connectivity,

   These goals will benefit fish:
   a. Mid Columbia River ESU Steelhead, rearing, passage and holding habitat will be improved.
   b. Mid Columbia Bull Trout, will add rearing habitat.
   c. Mid Columbia River Chinook will see an improvement in passage and holding habitat.
   The above fish will benefit both as juvenile and adults.

D. Describe the steps you will take to minimize the introduction and spread of invasive species during construction and restoration. The selected contractor will follow all requirements that the permits will detail.

Comments

Use this section to respond to the comments you will receive after your initial site visits, and then again after you submit your final application.
Response to Site Visit Comments

Please describe how you’ve responded to the review panel's initial site visit comments. *We recommend that you list each of the review panel's comments and questions and identify how you have responded. You also may use this space to respond directly to the comments.*

**Draft Application / Site Visit REVIEW PANEL comments**

<table>
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<tr>
<th>Date:</th>
<th>June 1, 2016</th>
<th>Project Site Visit?</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Review Panel Member(s):</td>
<td>Tom Slocum and Steve Toth</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

1. **Recommended improvements to make this a technically sound project according to the SRFB’s criteria:**

2. **Missing Pre-application information.**

3. **General Comments:**

The proposed project will increase large wood loading, improve floodplain connection, and limit bank erosion along a meander bend within this reach of the Touchet River. The project sponsor has done a good job of incorporating wood piles for anchoring structures and increasing wood loading in side channels. Based on our site visit to the large meander bend, the project sponsor might consider the following elements for their proposed project:

- Logs and ELJs can be anchored relatively easily and at low cost to the basalt bedrock outcrops around Station 10+00 using a rock drill and rebar. Tony Meyer with the Lower Columbia Fish Enhancement Group (tony@lcfeg.org (360) 882-6671) has employed this method with great success in the Washougal River. Large wood (anchored to rock as available) along the left bank around Station 8+00 to 10+00 would help with sediment aggradation in the meander bend and a reduction of shear stress along this bank.

- Response: The addition of LWD structures at the suggested locations would provide increased habitat and additional reduction of the accelerated bank erosion in the meander bend. The project is currently requesting funding from multiple sources, if supplemental funding becomes available, we will add additional LWD to the project.

- A left bank ELJ structure amongst the bank roughness structures at about Station 16+00 would help to ensure that the thalweg is kicked away from the bank during larger flood flows.

- Response: The addition of LWD structures at the suggested locations would provide increased habitat and additional reduction of the accelerated bank erosion in the meander bend. The project is currently requesting funding from multiple sources, if supplemental funding becomes available, we will add additional LWD to the project.

4. **Staff Comments:**

If there are any improvements you’d like to implement on the previously constructed upstream phase of the project (additional wood, removing weed fabric falling into the river, additional plantings), feel free to include it in this grant proposal.

Response: I have added an item to the bid sheet that “Remove and dispose of Black Mulch that is over or within 5 feet of bank (Phase A and B projects)”. The cost estimate for the project has not changed with the addition of this item. At this we are not requesting any additional funds for...
adding wood or plantings to the previous construction site. If supplemental funding is secured, the addition of LWD structures to the Phase 1 reach will be re-examined.

Please be sure to address all comments I provided when I reviewed the application in May (if you haven't already done so), along with completing all other final application requirements listed in Section 3 of RCO Manual 18 http://www.rco.wa.gov/documents/manuals&forms/Manual_18.pdf.

NOTE that all changes to your proposal should be made using “track changes” in Word.

Response: We looked at the PRISM documents and it looks like all of the comments have been addressed.

Response: There are two forms that need to be completed. According to PRISM, both of these will be completed in the next two weeks. (The RCO Fiscal Data Collection Sheet and Authorizing Resolution/Application Authorization)

Response to Post-Application Comments

Please describe how you've responded to the review panel's post-application comments. We recommend that you list each of the review panel's comments and questions and identify how you have responded. You also may use this space to respond directly to the comments.
McCaw Reach Fish Restoration(Design)
Phase B Project (14-1895)

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<td>4-7</td>
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<td>8</td>
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<td>Bank ELJ Details</td>
<td>9</td>
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<td>Bank Roughness Details</td>
<td>10</td>
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<td>Bank LWD Details</td>
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<td>Single LWD Details</td>
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<table>
<thead>
<tr>
<th>Structure(s)</th>
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<td>C</td>
<td>23</td>
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<tr>
<td>Bank LWD</td>
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<td>Excavation</td>
<td>CY</td>
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Final Design
McCaw Reach Fish Restoration(Design)
Phase B Project (14-1895)
Layers 1 & 2

Layers 3 & 4

Layers 5 & 6

BOX ELJ Typical Plan

Grading Notes:
1. 1 foot contours are shown for illustrative purposes only. Existing topography varies. See plan.
2. Pool excavation and grading may vary depending on site conditions.

BOX ELJ Typical Section

BOX ELJ Typical Profile

BOULDER

<table>
<thead>
<tr>
<th>Item</th>
<th>Area (sq. ft)</th>
<th>Area (sq. ft)</th>
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<td>Boulder</td>
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</table>

Walla Walla County Conservation District
325 North 13th Avenue
Walla Walla, WA 99362

Box ELJ Details

Final Design
McCaw Reach Fish Restoration (Design)
Phase B Project (14–1895)
Grading Notes:
1. 1 foot contours are shown for illustrative purposes only. Existing topography varies. See plan.
2. Pool excavation and grading may vary depending on site conditions.
CONSTRUCTION NOTES:
1. BANK LWD WILL BE FIELD LOCATED AT TIME OF CONSTRUCTION BY THE ENGINEER.
2. STRUCTURE ANCHORING IS ACHIEVED BY UTILIZING EXISTING TREES, LOG PILES AND BURIAL AS DIRECTED BY ENGINEER.
3. IF STRUCTURE ANCHORING IS ACHIEVED BY BURIAL THEN A TRENCH SHALL BE EXCAVATED FOR PROPER PLACEMENT AND BACKFILL TO EXISTING GRADE. EXCESS MATERIAL SHALL BE PLACED IN LEE OF STRUCTURE.
4. IF STRUCTURE ANCHORING CANNOT BE ACHIEVED W/ EXISTING TREES, PILES OR BY BURIAL; LARGE BOULDERS SHALL BE SUPPLIED BY CONTRACTING OFFICES FOR STRUCTURE ANCHORING.
5. PRIMARY STRUCTURAL MEMBERS ARE SHOWN. ADDITIONAL SLASH AND SMALL MEMBERS MAY BE ADDITED.

<table>
<thead>
<tr>
<th>LWD QUANTITIES</th>
<th>LOG Dia. (IN.)</th>
<th>ROOTWAD Dia. (IN.)</th>
<th>MIN. LOG LENGTH (FT)</th>
<th>QUANTITY</th>
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<td>15&quot;</td>
<td>54&quot;</td>
<td>35&quot;</td>
<td>3</td>
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<tr>
<td>LOG POLE</td>
<td>15&quot;</td>
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<td>30&quot;</td>
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<tr>
<td>SLASH</td>
<td></td>
<td></td>
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<td>5 CY.</td>
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TABLE NOTES:
1. MINIMUM LENGTHS ARE REPORTED FOR MATERIAL PROCUREMENT PURPOSES. ALL LWD SHALL BE CUT TO FIT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
2. ROOTWAD LOG LENGTHS DO NOT INCLUDE THE LENGTH OF THE ROOTWAD MASS.
3. ROOTWAD LOG DIAMETER IS MEASURED AT THE BREAST HEIGHT.
4. LOG POLE DIAMETER IS MEASURED AT THE MID POINT ALONG THE LENGTH OF THE LOG.
TABLE NOTES:
1. Minimum lengths are reported for material procurement purposes. All LWM shall be cut to fit in accordance with the plans and specifications.
2. Rootwad log lengths do NOT include the length of the rootwad mass.
3. Rootwad log diameter is measured at the breast height.
4. Log pole diameter is measured at the mid point along the length of the log.

CONSTRUCTION NOTES:
1. Single LWD will be field located at time of construction by the Engineer.
2. Structure anchoring is achieved by utilizing existing trees, burial of members and log pilings as directed by Engineer.
3. If structure anchoring is achieved by burial, then a trench shall be excavated for proper placement and backfilled to existing grade. Excess material shall be placed in lee of structure.
4. If structure anchoring cannot be achieved with existing trees, burial or log piles, large boulders shall be supplied by contracting officer for structure anchoring.
McCaw Reach Fish Restoration
Phase B

Prepared for:
Walla Walla County Conservation District

2/10/16
Lance Horning, PE
Revised 6/29/16
Project Overview

The project intends to increase fish habitat to a reach of the Touchet River. The project is located in the Touchet River Major spawning area and is located in a priority area for restoration, as identified in the Snake River Salmon Recovery Plan. The overall goals are to develop a design that will increase roughness elements, promote sediment storage and create a dynamic channel environment with complex side channels and large wood features. The reach extends from river mile (RM) 40.4 to RMM 41.5 (begins at Highway 124) and is located within Sec.8, T9N, R 37E.

Past Studies

A geomorphic assessment of the Touchet River was conducted in 2009 (Bair, 2009). The assessment looked at riparian, stream geomorphic and floodplain conditions along the Touchet River from River mile 45 to river mile 40 (Waitsburg to HWY 124 crossing). The assessment identified project goals and objectives for the reach are to reconnect historic floodplains and stream channel networks and restore riparian areas to recover the natural range of aquatic and riparian habitat conditions. The identified project reach was specifically identified in the assessment with the principal goals of arresting accelerated bank erosion at three locations within the overall reach.

Site Investigation

To further investigate the potential project a site visit of the reach was conducted with representatives from the local Technical Advisory Group (TAG). The members included personnel from; WDFW, Snake River Salmon Recovery Office and the Walla Walla County Conservation District.
The group walked the main channel and side channels of the reach and provided the general comments below:

- Very little wood present in the reach
- Very little complexity
- Opportunity to bring old side channels back into system
- Eroding banks are a problem.

Overall, the TAG assessment reached similar conclusions to that found in the earlier assessment. However, instead of only focusing on the severe bank erosion that is occurring, the group believes there are opportunities to provide more habitat enhancements by treating the full length of the reach. Additions of LWD structure to the full reach would add significantly to the available habitat.

An aerial image of the project reach is shown below.
Included below are a few pictures of the reach.

Figure 2. Station 50+00.

Figure 3. Station 47+00.
Figure 4. Station 44+00.

Figure 5. Station 42+00.
Figure 6. Station 37+00. One of the few pieces of LWD present in the reach.

Figure 7. Station 26+00. Looking upstream. Vertical cobble bank.
Figure 8. Station 12+00. Looking upstream. 8 foot vertical soil bank.

Project Goals/Objectives
The goals for the project are to improve habitat conditions for overwintering juvenile Chinook, steelhead and bull trout and adult steelhead spawning. After assessing the site conditions the specific project objectives are to:

- Increase channel complexity,
- Promote retention of mobile wood,
- Increase local sediment deposition,
- Increase floodplain and side channel connectivity,

These goals will be achieved by installing LWD structures.
Alternatives Analysis

To achieve the desired goals we looked at alternatives. First, the options for treating the vertical banks to reduce the excessive lateral migration were discussed. The main options considered were;

1. Shaping and planting the vertical banks.
2. Shaping the banks, planting and armoring with riprap.
3. Shaping the banks, planting and installing LWD.
4. Leaving the banks vertical and adding a series of engineered log jams (ELJs).

Through discussion with WDFW engineers and biologists it was determined that toe protection should be included. It was also determined that riprap was not a desired alternative to meet the goals of providing salmonid habitat. With this guidance, the remaining alternatives are #3 and #4. After further discussion with WDFW personnel alternative #3 was selected. We believe that alternative 3 will provide increased salmonid habitat while reducing excessive bank erosion. Also, by shaping the banks it will provide better planting conditions than the existing vertical banks.

The second point of discussion was how to increase the local habitat. The project goals are to increase the habitat of the reach by installing LWD structures, with the primary goals of;

- Increase channel complexity,
- Promote retention of mobile wood,
- Increase local sediment deposition,
- Increase floodplain and side channel connectivity,

The discussion with members of the TAG identified several structure types and locations that would achieve the desired goals. Descriptions of the structures are included below with detail drawings of the structures and plan view of the structure placement included in the plan set.
Structures

Box ELJ

The Box ELJ structure is intended to mimic a large debris jam. The structure is comprised of multiple layers of logs with rootwads attached. The layers are connected at the corners and ballast material is added to retain the structure at its desired placement. The structure is intended to collect and shed woody materials that are moving within the system. Additionally, small woody debris material (slash) can be added to the structure to increase the complexity. The first layer is buried in the streambed at an appropriate depth to avoid excessive scour and undermining of the structure. The structure is overexcavated horizontally to provide immediate pool habitat. Excavated materials are placed downstream (in the shadow) of the structure to promote natural bar formation. The Box ELJ structure is considered a channel forming structure and is placed at desired location to form center bars and promote side channel flow. The structures will provide pool habitat, high flow refuge, escapement cover, and will promote local deposition.

Bank ELJ

The Bank ELJ structure is intended to mimic a large debris jam. The structure is comprised of multiple layers of logs with rootwads attached and log poles. The layers are connected at the corners and ballast material is added to retain the structure at its desired location. The structure is intended to collect and shed naturally occurring wood materials that are moving in the system. Additionally, small woody debris material (slash) can be added to the structure to increase the complexity. The first layer is buried in the streambed at an appropriate depth to avoid excessive scour and undermining of the structure. The structure is overexcavated horizontally to provide immediate pool habitat. Excavated materials are placed downstream (in the shadow) of the structure to promote natural bar formation. The structures are placed on the streambank with a portion of the structure excavated into the streambank. The structures will provide pool habitat, high flow refuge, escapement cover and will promote local deposition.
Bank LWD

The Bank LWD structure is intended to mimic a small debris jam. The structure is comprised of multiple logs with rootwads attached and log poles. The structure are connected at the log crossings and is anchored with log pilings or ballast. The structure is intended to collect and shed naturally occurring woody materials that are moving within the system. Additionally, small wood materials (slash) can be added to the structure to increase the complexity. The structures are placed near the bank line to mimic a naturally occurring fallen tree. Additional LWD members are placed around the main member to provide for the retention of mobile wood, increase the complexity and to provide for ballasting of the structure. The structures will provide pool habitat, high flow refuge, escapement cover and will promote local deposition.

Bank Roughness

The Bank Roughness structure is intended to reduce accelerated erosion of fine grained sediment and to provide for long term development of riparian vegetation. The structure is made up of multiple logs with rootwads attached. The LWD is placed in layers at opposing angles and anchored with log pilings or ballasted with anchor rock. Cobble from the excavation is placed on the stems of the structure. The fine grained soil bank is shaped at a 2:1 slope to provide a stable slope that will maintain riparian vegetation. The structure will provide pool habitat, high flow refuge, escapement cover and will promote local deposition. The structure will reduce the accelerated erosion of the fine grained materials.

Single LWD

The Single LWD structure is intended to provide pool development and high flow refuge and cover. The structures are comprised of a single log with attached rootwad. These structure are placed to utilize existing trees as anchorage.
Design

To facilitate the design of the project potential risks, hydrology, hydraulics and structure stability were examined and are presented below.

General Site Description

The Touchet River is a large tributary of the Walla Walla River in southeastern Washington. Its headwaters lie in the Blue Mountains above the town of Dayton in Columbia County; the main river is formed by the confluence of the North and South Forks. The river is approximately 85 miles in length and drains an area of approximately 740 square miles (Bair, 2009). The project site is located near RM 40.4 and has a drainage area of 361 sq. mi (USGS, 1964).

Project Risks

Risks associated with the project were examined to determine if there would be any negative impacts to existing infrastructure or other uses.

Infrastructure

The reach is located in a production agriculture area (figure 1), bordered to the North and South by fields with both banks of the river enrolled in the CREP program. There are several structures present in the reach, however due to distance from the river and site topography none are at significant risk. At the downstream end of the project Highway 124 crosses the Touchet River at the Bolles bridge. The project will be designed to minimize any impacts to the bridge.

Recreation

The Touchet River is used recreationally for fishing and swimming. These activities will not be affected by the project.
It was determined that the project would not have any significant impacts on the infrastructure or recreational uses of the project reach.

Hydrology

Hydrology for the reach of interest was examined and 2 gages were found for the site. The first is an active flow recording gage at RM 40.4 (Highway 124, just downstream of the project reach) and is operated for the Washington Flow Monitoring Network. The gage has a period of record from 2007- current. A typical daily discharge graph is shown below.

![Daily Discharge for Touchet River gage at Bolles Rd. 2013-14 WY.](image)

Figure 9. Daily Discharge for Touchet River gage at Bolles Rd. 2013-14 WY.

The period of record for this gage is relatively short. The second gage is an inactive station with a period of record of 1952-1989. This gage is USGS gage 14017000 and was also located at RM 40.4, HWY 124. The daily discharge data for the gage is shown below. After a comparison of the data for the 2 gages it was confirmed that the flow data
for the active gage are representative of the inactive gage. The data from the historical gage was used to develop the return flows for the reach.

Figure 10. USGS gage 14017000. Touchet River at Bolles Rd. WY 1952-1988.

Using the data from USGS gage 14017000 it was shown that the 1.25 yr return interval was 1,459 cfs (Bair, 2009). Additional return interval flow data is shown below.

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Table 1. USGS Gage 14017000 Return Interval Data (Bair, 2009).
Hydraulics

To complete design of the structures the hydraulics were examined. LIDAR data for the reach were obtained and utilized to build a topographic model of the surface. Additionally, survey data was collected to provide cross-section information and data on the local bank erosion. The data show that the average bankfull width for the project reach is 60 feet and the average slope of the reach is 0.004 ft/ft. From aerial photos the maximum riparian width was measured to be a maximum of 1100 feet, minimum of 300 feet and a typical width of 600 feet. The cross-section data and stream profile data are shown below.

![Cross-Section - Station 12+00](image)

**Figure 11. Cross-Section – Station 12+00**
Figure 12. Cross-Section – Station 28+00

Figure 13. Cross-Section – Station 39+00

Figure 14. Cross-Section – Station 49+00
Figure 15. Touchet River water surface profile.
To complete the hydraulic calculations WinXSPRO was utilized. The program calculated an average velocity of 6-8 ft/sec at the 100 yr flow for representative cross-sections. These velocities were used in the design of the structures.

Structure Stability

To calculate the stability of the structures the horizontal and vertical forces acting on the structures were determined utilizing a standard force balance approach. The results of the analysis were used to determine the amount of ballast required with a minimum safety factor of 2.

Each of the different types of structures were analyzed to verify the stability of the structure. Analysis of the Bank LWD, Bank ELJ and Bank roughness ELJ structures included consideration for the anchoring provided by either the existing live trees or embedment depth of the LWD stems into the banks.

Scour around all of the structures is anticipated. The Single LWD, Bank LWD, Bank Roughness and Bank ELJ structures are ballasted to remain stable after scour events. The single LWD and Bank LWD structures are flexible in nature and are ballasted in such a manner that they may shift during high flow/scour events but they will remain intact. The Bank ELJ and Bank roughness structures will also remain intact so long as the supporting bank is not eroded. The Box ELJ structure is solely reliant on the ballasting materials present for its stability. This structure may be affected by excessive scour. Therefore an analysis of anticipated scour depth was completed. The scour analysis showed that during a high flow event the scour depth downstream of the structure may be 8 feet. To achieve stability with the anticipated scour the structure has been designed so that its base is set into the existing streambed, the structure is pinned together at the corners to retain the ballast materials and excavated materials are placed downstream.
Permitting

Permitting for the project will require:
- Cultural resources review,
- Hydraulic Project Approval

It is anticipated that securing these permits will follow a normal process and timeline with no delays anticipated.

References

McCaw Phase B
Project Specifications

Material Handling-

All project materials will be transported with care. Rock shall be handled in a manner to avoid fracturing the materials. Large Woody Debris materials will be handled in a manner to retain the rootwad complexity.

Access Roads/Staging Areas-

The access roads and staging areas are located in agricultural production fields, care should be taken to avoid unnecessary damage to these area.

Riparian Areas-

The riparian areas shall be treated as sensitive areas. Access paths will be developed to each structure location. The Contractor shall work with the existing topography to gain access to each site with the minimum disturbance to the riparian area. The Project manager will direct the work that is required at each site, including approving the removal of any woody materials prior to work be completed.

LWD Installation-

The structures will be located in the field prior to installation. The locations shown on the plans are approximate and will be finalized prior to construction. The Drawings show a typical installation, final installation will be site dependent as directed by the Project Manager.

Final Cleanup-

All staging areas and access roads shall have debris removed and returned to a farmable condition. All access paths and structure locations shall be restored to their prior condition. The Project Manager shall direct the work.
Materials Specifications

Article 1. LARGE WOODY MATERIAL

The Contractor shall deliver the indicated number and size of Large Woody Material to the project staging areas as described in the project Bid sheet. The Contractor will take reasonable care to deliver the materials to the project site with minimal disturbance to the existing ground surface. The Large woody materials shall meet the requirements below when placed on the ground at the project staging area. The storage areas will be staked at the project areas.

Rootwad Logs-

Shall be conifer trees of the following species; Silver Fir, Douglas Fir, Western Larch, and Ponderosa Pine; or other conifer species as approved by the Contracting Officer. The logs shall include an intact rootwad mass. The size of the rootwad log will be the diameter (inches) at DBH. The sizes will be as indicated on the bid sheet.

The trunk of the logs shall reasonably straight and uniform, and free of excessive bends and bulges. Logs exhibiting breakage, rot, splitting, holes, pest infestation, foreign objects/finishes, vandalism, burn, and other damages may not be allowed at the discretion of the Contracting Officer.

Log Poles-

Shall be conifer trees of the following species; Silver Fir, Douglas Fir, Western Larch, and Ponderosa Pine; or other conifer species as approved by the Contracting Officer. The diameter of the log pole shall be measured at the midpoint of the pole. The sizes will be as indicated on the bid sheet.

The trunk of the logs shall reasonably straight and uniform, and free of excessive bends and bulges. Logs exhibiting breakage, rot, splitting, holes, pest infestation, foreign objects/finishes, vandalism, burn, and other damages may not be allowed at the discretion of the Contracting Officer.

Article 2. Rock

The Contractor shall deliver the quantity and size of Anchor Rock and Toe Rock specified on the Project Bid Sheet to the project staging areas. The Contractor will take reasonable care to deliver the materials to the project site with minimal disturbance to the existing ground surface. The Rock shall meet the requirements below when placed on the ground at the project staging area. The storage areas will be staked at the project areas.
Anchor Rock

Anchor rock shall be either boulder or quarried rock. It shall be primarily angular, hard, dense and durable. It shall have a minimum density of 165 lbs/cu.ft. The maximum dimension shall not be greater than 3 times the minimum dimension. Diameter of the rock shall be measured at the intermediate diameter. The quantity and size of rock shall be indicated on the bid sheet.

Article 3. Hardware

Galvanized Steel Wire Rope

Wire Rope shall be 1/2-inch diameter, Type I General Purpose, Class 2, 6x19 Construction, galvanized, nominal breaking strength of 37,000 lbs. Rope shall not be spliced, unless otherwise approved by the Engineer.

Galvanized Steel Wire Rope Clips

Wire rope clips shall be 1/2-inch diameter (accommodate two strands of the specified wire rope), Type I single grip, single saddle, with U-bolts and nuts; Class I, galvanized drop forged. Installed to the manufacturer’s recommendations.

Article 4. Riparian

Plants

Contractor shall purchase and install 3000 riparian plants. Specific varieties shall be determined after consulting with local NRCS. Restoration of disturbed areas may require reseeding of native grasses as directed by Project Manager in accordance planting window requirements.

Mulch Removal

Contractor shall be responsible for removal and disposal of any black plastic mulch (Installed under CREP) that is over or within 5 feet of the bank. (Phase A and B)
McCaw Reach Fish Restoration -Phase B
Comments on Design with Responses

Horning responses are included below in the same font color.

Feedback on preliminary habitat restoration design drawings (dated 9/18/15) and report (dated 11/10/15) for the Touchet River McCaw Reach Phase B from a subgroup of the Snake River Region Regional Technical Team, reviewed between 11/16/15 and 12/1/15 (We did not share the associated engineers cost estimate with the review team):

1. I looked them over, seem pretty similar to the draft plans I saw before, and seems like the questions I had previously were answered. (Joe Bumgarner, WDFW – written communication)

2. I don't have any additional comments on this project other than to say it needs to be approved by Bruce Heiner or another hydroengineer. If he is ok with it then I am ok with it. Where are you hoping to get all the wood? (Diane Driscoll, NOAA – written communication)

Spoke with Bruce Heiner. See comments below.

3. Based on the level of detail provided in the drawings and report I do not have any problems with the conceptual locations and structures being proposed. I thought in our field reviews we encouraged activating the left bank side channel just upstream of the fishhook bend that is eroding the high bank (Sta 15+00 to 27+00). It did not look to me like this proposal will activate that channel.

Discussed this with Bruce and agreed to involve WDFW during construction layout to capture any available side channels.

The other thought I had is that I would like to work with Lance to see if there are ways to optimize the designs to keep boulder ballast to a minimum. In particular I suggest considering the use of driven log piles for structure stability. I know there are a number of W Wa. projects that have used excavator-mounted pile drivers, and I think the bed material in this part of the Touchet may be small enough to make pile driving work. If Lance is willing it would be worth contacting either some project managers or contractors on the west side that have done this to see if it is feasible (see additional attachment on Pile Drivers example). (Bruce Heiner, WDFW – written communication)

Discussed this with Bruce and modified designs to incorporate pilings as the primary anchoring method. Some location, where bedrock is present, will require alternate anchoring methods.
4. I reviewed the plans and made a couple of comments. Since I have not been part of this, some of my questions may have already been discussed.

This says the designs are preliminary. Does that mean that is a conceptual design or is it at the 30% level? My comments assume that this design is somewhere around the 60% level.

One objective of this project is to create complex side channels; Are the existing side channels expected to remain side channels? Is there a possibility of the main channel to “flip” to the side channel thereby making the side channel the main channel? Why aren’t we putting log structures into the existing side channels (other than the most downstream side channel)?

It is anticipated that the river will continue to follow natural processes and migrate. The final plans include increasing the LWD in the side channels.

How “significant” was the “error” in the LiDAR compared to the actual survey data? We have been finding that underwater the LiDAR derived elevation data may be off as much as a foot. Was error detected in the LiDAR derived elevation data? Was the LiDAR elevation data corrected for error using actual survey data? If the LiDAR were not corrected using field survey data and there is an error in the data, would it affect your assumptions of scour depth at the placed wood structures?

There was difference between the Lidar data and the surveyed points. The difference could be from the survey methodology or may be from the natural changes in the river topography. The survey data was utilized to perform the hydraulic calculations while the LIDAR data was used to generate the topographical data for the drawing set.

The LIDAR data was not used in the scour calculations.

On the South Touchet we found that the LiDAR data are not all that they’re cracked up to be – we found a bias of about +2.1 ft on average (ignoring the two points below the 1:1 line), with error bounds around +/- 1 ft, per the graph below which is a comparison of the field survey data at locations where the survey points are proximal to elevation contour lines derived from the LiDAR.
Generally speaking, the analysis seems quite light for this type of project compared to other projects where more robust analysis of the instream structures is used. For example, HEC-RAS was not used for the hydraulic modeling.

The primary objective of the design is to: Increase channel complexity, Promote retention of mobile wood, Increase local sediment deposition, Increase floodplain and side channel connectivity, and reduce excessive erosion of fine grained vertical banks. The design package provides the required information to achieve these objectives.

Could we please get rid of the steel chain in the rock and cable anchor designs? What about rope?

The design has been modified to use log piles as the primary anchoring system.

I can’t tell if there is any concern about width:depth. Is there any desire to deepen the thalwag? If there is, has any consideration been given to having log structures directly opposing one another on both banks acting to force a choke on the channel and hence deepen the thalwag?

The primary objective of the design is to: Increase channel complexity, Promote retention of mobile wood, Increase local sediment deposition, Increase floodplain and side channel connectivity, and reduce excessive erosion of fine grained vertical banks. The design will provide key LWD structures to begin the process. Also, local TAG and WDFW personnel will be asked to participate in the final layout of the LWD structures to provide the most benefit to the reach.
Will the newly constructed 2:1 bank be planted? I did not see a planting scheme.

The reshaped bank will be revegetated with riparian vegetation.

What kind of analysis went into determining the required radius curve of the new channel centerline at the current eroding bank? It seems rather excessive to move the new bank so far out to the left. Or is the distance required to obtain a 2:1 bank slope? (Jerry Middel, CTUIR – written communication).

The reshaping of the bank and the placement of the LWD determined the location of the finished line.

5. With regard to the large bend on sheet 7 (800’ of bank roughness) – is there a way to gain the same benefit using less structure? Also, with regard to the same proposed structure and location, it might be beneficial to add to the height as shown on sheet 10 – the height of the proposed structure is only to the typical ordinary high water level – there is some concern with this. (Dave Karl, WDFW – verbal communication).

I spoke with Dave in regards to this comment and we discussed alternatives to the proposed structure. After discussion, we determined that adding additional LWD members to the proposed structure to increase the complexity of the structure would provide additional benefits. These changes have been incorporated into the drawing set.

6. Hi Jeff and Lisa. I received the final comments back from the review panel regarding the preliminary design for the McCaw Reach Phase B restoration design project (#14-1895). Thanks for the opportunity to review the preliminary designs and the design report. Please consider the following comments:

   a. Consider placement of ELJs along the left bank between Stations 5+00 and 10+00 to help with sediment aggradation in the meander bend area (the bedrock outcropping in the channel bed at about Station 10+00 and the bank stratigraphy suggest an incised channel condition) and to limit bank erosion if the Touchet River creates a new alignment by avulsing through the existing high flow side channel.

   Historical imagery of the site has been reviewed and there were no signs of past avulsion to the south in this area. The “new side channel” has historically been the main channel with no indications of adjustment to the south.

   b. We recommend designing a different alternative for the bank roughness LWD structures along the meander bend between Station 10+00 and 16+25 that uses more wood and fewer boulders to provide more natural habitat structure while limiting bank
erosion. Strategic placement of bank ELJs (e.g., left bank Station 16+00) and bank LWD structures along the meander bend would be a preferred alternative that would deflect flows, encourage sediment deposition, and improve habitat conditions.

Alternatives to the proposed structure were considered and the discussion is included in the design report.

c. Please encourage the design engineer to minimize the use of boulder ballast, chains, and cable. Wherever possible utilize native backfill material, pilings, or bank material to help stabilize ELJ structures.

The design has been modified to use log piles as the primary anchoring system.

d. The box ELJ at Station 30+00 appears to be situated at this location to encourage split flow into an existing side channel. The project designer may want to consider adding LWD into the side channel to encourage scour and pool formation. If the Touchet River avulses into this side channel, will erosion at the outer edge of the meander bend create concerns for the landowner and require future bank protection? LWD placement along the right bank may be warranted to help minimize potential bank erosion in the future.

Additional LWD has been added to the side channels in the final design.

e. We’re not sure what conditions are like in the two side channels located between Stations 32+00 and 38+00 and Stations 46+00 and 52+00, but these may warrant at least a little LWD placement, particularly since we’re encouraging more floodplain reconnection.

Additional LWD has been added to the side channels in the final design.

f. The design report provides minimal data about channel conditions (e.g., no information on substrate, roughness coefficients, and only four cross-sections for a 5,500-foot reach), but perhaps that is not a large concern due to the limited risks to infrastructure. It doesn’t appear that an alternatives analysis was really conducted. Perhaps in a future phase, the project sponsor could look at re-activating the left bank floodplain between Stations 17+00 and 30+00.

The alternative analysis is included in the revised design report. The left bank floodplain will be further examined for potential work in future projects.
7. Please clarify whether or not you’ve looked into whether it is feasible to use pilings at the site and, if not, how and when this will be determined. Do you anticipate driving them or excavating?

After further review of information from Bruce Heiner and discussion with local contractors we determined that some of the sites for placement of LWD will permit the use of excavator driven pilings. Each LWD placement site will be examined to determine the feasibility as we approach construction. Sites where bedrock is present will be eliminated and the alternative methods will be used for structure anchoring.
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Appendix F: Landowner Acknowledgement Form

Landowner Information

Name of Landowner: Randell Kromm

Landowner Contact Information:

- Mr. ☐ Ms. ☐ Title:

First Name: Randall ☐ Last Name: Kromm

Contact Mailing Address: 2937 Bolles Rd., Waitsburg, WA 99361

Contact E-Mail Address:

Property Address or Location: Touchet River Miles 41, T9N, R37E, Section 8, Center

1. Randell Kromm (Landowner or Organization) is the legal owner of property described in this grant application.
2. I am aware that the project is being proposed on my property.
3. If the grant is successfully awarded, I will be contacted and asked to engage in negotiations.
4. My signature does not represent authorization of project implementation.

[Signature]

Landowner Signature ☐ Date: 4/8/16

Project Sponsor Information

Project Name: McCaw Reach Fish Habitat Restoration Project (Construction); Phase B

Project Applicant Contact Information:

- Mr. ☐ Ms. ☐ Title

First Name: Jeff ☐ Last Name: Klundt

Mailing Address: 325 North 13th Ave., Walla Walla, WA 99362

E-Mail Address: jeff.klundt@wwccd.net
Appendix F:
Landowner Acknowledgement Form

Landowner Information

Name of Landowner: Jack McCaw

Landowner Contact Information:

☑ Mr. □ Ms. □ Title:

First Name: Jack  Last Name: McCaw

Contact Mailing Address: 325 West 7th St., Waitsburg, WA 99361

Contact E-Mail Address:

Property Address or Location: Touchet River Miles 40.4 to 41.5, T9N, R37E, Section 8

1. Jack McCaw (Landowner or Organization) is the legal owner of property described in this grant application.

2. I am aware that the project is being proposed on my property.

3. If the grant is successfully awarded, I will be contacted and asked to engage in negotiations.

4. My signature does not represent authorization of project implementation.

[Signature]

Landowner Signature

Date 4/2/16

Project Sponsor Information

Project Name: McCaw Reach Fish Habitat Restoration Project (Construction); Phase B

Project Applicant Contact Information:

☑ Mr. □ Ms. □ Title

First Name: Jeff  Last Name: Klundt

Mailing Address: 325 North 13th Ave., Walla Walla, WA 99362

E-Mail Address: jeff.klundt@wwccd.net