WASHINGTON STATE
Recreation and
Conservation Office

Final Report

Project #09-1463, Livingston Bay Pocket Estuary Restoration

Submitted by Misha Henshaw on 03/20/2013 Accepted by Mike Ramsey on 03/29/2013

CONTACTS

Primary Sponsor: The Nature Conservancy

Lead Entity: Island County LE

Managing Agency: Rec. and Conserv. Office

Project Contact: Kat Morgan
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RCO Grant Manager: Mike Ramsey
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DESCRIPTION OF THE COMPLETED PROJECT

Project Start Date: 12/10/2009 **FundingEnd Date:** 12/31/2012 **RCO Closure Date:** 03/29/2013

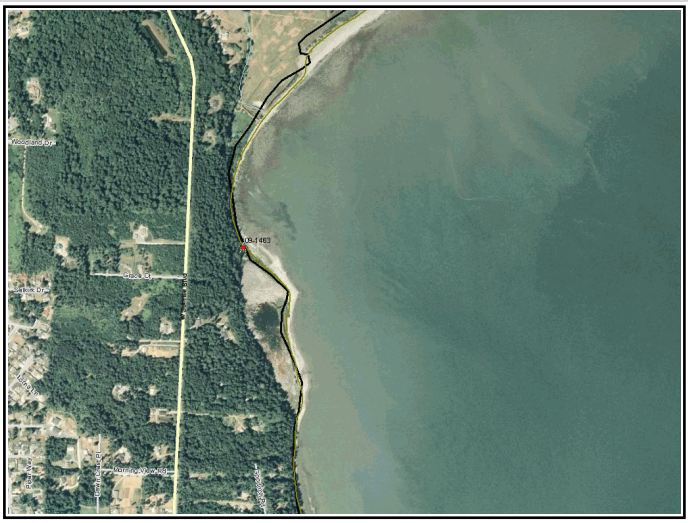
The Livingston Bay Pocket Estuary Restoration Project has restored ecological functionality, including salmon and forage fish access, to one of the highest value habitats in the WRIA 6 priority geographic area of Port Susan Bay. Chinook populations as well as other salmon species, such as bull trout and steelhead that originate in watersheds on the north Puget Sound mainland, depend on the nearshore habitats of Port Susan Bay to forage and rear as juveniles before heading into the ocean as adults. With more than 60% of Island County's coastal lagoons isolated from natural tidal processes, completing this opportunity for restoration of the 10 acre pocket estuary in Livingston Bay directly aligned with Island County's highest priorities for multi-species salmon recovery.

The Nature Conservancy's contractors removed approximately 100 feet of artificial dike and excavated a tidal channel connecting to the bay that restores tidal processes to the interior of the pocket estuary. The dike was built in the early to mid 1900s for the purpose of grazing livestock on the interior and was also used as a landing strip for small planes. A natural breach in the dike occurred at the southern end of the pocket estuary during storm events sometime in the late 1970s and 1980s, which has resulted in infrequent tidal inundation and large woody debris capture in the lagoon. This breach at the southern end of the site was repaired by creating a beach berm which will allow for more effcient tidal exchange at the new dike breach location at the north end of the pocket estuary. The new levee breach, tidal channel excavation, and southern breach repair allows natural processes to occur on a more regular basis, and has restored habitat for salmon and other fish and wildlife species.

SITE LOCATION

General Area of Project: Livingston Bay, Island County.

Waterbodies: Puget Sound



Cong District:	02
Cong District 2012:	02
County:	Island
HUC:	KITSAP
Leg District:	10
Leg District 2012:	10
Salmon Recov Reg 05:	Puget Sound
Section:	29
Township/Range:	T32NR03E
WAU:	CAMANO IS

Sponsor Clarifications:

Sponsor verified the above information is correct and complete.

PROJECT NARRATIVE

Final Project Report Narrative

The goal of the Livingston Bay Pocket Estuary Restoration Project was to return tidal exchange to a 10 acre pocket estuary to allow for fish and wildlife habitat, specifically salmon habitat. The site had been diked off in the early to mid 1900s and was used as pasture and according to neighbors, as a landing strip for small planes. Sometime in the late 1970s and 1980s, a breach occurred in the dike at the southern end of the property. This allowed wood to begin to accumulate into the site and during very high water events water would enter the pocket estuary but then have no efficient way to drain out. Over the years, more and more wood accumulated at the site and mosquito control was required in the stagnant water that remained at various levels over the course of each year.

Restoration work commenced at the Livingston Bay Pocket Estuary on September 17, 2012 when a barge arrived at the site with equipment to complete the project (Figure 1). Please see attached document titled "Construction and Post Project Photos" with photos and figures that supports this narrative. Leading up to the momentous date in September, The Nature Conservancy (TNC) had purchased the property in 2009, with funding from SRFB, with the intent to restore the site and spent approximately one and a half years working to prepare the restoration design, securing permits to complete the work, and finding contractors to complete the design and restoration work. A barge was required to bring equipment to the site because the site is located at the base of a steep bluff with no options for entering the site by road. A big part of making the project happen was securing an access agreement with neighbors to allow walking access to the site for project managers, engineers, permitters, contractors, and others (see lessons learned below).

After the equipment arrived on September 17, crews from Sealevel Bulkhead Builders, Inc. spent approximately one month completing the restoration efforts. The last day of construction activity was October 10, 2012 and the barge and equipment left the site at a high tide on October 11. Sealevel Bulkhead Builders, from Edmonds, WA was hired to complete the construction at the site. TNC worked with two other firms for the design and permitting work including Coast and Harbor Engineering who completed the design and Hart Crowser who subcontracted with Coast and Harbor to assist with permit applications. Additionally, TNC contracted with Herrera Environmental to serve in a role of construction manager and provide construction oversight expertise.

Figure 2 shows the various aspects of the restoration design and construction activities that were included in the project. The major aspects of the restoration included a dike breach at the north end of the project site (“North Levee Breach”) and the excavation of a tidal channel (“Tidal Channel Excavation”), starting at the point where the levee was breached and extending north to connect to the bay. Tidal channels were not constructed within the new pocket estuary, but wood was relocated in the area surrounding the levee breach to prevent wood from plugging the breach and with the expectation that new channels will form and connect to remnant channels (as depicted in Figure 2). In addition to the work at the north end of the site, work was done to repair the breach that occurred at the sound end of the site starting in the mid 1980s (“South Breach Repair”). This was recommended by the design engineers to create more efficient tidal exchange at the North Levee Breach and to restore the site in a way that was most similar to historic conditions without the more expensive option of removing the entire dike. Full dike removal would have involved barging fill material from the site at a very high cost.

Lastly, an old mobile home, wood shed, and truck were removed from the site (“Demolition Work”) that had been left at the site to decay. At one time a road entered the site from the north but has since been abandoned and is no longer usable.

Early construction activity involved clearing paths for construction equipment and clearing and grubbing the areas where work would occur. Figure 3 shows two excavators clearing the footprint for the North Levee Breach and Tidal Channel Excavation. Figure 4 shows an excavator relocating wood away from the North Levee Breach location. After completing construction surveying and clearing the area for construction, the actual work could begin. Figures 5 and 6 show the work done to excavate the tidal channel outside of the North Levee Breach area. The channel was dug during low tide periods when water was not present and completed prior to breaching the levee.

The next activity in the sequence of work involved completing the South Breach Repair. Logs and debris were cleared from the footprint of breach repair area and fill material from the tidal channel excavation and North Levee Breach were used as the base for the South Breach Repair. Figure 7 shows the South Breach Repair area after it has been cleared and base fill material is being placed. In addition, two loads of rock material were barged in to be used as material to cap the top and front face of the new beach berm, as called for in the restoration design. The rock material imported was sized to match existing rock material on the beach at the site. Figure 8 shows the rock placed and the South Breach Repair near completetion. Logs and driftwood were relocated back on the face of the levee to make it look natural and to help protect the new South Breach Repair.

Before completing the North Levee Breach, one additional activity included removing a mobile home, wood shed, and old truck, and associated debris from the site. The debris and garbage were taken out on the barge when the construction equipment was barged out at the end of the project. Figure 9 shows the mobile home prior to demolition and removal.

The last part of project involved completing the North Levee Breach. Channel work and wood relocation was completed on either side of the levee and the levee was slowly removed as shown in Figure 10. Some of the fill was used at the South Breach Repair but the majority of the fill material was placed in an upland fill disposal area where the old shed and mobile home were located before demolition. This upland fill disposal area is located at a higher elevation and away from the pocket estuary and the area was seeded and surrounded with silt fence at the end of construction activities. Figures 11 and 12 and Figures 13 and 14 show before and after pictures of the North Levee Breach and associated channel that goes through the North Levee Breach. Figures 15 and 16 show one of the first tides to come into and fill the new tidal channel, bringing tidal exchange into the site. The site has been performing as we hoped since construction with the pocket estuary received regular tidal exchange. Figure 17 shows a picture of the interior of the pocket estuary on January 13, 2012 during a very high tide event at Port Susan Bay. For comparison after restoration, Figure 18 shows the same area in the interior of the pocket estuary during another very high tide event on December 17, 2013.

Successes/Need for Adaptive Management

As discussed above, the site is performing as desired and tidal exchange is occurring at the site. The Stillaguamish Tribe will complete post project monitoring activities under a subaward beginning in February 2013. Funding for this monitoring work is from NOAA and private funding from TNC. The Tribe will measure fish density, relative abundance, and species assemblages at the site between February and August 2013. In addition, in the summer of 2013, a survey of the new tidal channel will be completed and compared with the dimensions of the channel when it was first constructed. This will inform us more about the performance of the channel. Lastly, quarterly monitoring photos are being taken through 2013, like those in Figures 11 - 14, to show how the project site changes over time.

Total Project Cost

Total project budget including design, permitting, construction management, construction, and post project monitoring was approximately $277,798.74. Project funders included Washington State Salmon Recovery Funding Board, Washington State Department of Natural Resources (Jobs Bill funding), NOAA, and private TNC donors.

Total Acres Restored and Jobs Created

The area of the pocket estuary restored is 10 acres. Just during construction alone, thirteen people including project managers and laborers worked on this project, contributing approximately 422 hours of work.

Lessons Learned

It is important to engage landowners and neighbors early in the process for projects like these. It was assumed there would be a way to access the site from old roads that traveled through neighboring properties. This turned out to not be possible for a number of reasons so it was determined that equipment would have to be barged to the site. Outreach to neighboring landowners that were willing to allow hiking access by trail allowed engineers, contractors, permitters, funders and TNC personnel to access the site. Without this access access agreement to complete design, permitting and other work, the project would have stalled and not gone forward.

Also, engagement early on with the neighbor at the south end of the property was also critical. The site work involving the South Breach Repair extended on to the neighbor's property. With the neighbor's support of the project, a temporary access agreement for construction was created which was essential for obtaining permits.

Lastly, engaging permitters and cultural resources professionals early is also critical to moving a project forward on a short timeline. A site visit was held for all permitters early on which was helpful in allowing the permitters to see the site and project components first hand and understand the challenges involved with the restoration effort. Also, and archaeologist was hired early on to complete a site assessment and survey and local Tribes were invited to the site for a site visit with the archaelogist and encouraged to visit the site during construction and restoration as desired.

Funds were also secured for post project ecological monitoring which was important in securing permits and will allow project partners to better understand the ecological outcomes resulting from the restoration efforts.

OVERALL PROJECT COSTS

Funding Formula:	Requested		Original		Final	
Puget Sound Acq. & Restoration:	$209,675.00	(85%)	$209,675.00	(85%)	$209,675.00	(85%)
Sponsor Match:	$37,000.00	(15%)	$37,000.00	(15%)	$37,000.00	(15%)
Total:	$246,675.00	(100%)	$246,675.00	(100%)	$246,675.00	(100%)

Paid To Date:	$209,675.00				**Last Released Billing:**	03/29/2013
Remaining RCO Funds:	$0.00				**Pending Billing:**	No
Advance Balance:	$0.00		**Match Bank:**	$0.00	**Number of Billings:**	6
Admin Limit:	$0.00		**Admin Spent:**	$0.00		
A&E Limit:	$56,925.00	30.00%	**A&E Spent:**	$61,063.04	24.75%	

Billed Cost Summary:	Original Agreement	Expended	Non-Reimbursable	Total Billed
Restoration				
Construction	$189,750.00	$164,590.17	$52,145.53	$216,735.70
A&E	$56,925.00	$45,084.83	$15,978.21	$61,063.04
Restoration Total	$246,675.00	$209,675.00	$68,123.74	$277,798.74
Total	$246,675.00	$209,675.00	$68,123.74	$277,798.74

Project Cost Metrics:	Original Agreement	Final
PCSRF Federal Funds:		
State Funds:		$209,675.00
		State funds in the amount of $209,675 will be spent on this award. There is a final invoice pending that includes $162,538.78 in reimburseable expenses and also includes $47,411,92 in non-reimburseable match.
Pending Billing - RCO Share Approved:		
		Pending Billing amount in Invoice 147029-3928-6F is $162,538.78
Retainage - RCO amount retained:		$0.00
Amount of other monetary funding:	$37,000.00	$68,123.74
		Total of non-reimburseable match contributed to this project = $68,123.74. The amount previously reported as non-reimburseable match totaled $20,711.82. The amount to be reported on invoice voucher 147029-3928-6F totals $47,411.92.
Project identifier for the other monetary funding:	N/A	N/A
Source of other monetary funding:	USFWS - National Coastal Wetlands Conservation Grant - $37,000	WA DNR - Livingston Bay Jobs Bill - $42, 372.88 NOAA CRP Grant - $25,750.86
Value of Donated Unpaid Labor (Volunteers):	$0.00	$0.00
Source of Donated Un-paid labor contributions:	N/A	N/A
Number of hours volunteers contributed to the project:		0
Describe how the value of the volunteers was determined:		N/A
Value of Donated Paid Labor:	$0.00	$0.00
Source of Donated Paid Contributions:		N/A
Value of Other In-Kind Contributions:	$0.00	$0.00
Source of Other In-Kind Contributions:		N/A
Description of other In-Kind contributions:	N/A	N/A

PROJECT METRICS

	Original Agreement	Final
Completion Date		
Projected date of completion:	12/31/2012	03/31/2013
Project Goals		
Goals, purpose, and expected benefits:		Project was completed in October 2012 and permission was received to extend final reporting until March 31, 2013. The project has restored estuarine and nearshore conditions and processes to the pocket estuary that is now connected to the larger Livingston Bay. The objective of restoring shoreline habitat diversity and function has been achieved. 10 acres are now receiving regular tidal innundation and the site is being monitored in 2013 for fish use and density.

WORKSITE #1: Livingston Bay Pocket Estuary

Worksite Description: Livingston Bay is located in the northwest portion of Port Susan Bay and consists of approximately 1,000 acres of highly productive and ecologically important intertidal mud flats and fringing tidal emergent marshes. The north and east extents of the bay are dominated by diked farmland and the west shoreline is characterized by mature forested marine riparian bluffs and pocket estuary habitat. The restoration site is the 10 acre pocket estuary in the nortwest Livingston Bay.

Driving Directions: The Worksite can be viewed by taking Interstate Highway I-5 Exit 212 (Stanwood/Camano Island), then traveling west on State Highway 532 through Stanwood. Travel approximately 3 miles after crossing the bridge marked "Stillaguamish River". Continue traveling on Highway 532 for approximately 2.5 miles. Livingston Bay can be seen by looking south.

Coordinates for Worksite Directions - Latitude: 0.00 **Longitude:** 0.00

Sponsor Clarifications:

Sponsor verified the above information is correct and complete.

Access/Entry Latitude = 48.22477
Access/Entry Longitude = -122.45345

WORKSITE #1 COSTS

Worksite Billed Cost:	Estimated	Expended	Non-Reimbursable	Total Billed
A&E	$56,925.00	$45,084.83	$15,978.21	$61,063.04
Construction	$15,000.00	$164,590.17	$52,145.53	$216,735.70
Worksite Total	$71,925.00	$209,675.00	$68,123.74	$277,798.74

Worksite Costs by Category:	Original Agreement	Final
Estuarine / Nearshore Funding:	$209,675.00	$203,042.00
		The final total for this category = $203,053 and is the total Estuarine/Nearshore funding net of the permitting, cultural resources, and A&E expenses for this project. The amount previously invoiced for including all RCO funds totaled $47,136.22. The amount included on the final invoice totals $162,538.78. Please note that an additional $31,123.74 in non-reimburseable match was contriubted to this project.
Cultural resource funding:		$6,308.00
		Final Cultural Resources expenses totaled $6307.80.
Permits Funding:		$7,386.00
		Contract expenses required to complete the permitting totaled $7,386
Architectural & Engineering Funding:		$61,063.04
		Total expenses for A&E which also inlcude non-reimburseable expenses totaled $61,052. Please note that an additional $31,123.74 in non-reimburseable expenses were contributed to this project.

WORKSITE #1 METRICS

	Original Agreement	Final

Targeted salmonid ESU/DPS:	Chinook Salmon-Puget Sound ESU, Chum Salmon-Hood Canal Summer-run ESU, Chum Salmon-Puget Sound/Strait of Georgia ESU, Coho Salmon-Puget Sound/Strait of Georgia ESU, Pink Salmon-Even year ESU, Pink Salmon-Odd year ESU, Sockeye Salmon-Baker River ESU, Steelhead-Puget Sound DPS	Chinook Salmon-Puget Sound ESU, Chum Salmon-Puget Sound/Strait of Georgia ESU, Coho Salmon-Puget Sound/Strait of Georgia ESU, Pink Salmon-Odd year ESU, Steelhead-Puget Sound DPS
Targeted species (non-ESU species):	Bull Trout	Bull Trout
Miles Of Stream Treated/Protected:	0.00	0.00
Project Identified In a Plan or Watershed Assessment:	Puget Sound Chinook Salmon Recovery Plan - Island County Chapter	Puget Sound Chinook Salmon Recovery Plan - Island County Chapter
Type Of Monitoring:	Implementation Monitoring	Implementation Monitoring
Monitoring Location:	Onsite	Onsite
Estuarine / Nearshore Project		
Total Amount Of Estuarine / Nearshore Acres Treated:	0.1	0.1
Dike Or berm modification / removal		
Total cost for Dike Or berm modification / removal:		
Miles Of Dikes Removed:	0.02	0.02
Acres of Habitat Made Available To Salmonids through dike or berm modification/removal:	10.0	10.0
General restoration activities		
Implementation monitoring		
Total cost for Implementation monitoring:		
Number of site visits:	12	
Cultural Resources		
Cultural resources		
Cultural resource work completed : Acres excavated:		1
Cultural resource work completed : Hours of monitoring required:		0
Cultural resource work completed : Number of structures documented:		0
Total cost for Cultural resources:		
Acres surveyed for cultural resources:	3.00	10.00
Permits		
Obtain permits		
Total cost for Obtain permits:		
Number of permits required for implementation of project:		4
Architectural & Engineering		
Architectural & Engineering (A&E)		
Did A&E costs exceed billed amount (Yes/No):		No

PROPERTY DESCRIPTION (Nelson)

Activity: Restoration

Control & Tenure:

Instrument Type: Sponsor owned property

Timing: Proposed

Term Length: Perpetuity **# yrs:**

Expiration Date:

Landowner Type: Private **Note:**

Sponsor Clarifications:

Sponsor verified the above information is correct and complete.

Sponsor Clarifications:

SPONSOR CERTIFICATION

[X] I certify that this project has been completed in accordance with the project agreement.

[X] I certify that, to the best of my knowledge, the information in the Final Report is true and correct.

Submitted by Misha Henshaw on 03/20/2013