



Habitat Restoration Project Application

This application is based on the Expert Regional Technical Group’s (ERTG) project review template. However, modifications necessary to satisfy the Estuary Partnership’s project review process were made to the template. Habitat restoration project applications will be reviewed against the Estuary Partnership’s project review criteria, and may be reviewed against the ERTG project review criteria. The review process is described in greater detail in Section 2 (Project Narrative) of this application.

SECTION 1: BACKGROUND AND PROJECT DESCRIPTION

1. PROJECT INFORMATION

Project Title: Elochoman Slough Tidal Restoration
 Project Type: Construction Acquisition Design / Planning

2. APPLICANT CONTACT INFORMATION

Organization: Washington Department of Fish & Wildlife (WDFW)
 Project Manager/Title: Steve Vigg
 Address: 2108 Grand Blvd. Vancouver WA 98661
 Telephone Number: 360-906-6710
 Fiscal Agent: _____
 Email: Steven.vigg@dfw.wa.gov

3. PROJECT LOCATION

Latitude, Longitude (e.g., -123.45, 45.67): _____
 Watershed Name and Code (10 digit hydrologic unit code): Lower Elochoman River (170800030504)
 County/State: Wahkiakum County Washington
 Columbia River Mile: RM 36
 River or Stream Name: Elochoman Slough
 Distance from mainstem Columbia River (in river miles): ~ 0.80 miles
 Landowner(s)
 Public: Agency: Washington State Department of Transportation (WSDOT)
 Private: Name(s): Columbia Land Trust (CLT)

4. PROPOSED PROJECT SCHEDULE

Provide a list of major tasks to be completed as part of this project, start and end dates for each task, and a description of the task.

Project Task	Start Date	End Date	Task Description
Design New Culverts	January 2012	March 2014	Finalize design of two culverts to replace existing fish passage barriers.
Permitting	November 2012	March 2014	Acquire all federal, state, local regulatory and cultural permits.
Implementation	July 2014	September 2014	Replace two culverts with box culverts.
Post Construction Monitoring	November 2014	2019	Photos, WSE’s, temperature

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5. PROJECT COST

Total Project Cost: \$___ \$ 1,667,870
 Estuary Partnership Share: \$ _____
 Applicant's Share: \$ _____

Cost-share is not required for this funding opportunity.

6. PROJECT PARTNERS

List all anticipated funding sources and indicate the dollar value of their cash or in-kind contributions. Mark the respective box to show if contributions have been secured or are pending.

Project Partner	Cash	In-Kind	Secured	Pending
Washington State Dept. of Transportation			\$833,935	
BPA			\$833,935	

7. PROJECT SUMMARY

Provide a 250 word summary of the project, including the following: project type (i.e., design, restoration, acquisition); project description; number of acres or miles treated; habitat function(s) being restored; benefit to salmon; timeline; and partners.

The Elochoman Tidal Slough Restoration project will enhance the hydrologic connectivity of up to approximately 223 acres (including phases I and II) of intertidal forested riparian and wetland habitats in the floodplain of the Columbia River Estuary (RM 36) and the lower Elochoman River. CLT has purchased properties in the Lower Elochoman River floodplain with the intent of restoring and enhancing intertidal wetland habitats (phase I property was purchased in 2009, phase II property was purchased in November 2012). The phase I property is bounded on the west by Hwy 4, and on the north by the Elochoman River. The phase II property is bounded by the Elochoman River on the east and is adjacent the phase I property on the west. All are located just north of Cathlamet in Wahkiakum County, Washington. The properties are near the 5,600 acre USFWS Julia Butler Hansen Refuge on the Columbia River and adjacent to 210 acres conserved by CLT on Indian Jack Slough and Nelson Creek.

The habitat on the phase I property is relatively intact with enhancement and restoration potential, offering significant habitat benefits for juvenile salmonids within close proximity of the Columbia Estuary. Intertidal wetlands and side channels provide important habitat for migrating ocean-type and stream-type juvenile salmonids, particularly in this area where much of the historical floodplain and off-channel areas have been diked and filled. Coho, chum, Chinook, and sea-run cutthroat trout all utilize this habitat complex for foraging and rearing. The property also hosts endangered Columbia white-tailed deer. Enhancement actions include abandoned logging road removal, replacing two culverts (one with a tide gate) on Hwy4 which bisects lands between Elochoman Slough and the CLT properties , planting native trees and invasive weed control.

Abandoned logging road decommissioning was completed in 2012. Culvert replacement on Hwy 4 is scheduled for 2014. While CLT has purchased phase II property (a hybrid Poplar plantation), restoration work there will be delayed until an existing agricultural easement held by the previous owner expires. In total, fish access to and hydrologic connectivity with approximately 16.6 acres of intertidal channel area and approximately 223 acres of forested wetland will be accomplished.

Phase I project tasks will be completed by 2014, when culvert replacement will occur on Hwy 4 right-of-way. The project is being jointly funded through a cost-share agreement between the Washington State Department of Transportation (WSDOT) and the BPA.

Note which of the 13 ESA listed salmon Evolutionarily Significant Units (ESUs) or steelhead Distinct Population Segments (DPSs) found in the Columbia River will benefit from the project:

	Chinook Salmon (<i>Oncorhynchus tshawytscha</i>):		Steelhead (<i>Oncorhynchus mykiss</i>):
X	Snake River spring/summer Chinook salmon	X	Snake River steelhead
X	Snake River fall Chinook salmon	X	Upper Columbia River steelhead
X	Upper Columbia River spring Chinook salmon	X	Middle Columbia River steelhead
X	Upper Willamette River Chinook salmon	X	Lower Columbia River steelhead
X	Lower Columbia River Chinook salmon	X	Upper Willamette River steelhead
X	Chum salmon (<i>Oncorhynchus keta</i>) Columbia River chum salmon	X	Sockeye salmon (<i>Oncorhynchus nerka</i>) Snake River sockeye salmon
X	Coho salmon (<i>Oncorhynchus kisutch</i>) Lower Columbia River coho salmon		

If ESU information is unavailable, specify if ocean-type or stream-type salmonids will benefit from project.
<http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Maps/Index.cfm>

8. AUTHORIZED SIGNATORY

I certify to the best of my knowledge that the information in this application is true and correct and that I am legally authorized to submit this information on behalf of the applicant.

Printed Name Steve Vigg	Signature
Title WA Estuary MOA Coordinator	Date

SECTION 2: PROJECT NARRATIVE

Please answer the following questions. The responses to these questions will be the basis for evaluating and ranking project proposals. Please ensure text is single spaced, with no less than one inch margins and 11-point font. Refer to the ERTG Resources document (<http://lcrep.org/sites/default/files/restoration/docs/Expert%20Regional%20Technical%20Group%20Resources.pdf>), Estuary Partnership project review criteria (<http://lcrep.org/sites/default/files/restoration/docs/Estuary%20Partnership%20Project%20Review%20Criteria.pdf>), and definitions below (footnotes) when completing the project narrative. Reference to the Columbia River Estuary Conceptual Model (see above hyperlink for ERTG Resources document) can also be made to help standardize terminology and to provide descriptions for stressors, habitats, processes and functions. An example of a completed ERTG Project Template can be found on the Estuary Partnership's Project Application webpage (<http://lcrep.org/sites/default/files/restoration/docs/Project%20Template%20Example.pdf>).

Header:	
Date	January 25, 2013
Prepared by	Alex Uber alex.uber@dfw.wa.gov (360-906-6761) Donna Bighouse donna.bighouse@dfw.wa.gov (360-906-6738) Steven Vigg steven.vigg@dfw.wa.gov (360-906-6710)
Sponsoring agency	Washington Department of Fish & Wildlife Steven Vigg steven.vigg@dfw.wa.gov (360-906-6710)
Funding agency	BPA: Ben Zelinsky bdzelinsky@bpa.gov
Site	Elochoman Slough Tidal Restoration / WA Shore Columbia River / RM 36 (-123 23.6238/46 13.6278)
Project status or stage	Design, Permitting, and Implementation

Proposed Project:

Problem statement *Summarize the site-specific problem(s) the proposed restoration(s) is intended to address. What are the causes of the problems?*

According to the Columbia River Estuary Recovery Plan Module for Salmon and Steelhead, the main stem estuary has nearly been reduced to a single channel (Northwest Power and Conservation Council 2004). Diking, channelization, shoreline armoring, and other human alterations of the estuary have eliminated access to an estimated 77 percent of historical tidal swamps (Fresh et al. 2004). Over the past 200 years the surface area of the estuary has decreased by approximately 20 percent (Fresh et al. 2005).

Much of the Lower Elochoman River, including tidal wetlands and side channel habitat, has been altered through the clearing of vegetation, ditching, diking, filling, dredging, highway and other access road development and other human activities. The subject site was historically an intertidal Sitka spruce swamp, with most of the mature spruce trees logged and removed in the early 20th century. The property is hydrologically connected to the Elochoman River through a major tidal channel at most Elochoman River stages, and numerous minor channels at higher flows. It is also linked to Elochoman Slough through two undersized culverts (one tidegated) under SR 4 along the west edge of the property. Both the river and the slough are directly connected to the Columbia River. About 50-70 years ago a logging road was constructed to the east off SR 4 which bisects the property. This road disrupts some of the natural flow within the main tide channel, and through other minor channels. The

tidegate (SR 4, MP 34.09) and culvert (SR4, MP 33.94) under State Hwy 4 potentially prevent full tidal exchange and fish access into an estimated 7,130 feet¹ of high quality side/off channels wetland habitat.

In the last 30 years the adjacent land to the east of the CLT property has been cleared and converted to a poplar plantation. Ditches were installed to drain the property (see figure 9). The new acquisition of this property (which is owned by the same landowner the CLT property was purchased from) could allow for an increase in the scope of this project, at some future date.

The proposed project is intended to increase tidal inundation and fish access from the Elochoman Slough and the Columbia river main stem by significantly increasing the flow capacity of culverts under SR-4 and removing barriers to fish passage along and within the property boundary.

Vision/goal

Describe what the site would look like if restoration is successful, i.e., state the expected outcome.

Vision: A properly functioning tidal reach of the Elochoman Slough that supports the entire life cycle for in-basin anadromous salmonid populations – coho, Chinook, chum, steelhead, sea-run cutthroat -- as well as providing temporary rearing and foraging habitat for out of basin (non-Elochoman River) stocks.

The primary goal is to improve habitat for rearing juveniles and spawning adult anadromous salmonids -- originating from both the Elochoman and Columbia River populations.

The outcome is an unobstructed connection of 200 to 350 acres of forested swamp and scrub-shrub wetlands to the Elochoman River and Slough – that increases survival and production of the thirteen Evolutionarily Significant Units (ESUs) currently protected under the Endangered Species Act, as well as unlisted salmonids and other anadromous fish species (smelt, lamprey, and sturgeon).

Objectives

State the project's objectives in terms of functions for salmon. For example, how will access, capacity etc. be increased or enhanced?

1. Improve access to more than 200 acres of forested wetland habitat for rearing and foraging salmonids.
2. Improve hydrologic connectivity to tidal channels (>7,000 feet of tidal channels) on forested wetlands within existing and potential future CLT owned lands.
3. Restore and enhance Elochoman Slough – aquatic habitat, riparian habitat and terrestrial vegetation – to enhance overall juvenile salmonid flood plain habitat:
4. Incorporate effectiveness Monitoring & Evaluation (M&E) component and/or coordinating with other M&E efforts.

Project actions, phase, sizes by year

List the proposed restoration² actions and phases by year. For each restoration action, state the number of barriers to be removed, the width of the breach or reconnection, and/or the number of acres/miles to be restored by year. In a multi-year effort, be sure to identify the action(s)/phase(s) that are being proposed at this time.

The following actions were implemented in FY2011-12: (Phase I)

¹ May 2010 Columbia Land Trust estimate of total tidal channel length within property boundary, pers. comm.. Ian Sinks (CLT)

² As used here, the term "restoration" refers to conservation, protection, enhancement, restoration, or creation.

1. Remove tidegate lid from culvert located at MP 34.09 on Hwy 4.
2. Decommission old interior access road, associated culverts and fill material blocking minor tidal channels.
3. Restore riparian zone by replanting native trees and shrubs including Sitka spruce.

The following action would be implemented in FY 2013-2014

1. Restore hydrology to the tidal channels within the property by removing two fish passage barrier culverts (36" diameter round precast concrete pipe) under Hwy 4 and replacing them with four-sided box culverts (20' x 12' @ MP 34.09 and 12' x 8' @ MP 33.94).

Future actions: (Phase II): Approximately 150 acres of additional tidal wetlands, adjacent to the east, were acquired by CLT in November 2012. This land has been used as a cottonwood/poplar hybrid plantation and the seller has retained an active lease to continue this use until 2022, when CLT will exercise an option to purchase. Following acquisition of this additional acreage, the following restoration actions will occur:

1. Ditch filling and restoration of approximately 12.4 acres of channel area
2. Potential removal of approximately 0.7 miles of levee along the Elochoman River.

Estuary Module action, subaction(s) and project goal
Maps of the site, landscape, and site location in the LCRE

Identify the appropriate subaction(s) (ERTG Resources document, page 4) and state the size (number of acres or miles) the project subaction(s) will provide. Document how the value was obtained. Show these subaction(s) on a map of the site. Also include a map of the project site in its landscape and a map of the project's location in the lower Columbia River and estuary.

The proposed restoration project presented herein includes work within the right-of-way of Hwy 4, south of the Elochoman River along the west side of the CLT property. Restoration actions include the replacement of two fish passage barriers at MP 34.09 (culvert and tide gate) and MP 33.94 (culvert only) with new, larger span box culverts (see Figures 1,2,3) .

Phase I actions were implemented in 2012, and included decommissioning an old forest road and removing two culverts, east of Hwy 4 on CLT land, to reconnect tidal channels within the bounds of CLT owned lands. A tide gate lid was also removed from the western end of the culvert at MP 34.09 on Hwy 4. The abandoned logging road was ripped, and swales were constructed where appropriate to reconnect adjacent minor tidal channels. Approximately 1100 ft of restored road surface was replanted with native trees and shrubs. Columbia Land Trust has conducted an inventory of invasive species infestations on the site and will continue monitoring the site for future infestations.

The following Estuary Module Actions, and corresponding metrics are shown below (also, see Figures 4,5):

Estuary module Sub-actions:	CRE 1.4	0.2 mi
	CRE 9.4	4.2 acres
	CRE 10.3*	222.8 acres
	CRE 15.3 & 9.	206.9 acres

Note: This 10.3 CRE is preliminary. The project will be rescored using CRE 10.2 in a future scoring, and calculated SBUs update (source Scott McEwen, CLT).

Restoration Goal (acres or miles)	Phase I and II total acres are 350 acres (200 acre phase I CLT acquisition, 150 acre phase II acquisition). Potential tidal channel area affected: 12.6 acres. Potential total area of inundation: 222.8 acres.
Total Project - Restoration (area or length)	<i>State the acreage or length (in miles) affected by the project as a whole. Document how the value was obtained.</i> Phase I and II total acres are 350 acres (200 acre phase I CLT acquisition, 150 acre phase II acquisition).

Pre-Assessment:

Whenever possible, provide summary data (values).

Fish Sampling

Fish sampling was conducted on May 27, 2011 by USFWS staff, on both the east and west sides of the tide gated culvert at MMP 34.09. The results are shown below (source Jeff Johnson, USFWS):

We sampled last Friday at the South CLT Parcel near Julia Butler Hansen NWR. We pulled four seines on the west side of SR4 (in the backwater connected to the Elochoman Slough) and four on the east side of SR4 (adjacent to the backwater that connects to the Elochoman Slough).

On the East side we captured (total of all 4 seines, total area sampled = 42 square meters, one of the seine pulls produced no fish):

*4 three-spine stickleback
1 killifish
1 coho (48mm fl)*

On the west side of SR4 we captured (total of all 4 seines, total area sampled = 57 square meters, fish were captured on each pull):

*40 three-spine stickleback
1 sculpin
1 rough skinned newt
1 coho (48mm fl)
2 Chinook (42 and 45 mm fl)*

Culvert Assessment

Washington Department of Fish and Wildlife (WDFW) has completed an inventory and assessment of the Washington State Department of Transportation (WSDOT) tidegates and culverts under Highway 4. Two culverts (36" diam round with tide gate @ MP 34.09, 36" diameter round culvert with no tide gate) which convey tidal flows upstream from Elochoman Slough have been identified as fish passage barriers.

WDFW biologists and environmental engineers have scoped alternatives to correct fish passage and restore tidal connection between the Elochoman Slough and the

upstream CLT property. Specifically, topographic surveys were completed which detail existing conditions (invert and crown elevations, fill heights etc) and also present conceptual designs for replacement structures (see Figures 6 and 7).

In May of 2010 surface water elevation data loggers were placed in three locations at the project site, and tied to WSDOT survey monuments. Two were placed at each end of the culvert at MP 34.09, and one was placed at the upstream end of the culvert at MP 33.94. Water surface elevations (in NAVD 88) were recorded at hourly intervals for two weeks, and were plotted (see Figures 10 and 11).

Photo Point

Provide a digital photograph(s) of the site; note the point and orientation of the photograph, time of year, and tide/water level stage.

Aerial image from a satellite or plane. Annotate the image to convey information about the project.



Figure 1. Project vicinity map, showing phase I proposal as 'Project Site'. 150 acre phase II proposal is between phase I project site and the Elochoman River (Map source CLT)

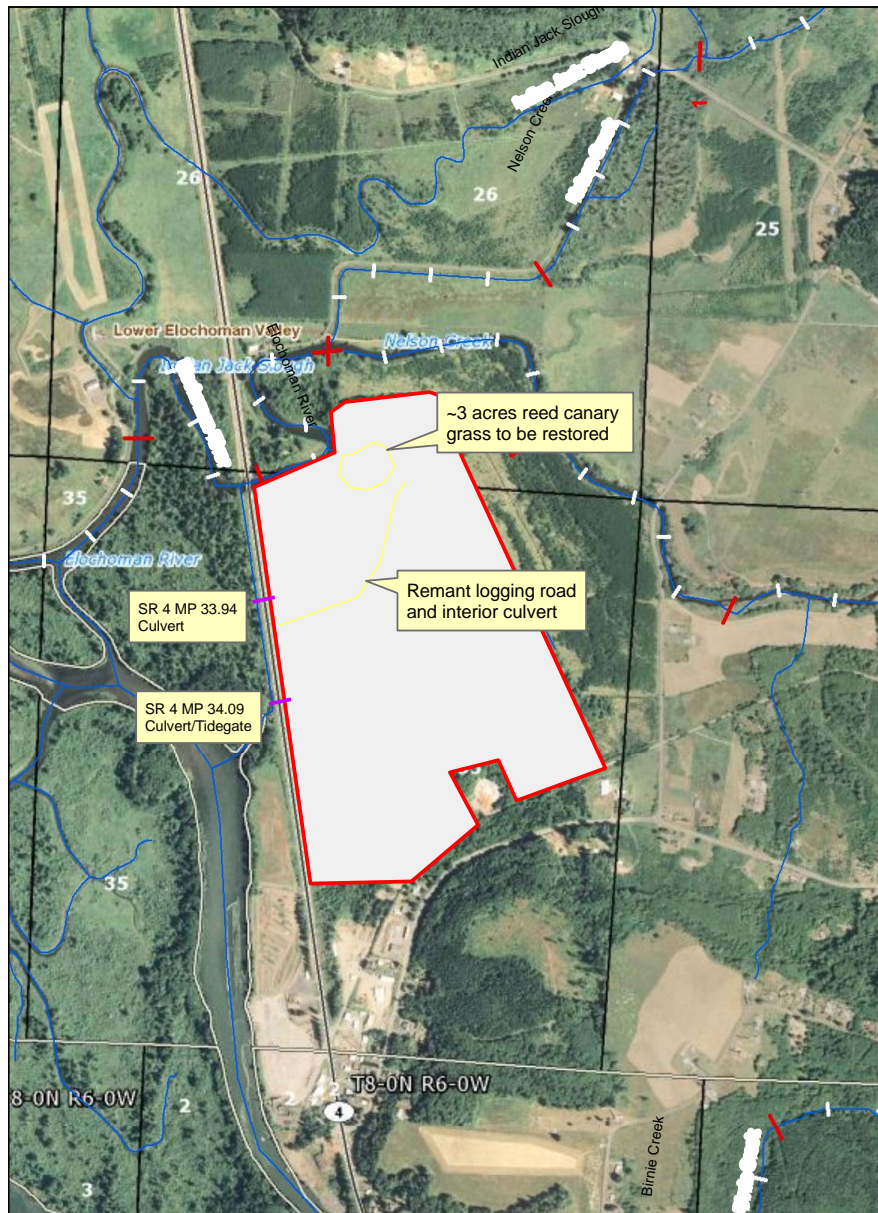


Figure 2. Lower Elochoman Phase I restoration actions. (map source: WDFW)

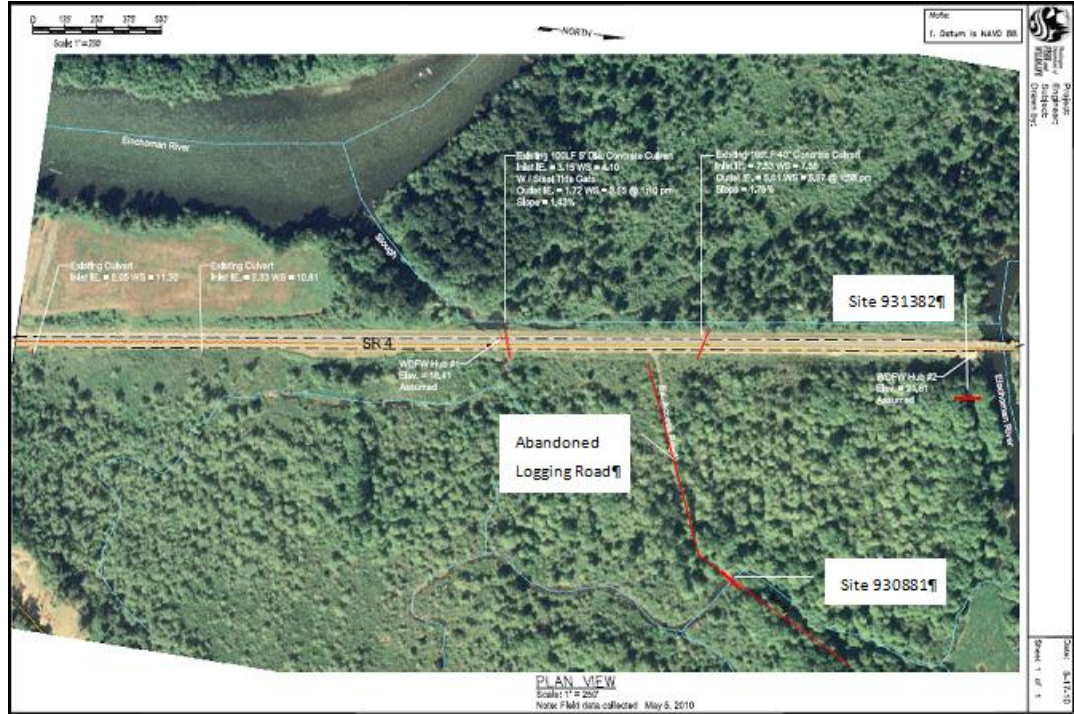


Figure 3. Plan view of SR-4 along the South CLT parcel showing culverts and bridge over Elochoman River between milepost 33.69 and 34.44 (map source WDFW)

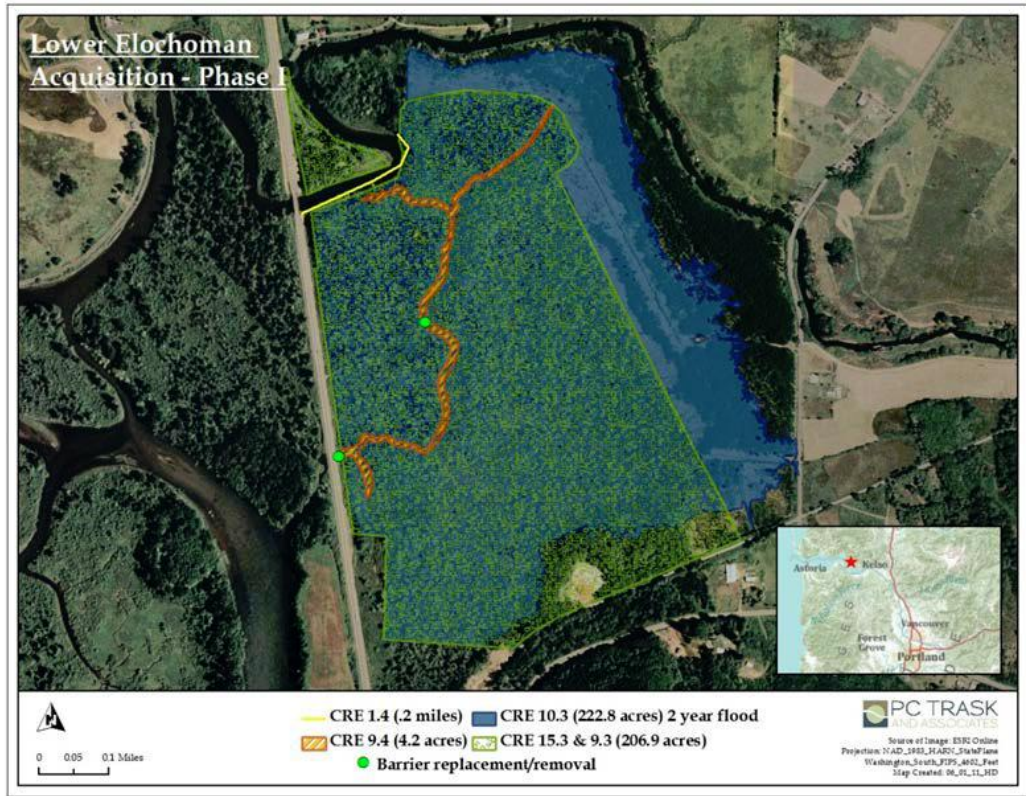


Figure 4. Lower Elochoman, phase I map and SBU summary (map source, PC Trask Assoc)

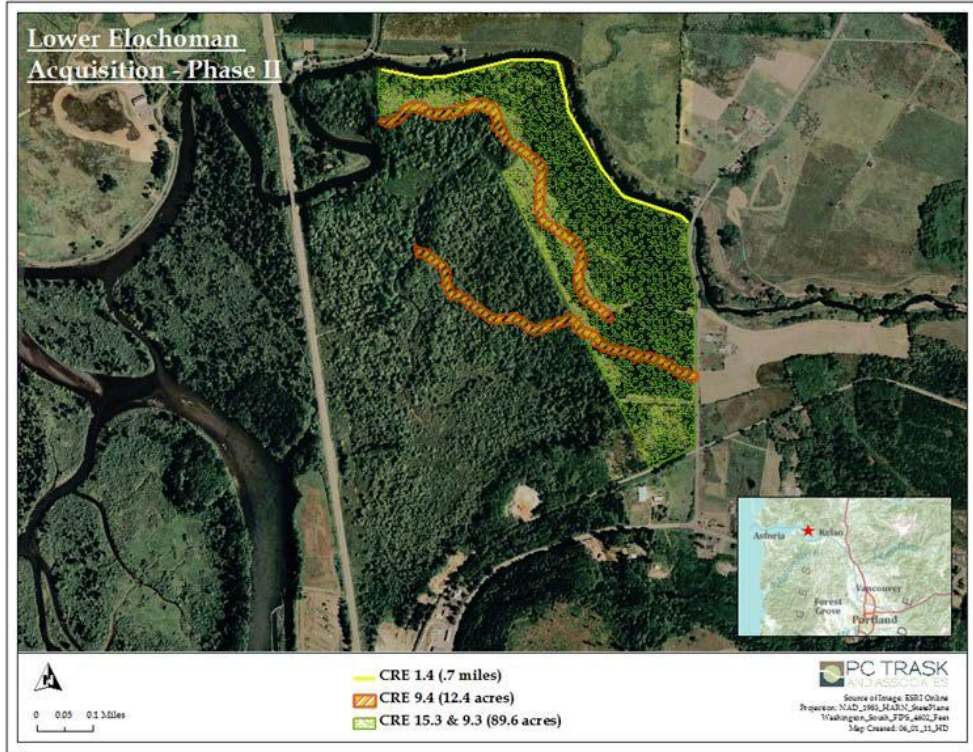


Figure 5 Lower Elochoman, phase II map and SBU summary (map source, PC Trask Assoc)

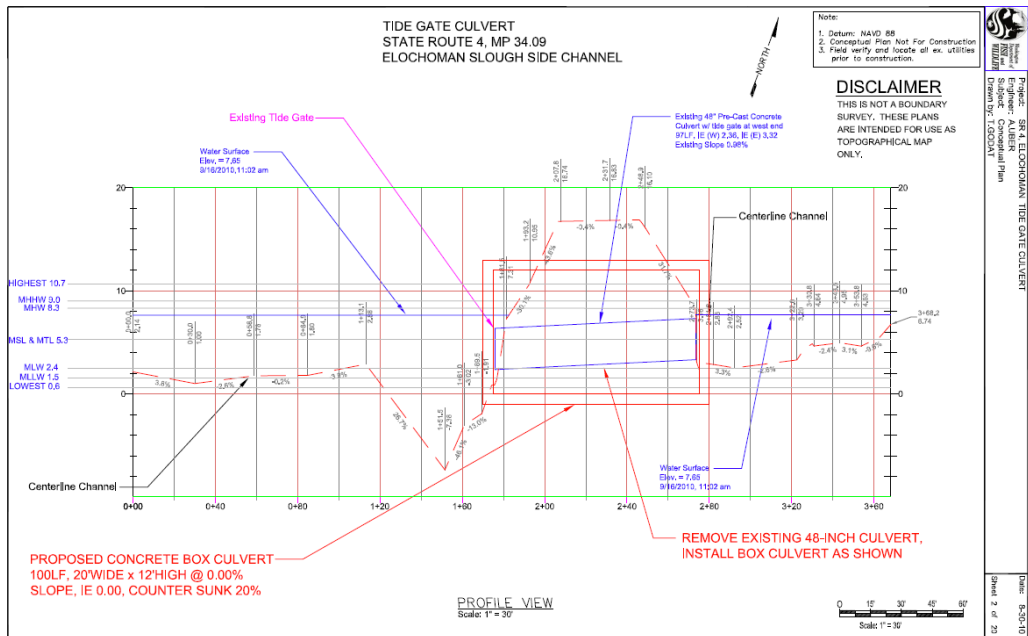


Figure 6 Tide Gate culvert at SR-4 MP 34.09 showing existing conditions and proposed culvert replacement (source WDFW).



Figure 9. West (Elochoman Slough) end of culvert at MP 33.94 Hwy 4.

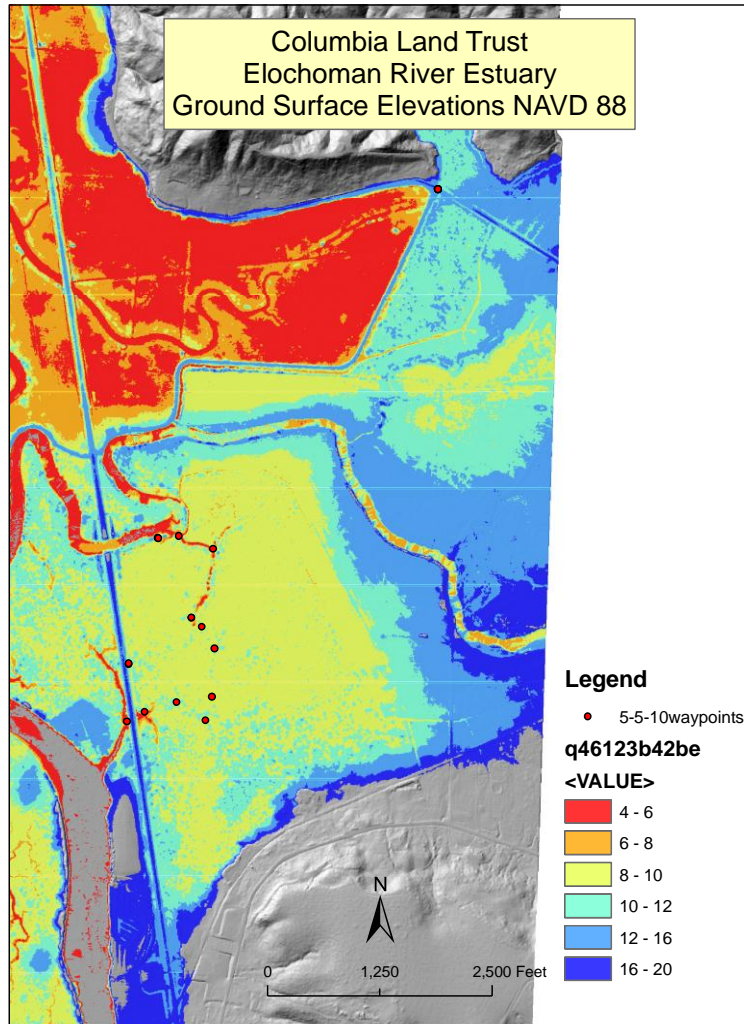


Figure 8. LiDAR image showing ground surface elevations at CLT properties. Note subsidence on cleared and highly impacted Indian Jack Slough parcel north of the Elochoman River (map source WDFW).

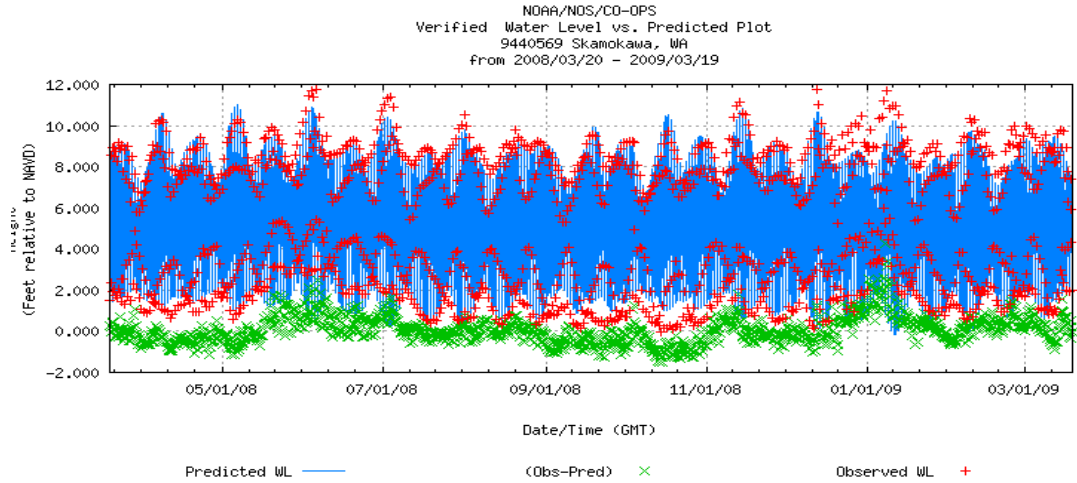


Figure 9. Columbia River tidal frame 3/20/8 to 3/19/09. Gage is approximately 4 miles downstream of site at Skamakowa WA. Mean tidal range is 6.12 ft, diurnal range is 7.56 ft.

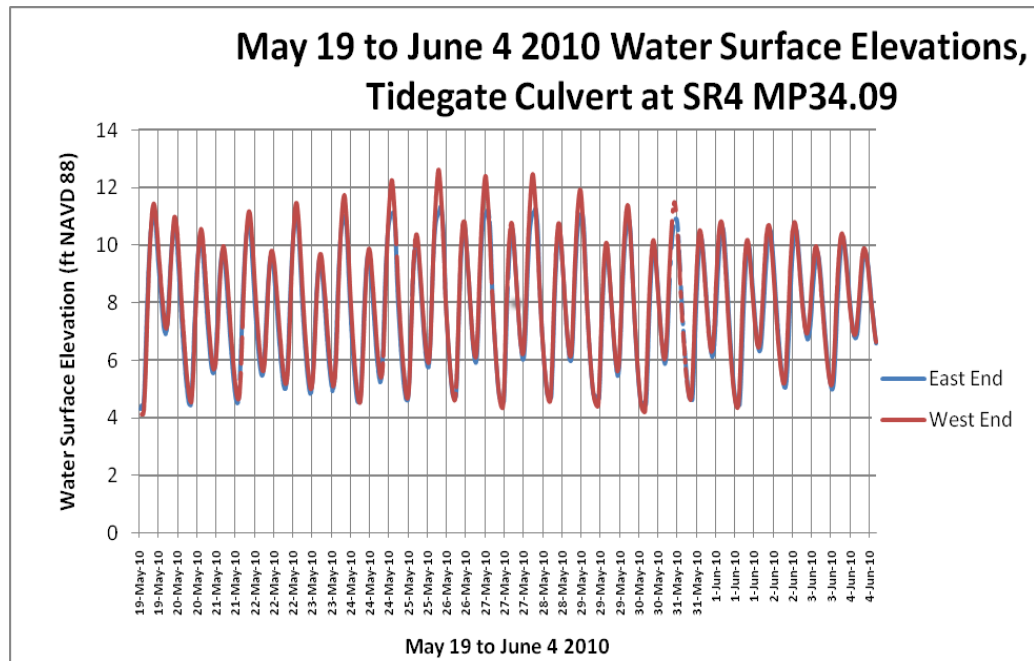


Figure 10. Water surface elevation plots (from hourly readings) from the east and west ends of the tide gated culvert at MP 34.09 on Hwy 4.

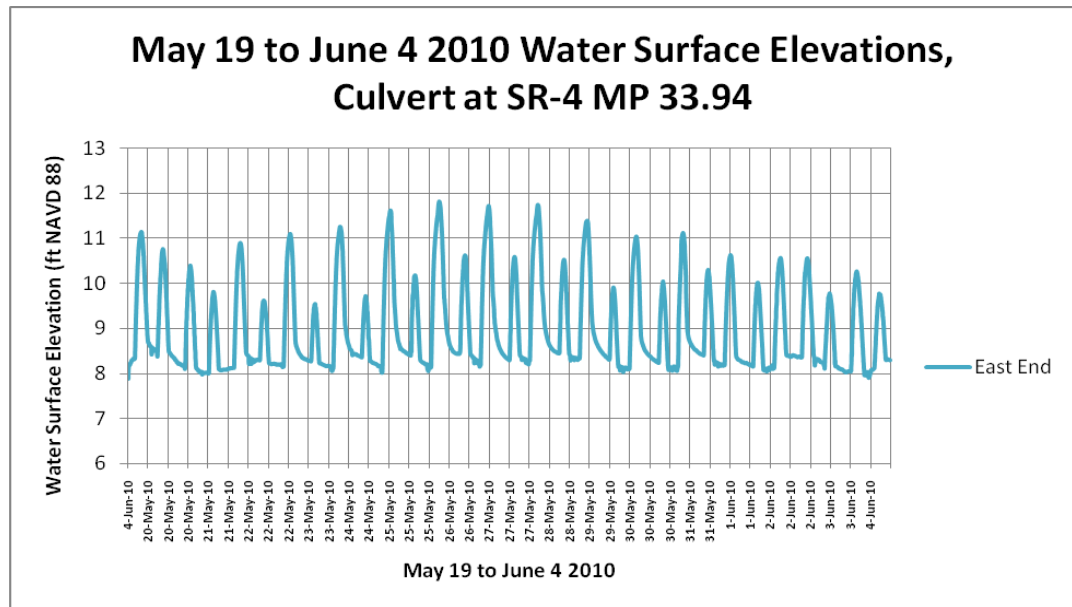


Figure 11. Water surface elevation plots (from hourly readings) from the east end of the culvert at MP 33.94 on Hwy 4.

Condition of physical metrics

Describe the major stressors and physical controlling factors³. Summarize the existing condition of the site. What is the average tidal range, salinity? What is the ordinary high water tide elevation? Extreme high water elevation? Two-year flood elevation?

The Lower Elochoman CLT properties qualify as relatively high quality forested wetlands with intertidal channels, and should be considered to hold significant benefits to salmonids originating in the Columbia River estuary generally. The major impact to the site has been the construction of Hwy 4 through these wetlands which has altered normal tidal exchange between the Columbia River via Elochoman Slough and the site. While a major tidal channel connects the property to the Elochoman River main stem to the north, the southeast connection of this channel to Elochoman Slough has been impacted by the placement of fill material and a limited number of undersized culverts related to construction of Hwy 4. As noted, the tide gate and culvert under Hwy 4 are fish passage barriers to adult and juvenile salmonids. (WSDOT Fish

³ Controlling factors are the basic physical and chemical conditions that construct and influence the structure of the ecosystem.

Passage Inventory 2009).

Water surface elevation plots from the Skamakowa Gage (approximately 4 miles downstream of the site) show that the tidal maximum is about 12 ft NAVD 88. The Mean tidal range is 6.12 ft, diurnal range is 7.56 ft. Water surface elevation plots created from data loggers placed at the site for a two week period in May 2010 show similar tidal range and elevations (see Figures 10 and 11).

Tide	Highest	MHHW	MHW	MSL	MTL	MLW	MLLW	Lowest
Stage (ft)	10.7	9.0	8.3	5.3	5.3	2.4	1.5	0.6

Table 1. Mean elevations for the tides shown at the Skamakowa Gage, Columbia River mile 36, 2002 to 2010.

Skamakowa (rkm 54) is just upstream of the known upstream maximum extent of salinity in the Columbia River estuary (rkm49).

Condition of habitat metrics

Describe the key results of a vegetation survey.

The CLT properties consist of about 200 acres of relatively intact forested wetland and riparian habitat (phase I property) and about 150 acres of land cleared and planted with hybrid cottonwood trees (phase II). Historically, both properties would have been mature Sitka spruce swamp. Over 50 years ago, the conifers were mostly removed, with some patches of trees remaining. Currently, vegetation throughout the phase I property is dominated by 30 to 50 year old alders with some spruce and cedar, native shrubs, and understory. The phase II property has recently been cleared of all tree cover.

Condition of functional metrics

Assess using existing data whether juvenile salmonids are present in the area and within the site. Describe the species composition and population sizes in the immediate or nearby watershed; use any available historical and current fish species and abundance data. Provide context for the potential of the site for fish availability.

See ‘Pre-Assessment’, page 7. Limited fish sampling was done at the site by USFWS in May of 2011. Four beach seine pulls were done both upstream and downstream of the culvert at MP 34.09. Regarding salmonids captured at the site, one (1) coho was captured in the channel immediately east of the culvert, while one (1) coho and two (2) Chinook were captured in the channel west of the culvert.

During pre-project field scoping, juvenile salmonids were observed on several occasions in forested channels and pools throughout the property, in the interior of the site east of Hwy 4 (source: Alex Uber WDFW)

Performance Anticipated:

Physical change

Describe how the action(s) will affect physical controlling factors.

Replacement of the existing undersize culverts and tide gate under Hwy 4 would eliminate tidal muting which is occurring due to flow restriction through these structures and improve fish passage. The result would be overall enhancement of tidal floodplain surface water inundation and ecological function throughout the CLT property, and improved access for salmonids accessing the site from the Columbia River

via Elochoman Slough.

Water surface elevation plots from onsite data loggers and from the NOAA gage at Skamokawa gage (CRkm 54) show that both culverts under Hwy 4 are barriers to fish passage due to insufficient water depth in a typical water year.

For the culvert at MP 33.94, a data logger was placed at approximately the same elevation as the culvert inlet (7.57 ft and 7.53 ft respectively). Resulting WSE plots show that this culvert was tidally inundated at tide elevations greater than about 8 ft. Further, examination of the data from May 20 and 21 show that on these dates the culvert was backwatered by tidal inundation about 40% of the time. Therefore, on these same dates the culvert was not passable to fish about 60% of the time due to inadequate flow depth in the culvert. Stream culvert criteria in WAC 220-110-070 (Washington Administrative Code for Water Crossing Structures) state that a culvert must be passable to fish 95% of the time during the migration period of fish species of concern⁴.

For the culvert at MP 34.09, WSE plots show that, for the time period of measurement, water surface elevations on the west end of the culvert (Elochoman Slough side) exceeded those on the east end (CLT parcel side) by about 1.5 feet at tide elevations greater than about 11 feet. The plots also show that, with an invert elevation of 1.72 at the west end the culvert was fully backwatered during all tides, during this time period. This may indicate that, if fish passage velocity criteria are not being exceeded and if fish blockage by the tidegate lid were addressed, this culvert could meet current fish passage criteria⁵.

It is important to note that the culvert may not be backwatered at lower Columbia River stages and extreme low tides. The Stage-Duration curve⁶ for the Skamakowa gage shows that the invert of the culvert outlet (west end) is approximately at the 95% exceedence elevation of the Columbia River. If the required 0.8 ft depth is added to the 3.15 invert elevation, (~3.85 ft), the stage duration curve shows that the culvert would achieve the required 0.8 ft depth throughout the culvert about the 70% of the time.

Habitat change *Describe the expected condition of habitat after restoration.*

Culvert Replacement

Existing water conveyance structures under SR 4 will be replaced and enlarged to maximize tidal prism, and thus optimize estuarine function on CLT lands. If tidal muting is occurring, the form and width of the natural channels east of the culverts will respond to the increased tidal prism. Both culverts will be 100% passable to juvenile and adult salmonids when sufficiently backwatered by higher tides.

Fish passage will also be improved by replacing existing sheet flow over the existing smooth concrete-lined pre-cast concrete culvert beds with naturally roughened beds comprised of woody material and native bed material present upstream and downstream of the culverts. As a result, fish access to forested wetland habitat east of the Hwy 4 will be improved by shortening the migratory pathway from the Columbia River main stem and Elochoman Slough. (Currently, with fish passage hindered along this portion of Hwy 4, and fish must access the habitat by migrating up the Elochomon River main stem above the Hwy 4 bridge, then

⁴ Design of Road Culverts for Fish Passage, WDFW 2003, Appendix B

⁵ Design of Road Culverts for Fish Passage, WDFW 2003

⁶ Final Implementation Document and Environmental Assessment, Julia Butler Hansen Columbian Whitetail Deer National Wildlife Refuge, Section 536 Habitat Restoration Project Lower Columbia River and Estuary, June 2008 Appendix A

into tidal channels along the north boundary of the CLT properties.

Riparian plantings

Replanted riparian areas would eventually shade out reed canary grass and other non-native species and ultimately become mature forested wetland tree species. Following remnant logging road decommissioning, the interior main tide channel, and several minor channels and associated marshes would be unobstructed.

Process/Function change *Describe the expected changes in ecosystem processes and functions; e.g., juvenile salmon feeding, rearing, refuge, water quality improvement, and off site food web support.*

Enhanced hydrologic connection with Elochoman Slough would potentially benefit juvenile feeding, rearing, and refuge for salmonids originating in both the Columbia and Elochoman Rivers. While adult spawning habitat does not exist on the CLT property, migrating adults could benefit from an overall increase in floodplain connectivity, access and holding habitat.

Certainty of Success:

Landowner support *Describe the willingness and support of the landowner.*

CLT owns the entire, approximately 350 acre phase I and II properties along Hwy 4 (between MP 33.69 and MP 35). WSDOT owns and maintains Hwy 4 and the tide gate and culverts associated with this project. Both landowners are completely supportive of the project. A cost share agreement has been implemented with WSDOT funding the entire cost of the replacing the culvert at MP 33.94. Adjacent landowners have been contacted and informed regarding the project.

Constraints or show-stoppers *Describe potential issues that could inhibit or prevent execution and fulfillment of the project goals and objectives.*

Most of the project constraints have been addressed and permitting is well underway. At this time, no community members have expressed concern with this project.

Restoration technique *Describe the level of acceptance and maturity of the restoration technique; e.g., tried and true or experimental.*

Restoring access to high quality salmon habitat by removing fish passage barriers has been a successful restoration technique implemented in the Pacific NW for decades. The Lower Columbia Fish Recovery Plan and Lower Columbia River Estuary Plan have identified this action as very high priority for salmon restoration.

Natural processes and self-maintenance *Explain the extent to which natural processes would be restored and how well the restoration action(s) are anticipated to be maintained through natural processes.*

The historical t-sheets from the 1870's indicate the CLT properties were originally connected to the Elochoman Slough on the west side of the properties. Removing the human made fish passage barriers and flow constrictions would help restore natural hydrologic processes. Replanting impacted riparian areas with the native Sitka spruce and other conifers would help restore the natural functions of providing shade, recruitment of wood, adding to instream food sources for fish and aquatic insects, and stream bank stabilization to the floodplain habitat.

Community support *Describe the level of support in the community for this project and how local commitment will be demonstrated throughout the life of the project. Describe how the project will promote partnerships (i.e. – among communities, organizations, and agencies.*

The CLT has worked with many of the adjacent property owners in Elochoman River and tidal slough area. Some have expressed their willingness to sell their property to CLT in the future. This project is a partnership between two state agencies (WDFW & WSDOT) and a non-profit group (CLT). We hope to continue fostering this partnership in the future on other nearby project sites such as Indian Jack Slough to remove fish passage barriers along Hwy 4.

This site is highly visible and accessible to the local community. The adjacent Julia Butler Hansen Refuge has thousands of visitors each year. Many people canoe and kayak the lower Elochoman and associated sloughs for fishing, hunting, and birding.

Project management experience

Describe your experience administering and fiscally managing similar projects.

WDFW and WSDOT have managed, designed, and implemented projects of this type for decades. Both agencies are staffed with highly qualified engineers, biologists, project managers and construction crews fully capable of implementing projects of this size and larger.

Potential, Anticipated Access Benefit:

Distance of the project to the main stem Columbia River
Connectedness to mainstem

State distance in river miles from the mainstem Columbia River.

The project site is approximately 0.8 miles from the Columbia River main stem.

Describe how well the project site is currently connected and will be connected to the mainstem after the restoration. Include any historical data on habitat access and quality.

The project site is currently connected to the Elochoman Slough through two culverts (one tide gate) under Hwy 4 (both undersized). There is another connection to the Elochoman River on the North end of the property through a large swale. This swale is confined by an undersized culvert under an old forest roadway. The historical T-sheet in Figure 8 denotes the original location and size of these channels.

The restoration will open up two tidal channels under Hwy 4 to the width of 20' X 12' and 12' X 8' box culverts. During the first phase of this project the old forest road was decommissioned in and the associated 12" and 36" culverts removed. The resulting open swales were recontoured to match the current channel wide. Currently these four culverts mute the Columbia River's tidal influence and act as fish passage barriers.

Species impacted

Describe which species, stocks, or populations are likely to benefit, based on the best available data.

Washington Department of Fish and Wildlife have identified five species of salmonids originating from the Elochoman River including Chinook, coho, steelhead, chum, and sea-run cutthroat trout.

Species life stages which may benefit from this project include:

Chum – Estuary : 0-age transient rearing

Coho -0-age active rearing, 0-age inactive, 1-age active rearing

Winter steelhead – 0,1-age inactive,2+ age active rearing, 2+ age migrant

Fall Chinook Fry colonization, 0-age active rearing, Pre-spawning migrant (LCFRB 2004) and all life stages of sea-run cutthroat.

Recent ('Spring through December 2012) sampling data results were obtained from USFWS (Jeff Johnson) from recent work in areas surrounding the site (see Table 2 below). All three sites shown in Table 2 are just downstream of the proposed SR-4 culvert/tide gate replacement project. Two sites (Duck Lake and Indian

Jack Slough) are on the Julia Butler Hansen wildlife refuge. As details documenting these results was not available, these data should be used to support salmonid presence/absence confirmation in the lower Elochoman River generally.

Sum of Total Number Row Labels	Column Labels			Grand Total
	DUCK LAKE	INDIAN JACK	SOUTH HUNTING EAST	
CHINOOK SALMON	143	201	62	406
CHUM SALMON			3	3
COHO SALMON	31	20	38	89
Grand Total	174	221	103	498

Table 2. 2012 fish sampling results from three areas adjacent to the site confirming the presence of salmonids. (source: Jeff Johnson, USFWS)

It is not known if genetic analysis was, or will be completed to indicate stock of origin of these fish, so it is not known if sampled fish are of in-basin (Elochoman River) or out-of-basin (Columbia River) origin. However, the following species from these ESA listed populations could potentially access the site: Snake River spring/summer Chinook Salmon, Snake river Fall Chinook Salmon, Upper Willamette River Chinook, Lower Columbia Coho, Lower Columbia Chinook, Lower Columbia Chum, and Upper Columbia River Spring Chinook.

**Potential,
Anticipated
Capacity
Benefit:**

Habitat
complexity

Describe habitat complexity, channels, large woody debris.

The CLT properties were historically tidal Sitka spruce dominated wetlands seasonally inundated by high Columbia River flows/tides via Elochoman Slough. Remnants of these historic wetlands remain in some locations near the site (see ‘Adjacent lands’ section below). While most mature Spruce has been logged off the property, the phase I CLT parcel is forested with Alder, Willow, Cedar and other tree species, with diverse understory vegetation. Beaver dams are present on tidal channels throughout the property, and large woody debris is present throughout channels on this parcel.

The phase II parcel has been cleared of all native vegetation, and natural channels have been filled and the property has been ditched to drain wetlands. As noted, CLT has purchased the property, but an agricultural easement held by the seller will remain in place until 2022, at which time restoration efforts can commence on this parcel. Habitat complexity is current considered low on this property.

Water quality
Invasive species

Describe water quality.

Describe impacts from invasive plant and animal species.

Water quality at the site is most likely improved by proximity to the lower Elochoman River, which influences the hydrology of the CLT properties. While temperature, or other water quality monitoring has not been completed, the Elochoman River may be contributing lower temperature flows to wetland habitats in the area.

Numerous invasive plant, fish, and other species are present throughout the lower Columbia River, and these species have no doubt been able to colonize the intertidal habitat throughout the CLT owned lands along the lower Elochoman River. On the phase I property, Reed Canary Grass proliferation has been kept in check by the presence of dense forest and understory vegetation cover throughout the site.

Most of the disturbed habitat is associated with the abandoned logging road built when the site was logged. As noted, as part of phase I work, this forest road has been decommissioned and replanted with native trees and shrubs, including Sitka Spruce. While there remain patches of reed canary grass and Himalayan blackberry along this road, overall dense forest cover on the property has controlled their proliferation.

Adjacent lands *Describe the condition of adjacent lands.*
 To the north of the CLT property, across the Elochoman River, is the 210 acre Indian Jack Slough (also owned by CLT). This property has been diked, ditched, and has undergone significant subsidence (see Figure 8). Indian Jack Slough, the main drainage feature on this parcel, drains under Hwy 4 and is controlled by a self-regulating tide gate (constructed in 2011 by the Corps of Engineers) built on USFWS land. Flow through the tide gate is controlled so that water surface elevations on USFWS and CLT lands remain in the lower half of the tide frame (~5.3 ft). Significant wetland restoration potential exists on this area. As noted, CLT has recently purchased the 150 acre poplar plantation to the east, which will be the basis for phase II restoration work. While this section of land has been purchased by CLT, an agricultural easement allowing continued hybrid –cottonwood farming will remain in place until 2022⁷. Restoration actions will most likely be undertaken on this property after the easement expires. Property to the south is privately owned and used for industrial and timber processing. Hwy 4 and the USFWS Julia Butler Hansen Wildlife Refuge border the CLT properties to the west.

Monitoring:

Monitoring plan *Describe any long term monitoring plan that has been developed for the site. Describe how anticipated results will be measured and used.*

Reference site *Describe any reference site(s) that have been identified.*
 As noted on page 1, post project monitoring will occur at the site between 2014 and 2019 and will include water surface elevation and temperature measurements. In addition, photo points will be established and site changes through time (ie channel geometry, vegetation growth etc) will be documented. This level of monitoring is in accordance with the ‘Standard - Level 3’ effort required for most BPA funded Columbia River estuary projects⁸.

Relatively undisturbed intertidal wetlands are present which could be used as restoration reference near the site. In this regard, Hunting Island, directly west of the project, has been surveyed for juvenile salmonid presence (see Table 2, pg 22). In addition, basic water quality monitoring (DO, Conductivity, pH, Turbidity, Transparency)⁹ has been completed, and is expected to continue in the future.

Management

Plans: *Explain how the project is consistent with the Estuary Partnership’s Management Plan (<http://www.lcrep.org/complete-plan>) and other regional plans.*

Consistency with regional management plans *Describe any long-term management plan that has been developed for the site. For acquisition projects, list any possible restoration actions that have been identified for the site.*

Site management plan This project is consistent with the Lower Columbia River Estuary Partnership’s management plan for protecting the lower Columbia River and estuary. Specific action goals that the project would support include:

Action 2. Protect, conserve, and enhance identified habitats, particularly wetlands, on the mainstem Columbia River.

⁷ Pers Comm, Jan 30 2013, Scott McEwen, Columbia Land Trust

⁸ ‘Action Effectiveness Monitoring’ protocols outlined in the 2013 Columbia Estuary Ecosystem Restoration Program (CEERP) Strategy Report (BPA, USACE July 2012)

⁹ Julia Butler Hansen National Wildlife Refuge: Assessment of Fishes, Habitats, and Tide gates in Sloughs on the Mainland 2007, 2008 Progress Report Prepared By: Jeffrey Johnson, Jennifer Poirier, Sara Ennis, Timothy A. Whitesel, U.S. Fish and Wildlife Service Columbia River Fisheries Program Office, Population & Habitat Assessment Program, 1211 S.E. Cardinal Court, Suite 100 Vancouver, Washington 98683, May 2009

Action 4. Preserve and /or restore buffer areas in appropriate locations along tributaries and the Columbia River to a condition that is adequate to maintain a healthy, functioning riparian zone for the lower river and estuary.

Action 5. Restore 3,000 acres of tidal wetlands along the lower river 46 river miles to return tidal wetlands to 50 percent of the 1948 level.

The proposed project is consistent with *The Columbia River Estuary ESA Recovery Plan Module for salmon and steelhead* as referenced in the previous section “Linkage to the Estuary Module”.

According to the LCFRB’s plan and 6-Year Habitat Strategy, this project will benefit juvenile salmonids from the Columbia River and Elochoman subbasins. It will *restore the connectivity between river and floodplain, tidally influenced reaches of tributaries, as well as in-river habitats for rearing juvenile salmonids*. It will also benefit foraging adults.

CLT has developed a reforestation plan entitled “Lower Elochoman and Indian Jack Slough Reforestation Plan” This plan was used to re-vegetate the abandoned roadway (completed summer 2012) and spoils site.

Comments: *Include comments or other pertinent information.*

SECTION 3: PROJECT BUDGET

Applicants shall provide an itemized budget describing how funds will be spent and the details of the project’s cost-share. Cost-share is not required for projects to be awarded funding. Although cost-share is not required, if matching funds are available for the project, please include them in the itemized budget. Using this Excel template (<http://lcrep.org/sites/default/files/restoration/docs/Estuary%20Partnership%20Application%20Budget%20Form.xls>) describe each task in detail, provide cost estimates for each task, and provide justification for the estimates (unit costs, units, etc.).

A budget summary for the construction portion of the Lower Elochoman SR-4 culvert replacement project is shown below:

Instructions:
 Complete budget detail for each Task included in the SOW using the expense categories listed below.
 Include sufficient description of how expenses were calculated using unit cost where applicable.

Lower Elochoman SR-4 culvert Replacement Estuary Partnership BPA/WSDOT Budget Feb 2013		Quantity	Unit	Cost per Unit	Total Cost	BPA Expense	Cost Share Expense	Cost Share Source
Task 1.	Finalize Design and Specifications							
Task 2.	Construction Site Prep							
	<i>Supplies: Sheet Pile Materials</i>	1600	sq ft	\$40.00	\$64,000	\$32,000	\$32,000	WSDOT SW Region
	<i>Supplies: BMP Materials</i>	400	foot	\$4.00	\$1,600	\$800	\$800	
	<i>Contractual: XYZ Construction</i>	2200	hour	\$150	\$330,000	\$165,000	\$165,000	
				Task Subtotal	\$395,600	\$197,800	\$197,800	
Task 3.	Culvert Construction					\$0		
	<i>Supplies: Box Culvert materials</i>	190	foot	\$800	\$152,000	\$76,000	\$76,000	WSDOT SW Region
	<i>Supplies: Bedding materials</i>	250	foot	\$1,000	\$250,000	\$125,000	\$125,000	
	<i>Supplies: Road restoration and safety</i>	35100	sq ft	\$1.50	\$52,650	\$26,325	\$26,325	
	<i>Contractual: XYZ Construction</i>	2365	hour	\$150	\$354,750	\$177,375	\$177,375	
	<i>Other: Permits</i>	0	fee	\$0	\$0	\$0	\$0	
				Task Subtotal	\$809,400	\$404,700	\$404,700	
Task 4.	Project Management					\$0		
	<i>Personnel: Project Management Staff</i>	10640	hour	\$35	\$372,400	\$186,200	\$186,200	WSDOT SW Region
	<i>Other: Project Management Overhead</i>	10,640	hour	\$7	\$74,480	\$37,240	\$37,240	
				Task Subtotal	\$446,880	\$223,440	\$223,440	
Task 5.	Effectiveness Monitoring					\$0		
	<i>Personnel: Monitoring Manager</i>	216	hour	\$35	\$7,560	\$3,780	\$3,780	WSDOT SW Region
	<i>Personnel: Monitoring Technician</i>	216	hour	\$30	\$6,480	\$3,240	\$3,240	
	<i>Supplies: Post anchors</i>	1	post anchor	\$200	\$200	\$100	\$100	
	<i>Supplies: Trap net</i>	1	net	\$400	\$400	\$200	\$200	
	<i>Other: Boat Rental</i>	9	day	\$150	\$1,350	\$675	\$675	
				Task Subtotal	\$15,990	\$7,995	\$7,995	
Task 6.								
				Task Subtotal	\$0	\$0	\$0	
TOTAL					\$ 1,667,870	\$ 833,935	\$ 833,935	
PERCENTAGE TOTAL					100%	50%	50%	

Provide a short narrative describing what information was used to develop the budget (i.e., contractor or engineering estimates, past project experience), any assumptions used for specific budget elements, and explanations for any unusual costs. Provide an estimate for future costs necessary to complete the restoration project.

Information used to develop the project budget was from WSDOT SW Region project manager John Brooks, who supplied the total project construction costs for replacement of both SR-4 culverts. Cost share break out is based on an assumed 50/50 split between WSDOT and BPA. An addendum to an April 2012 'Interlocal Agreement' between WSDOT and WDFW is shown below. It should be noted that the BPA cost share obligation shown exceeds the most recent project construction cost estimate provided by WSDOT by just under 20% (\$991,900 vs \$833,935). However, the BPA cost estimate was formulated prior to the more recent WSDOT estimate, and a cost adjustment estimate may be necessary to align the cost share portions.



Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

April 19, 2012

In reply refer to: KEW-4

Mr. Mike Barber
Stream Restoration Program Manager
Washington State Department of Transportation
310 Maple Park Ave SE
Olympia WA 98504-7331

RE: Projected BPA Costs for Correction of Fish Passage Barriers
At SR4: MP 34.09 and MP 33.94

Dear Mr. Barber:

This is a follow up letter to confirm the dollars the Bonneville Power Administration (BPA) will contract with Washington Department of Fish and Wildlife (WDFW) for the completion of the above mentioned project. Please refer to the BPA letter dated April 4, 2012 for further details on the project.

BPA will contract with WDFW for the following:

Project Engineering	\$116,000
Construction	\$991,900
Total	\$1,107,900

Please contact me by phone at 503-230-3098 or by email at jpkarnezis@bpa.gov with any additional questions you may have.

Sincerely,

Jason P. Karnezis
Fish & Wildlife Project Manager

cc. Mr. Steven Vigg, Washington Department of Fish and Wildlife, Habitat

Awards may be made for less than the full amount requested by the applicant.

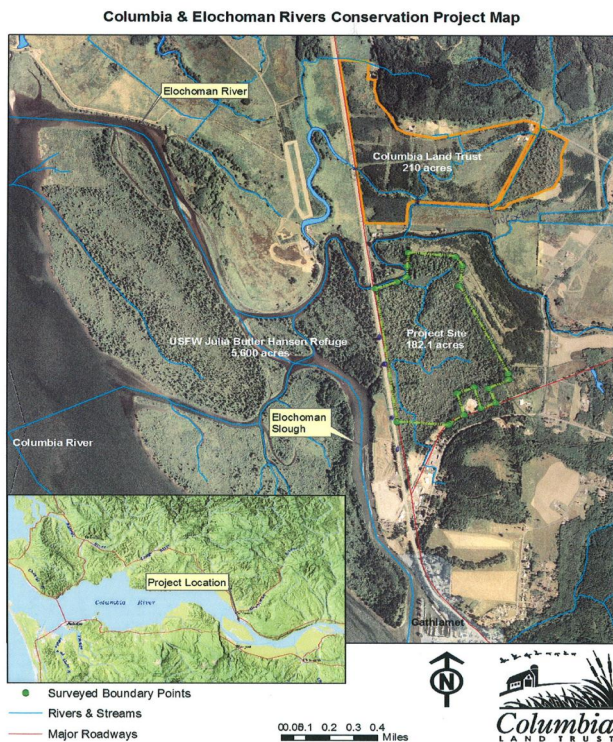
In-kind contributions may be used as cost-share (not required). They are subject to the following limits:

- In-kind contributions shall relate directly to the proposal.
- In-kind contributions are limited to time, material, or real or personal property donated to the sponsoring organization to fulfill project requirements.
- Volunteer time may be donated at a rate not to exceed \$20.00 per hour.
- Contributed time from individuals receiving compensation through the grant may not be counted as an in-kind contribution.
- Advisory groups or committee time is not eligible. An advisory group or committee is a group that provides advice about the project to the sponsoring organization.
- Donations of indirect costs, per diem, travel and subsistence expenses are not allowable, nor are studies conducted by other state or federal agencies.
- In-kind contributions shall be fully documented and reported separately when requesting reimbursement. In-kind contributions performed prior to the execution of the grant agreement or funded under another grant are not eligible.

SECTION 4: MAP AND PHOTOS

Please include a project map and photos of the project site. Please attach photos, including those used in Section 2 (Project Narrative), in JPEG format, separately.

Site Map



Site Map (source Columbia Land Trust)

Site Photos



Site Photo 1: Outlet and tide gate at SR-4 MP 34.09.



Site Photo 2: Inlet culvert and tide gate at SR-4 MP 34.09.



Site Photo 3: Outlet of culvert at SR-4 MP 33.94



Site Photo 4: Inlet culvert at SR-4 MP 33.94.



Site Photo 5: North end abandoned logging road culvert and fill (removed summer 2012).



Site Photo 6: South end abandoned logging road culvert and fill.

Completed applications must be submitted electronically (in MS Word format) to:

ccorbett@estuarypartnership.org

Catherine Corbett

Chief Scientist

Lower Columbia Estuary Partnership