# Appendix C-3: Restoration, Acquisition, and Combination Project Proposal

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| **Project Number** | 18-1366 |
| **Project Name** | Crescent Harbor Creek Restoration |
| **Sponsor** | Skagit River System Cooperative |

List all related projects previously funded or reviewed by RCO:

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| --- | --- | --- |
| **Project # or Name** | **Status** | **Status of Prior Phase Deliverables and Relationship to Current Proposal?** |
| 13-1112 | Completed | All deliverables have been completed. Restoration design will be used for construction |
| 04-1217 | Completed | All deliverables have been completed. This project is directly connected to lower Crescent Harbor Creek and would benefit from restoration of the creek. |

**Project brief.** *In one or two sentences, what do you propose to do?*

We propose to use SRFB funds to restore Crescent Harbor Creek to a historic floodplain alignment by implementing restoration actions developed through the Crescent Harbor Creek Restoration Design project (PRISM # 13-1112). Restoration of the creek, which is a tributary to the restored Crescent Harbor Salt Marsh (PRISM # 04-1217) , will reduce stream velocity, improve floodplain connectionsin-channel complexity, and water quality, and will restore native wetland hydrology to the site.

**Project location.**

The Crescent Harbor Creek project site is situated at the lower end of the Crescent Harbor watershed, one of the largest watersheds on Whidbey Island. The northern extent of the project site is located at a culvert outfall beneath Crescent Harbor Road and the southern boundary is located at the MHHW elevation (+9.45’ NAVD88) of the salt marsh into which Crescent Harbor Creek drains. The project site is bordered to the east and west by former agricultural fields and pasture land, now laying fallow and owned and managed by the US Navy. No large water bodies exist in the watershed, though several agricultural ponds are located upstream of the project site in a realtively small watershed emcompassing approximately 600 acres (Mickelson 2009) .

1. **Problem statement.***.*

Crescent Harbor Creek is a small stream located on Whidbey Island just north of Crescent Harbor, on Naval Air Station Whidbey Island (NASWI). The stream drains into the northwestern edge of the Crescent Harbor Salt Marsh, a 206 acre tidal channel wetland that was the site of a large SRFB- and ESRP-funded restoration project that was completed in 2009. Monitoring of the restoration project has included the lower 1,000 LF of Crescent Harbor Creek, documenting usage of stream channel habitat by juvenile Chinook and coho salmon, as well as by other native fish species.

The stream channel in this reach has been diked and diverted from its historic alignment into an incised ditch, reducing channel length and increasing flow velocity. The deeply incised ditched channel is much lower in elevation than the historic channel thalweg. Groundwater monitoring wells on the site have indicated that the diked stream is altering the hydrology of adjacent forested and scrub-shrub wetlands (EDAW et al., 2008). Additionally, the creek is a 303d listed waterway for fecal coliform and dissolved oxygen (WA DOE Listing IDs 45181 and 47709).

Lower Crescent Harbor Creek was the subject of a restoration feasibility study conducted by consultants to the Navy for the purpose of mitigating for wetland impacts from a nearby runway expansion (EDAW et al. 2008). Though the use of the site for mitigation purposes is no longer required, the feasibility study informed the final project design that was developed through the Crescent Harbor Creek Restoration Design Project (13-1112). We propose to use SRFB funds to implement the restoration design to restore the historic floodplain alignment, reduce stream velocity to increase fish access and improve water quality, and restore native wetland hydrology in lower Crescent Harbor Creek.

1. **List the fish resources present at the site and targeted by this project.**

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| --- | --- | --- | --- |
| **Species** | **Life History Present (egg, juvenile, adult)** | **Current Population Trend (decline, stable, rising)** | **Endangered Species Act Coverage (Y/N)** |
| Chinook | Juvenile | Decline | Y |
| Coho | Juvenile, poss. Egg and Adult | Decline | N |
| Cutthroat Trout | Poss. Egg, Juvenile, Adult | Decline | N |
| Other Native Salmonids | Juvenile | Decline/Stable | N |

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

This project will primarily benefit juvenile Chinook and coho salmon that utilize the site for rearing purposes (Beamer et al. 2016). Other native salmonids such as cutthroat trout, pink salmon, and chum also likely utilize this site for rearing purposes. Adult coho may utilize the site for spawning purposes. Current high flow velocities in the deeply incised channel present challenges for juvenile fish passage, and water quality in this agricultural watershed is impaired.

1. **Project goals and objectives.**
   1. **What are the project’s goals?**

The overall goal for the Lower Crescent Harbor Creek Restoration Project is to sustainably restore natural stream and floodplain processes, conditions, functions, and biological responses by restoring a natural stream corridor to a diked and straightened section of stream.

In accomplishing our goal we will be cointributing to the following recovery targets;

1. Restore riparian and surrounding scrub-shrub wetland habitats.
2. Restore non-natal stream channel rearing capacity and freshwater nearshore inputs for ESA-listed juvenile Chinook salmon during the early phases of their oceanward migration
3. Restore channel spawning habitat capacity for adult coho salmon.
4. Restore estuarine and wetland habitat conditions for other native fish and wildlife species.
5. Improve water quality conditions within lower Crescent Harbor Creek and the Crescent Harbor Salt Marsh, a 206 acre SRFB- and ESRP-funded estuary restoration site located at the mouth of Crescent Creek.
   1. **What are the project’s objectives?**

Project objectives for restoration at the site extend from the project goals and include:

1. Construct 316 LF of new channel to allow connection to an existing culvert at the upstream end of the project site.
2. Regrade 1,104 LF of the historic channel and floodplain alignment in places where it has been filled or the grading has been altered from the original configuration to increase habitat area, improve water quality, decrease velocity, and improve connectivity to the downstream salt marsh restoration site.
3. Construct a 40’ roughened channel just downstream of the existing Crescent Harbor Road crossing to reduce scour potential.
4. Construct a series of 13 riffles and pools to mimic a channel established via natural processes.
5. Install log scissor weirs above pools to increase likelihood that constructed pools will maintain depth.
6. Install rootwads and logs along the length of the restored channel to increase habitat diversity and complexity.
7. Restore native riparian forest and scrub-shrub wetland vegetation to the site to support riparian functions and detrital food chains for juvenile salmonids and marsh birds.
   1. **What are the assumptions and constraints that could impact whether you achieve your objectives?**

Possible problems or delays may center around unforeseen discovery of cultural resources, utilities, etc, although the previously completed feasibility study indicates that this is unlikely.

Crescent Harbor Creek is ungauged, so assumptions have been made about flow characteristics during storm events and low flow conditions. However, widely accepted methods for estimating flow conditions were used, and we have confidence that the design will have adequate capacity to handle storm flows.

Cost estimates for this project are based upon current fuel, materials, and equipment costs, but unforeseen changes in pricies could impact construction costs.

Our responses will depend upon the nature of the problems encountered, but we employ for a data-centered adaptive management approach so that decisions by project managers, landowners, and partners can be supported by information.

1. **Project details.** 
   1. **Provide a narrative description of the proposed project.**

Once Navy Environmental Affairs staff have secured all necessary permits, construction work will begin with clearing of vegetation along the proposed channel corridor, and in selected spots along the existing channel to assist with fish exclusion after creek flow is switched to the new channel. Clearing lmiits along the new channel will vary from 20’ to 40’ per project design. 20’ wide access routes will be cleared at three locations along the new channel alignment to provide access for equipment and materials. Large wood for instream placement will be retrieved from the historic mouth of the channel at this time. The channel will largely follow the historic alignment, but will be routed to the east edge of a constructed berm and ponded wetland to avoid impacts to native wetland and wildlife species that have come to inhabit the area.

Following clearing, channel subgrade excavation will begin at the downstream end of the project site, working upstream toward the existing culvert. Excavated spoils will be hauled to an onsite upland storage site to be selected by SRSC and Navy staff. Cobble/sand substrate and log scissor weir/structure installations will be installed per design specs as the excavator works upstream.

No water control will be required for most of the length of the new channel, until the existing channel is encountered approximately 75’ from the end of the Crescent Harbor Road culvert. For this section water will be pumped from the upstream end of the culvert back into the existing channel downstream of the reconnection site using sandbag dams to block flow. A 40’ roughened channel will be constructed immediately below the cuvlvert to reduce scour potential from the moderately undersized culvert. Following completion of channel construction, native soils will be used to block a 40 LF section of the old channel just below the connection point, diverting flow into the new channel. The remainder of the old channel will be abandoned in place, and will not be filled. It is anticipated that the restored channel will be stable due to the low-gradient, relatively low-energy environment, so it is not likely that the unplugged portion of the ditch will be reclaimed via channel migration. 40 LF of fill is adequate to prevent leakage into the ditched portion of the site.

Finally, disturbed areas along both the new and old channels will be replanted with native wetland and scrub-shrub plant species. After completion of construction elements an as-built survey will be conducted to document post-project conditions. Results will be summarized in an as-built report that will outline a plan for post-project monitoring.

* 1. **Provide a scope of work and detailed list of project deliverables.**

Scope of work:

1. *Spring 2019:* Permit acquisition. (Navy staff with support from SRSC) Anticipated permits include:
   1. *JARPA-* a Joint Aquatic Resources Permit Application (JARPA) will be prepared and submitted in order to obtain Section 404 and 401 permits, shorelines and critical areas permits, and cultural resources permits.
   2. *NEPA*- Compliance would likely take the form of a short Environmental Assessment (EA), including Land Use, Water Quality and Hydrology, Vegetation and Wetlands, Fish and Wildlife, Endangered and Sensitive Species, Recreation, Environmental Justice, Cultural Resources, and Cumulative Impacts.
2. *Summer 2019: Finalize 100% (Construction-ready) design. (Project engineer and SRSC)*
3. *Winter 2019:* Publish request for bids from construction contractors. (SRSC)
4. *Spring 2020:* Select contractor in consultation with Navy Environmental Affairs staff. (Navy and SRSC)
5. *Summer 2020:* Establish channel layout and begin site clearing. (Project Engineer and SRSC)
6. *Summer 2020:* Channel construction (dry work), including pool/riffle, scissor weirs, log structure, and channel substrate. (Contractor and SRSC)
7. *Late summer 2020:* Flow diversion and connection to existing channel during approved fish window. (Contractor and SRSC)
8. *Late summer 2020:* Construction of roughened channel. (Contractor and SRSC)
9. *Late summer 2020:* Plug old channel with native soils and divert flow into new channel. (Contractor and SRSC)
10. *Late Summer/Fall 2020:* Revegetation of disturbed soils using native wetland and scrub/shrub vegetation. (SRSC)
11. *Fall 2020:* As-built survey. (SRSC)
12. *Fall/Winter 2020:* Preparation of as-built report, drawings, and monitoring plan. (SRSC)
13. *Late Summer/Fall 2020:* Revegetation of disturbed soils using native wetland and scrub/shrub vegetation.
14. *Fall 2020:* As-built survey.
15. *Fall/Winter 2020:* Preparation of as-built report, drawings, and monitoring plan.

Deliverables for this project include:

1. Construction of a 1,420 foot sinuous channel, pools, riffles, log structures, and connected floodplain along the historic alignment of Crescent Harbor Creek.
2. Planting of native forest and scrub-shrub vegetation along the histored channel.
3. As-built designs drawings for the completed project.
4. A final report and monitoring plan.
   1. **Explain how the sponsor determined cost estimates.**

Cost estimates were prepared based on experience managing similar projects and on current rates for equipment, materials, and services.

* 1. **Describe the design or acquisition alternatives considered to achieve the project’s objectives.**

Alternatives that involved reshaping the streambed along its existing alignment were rejected because achieving a proper stream gradient is problematic within the deeply incised existing channel corridor. Additionally, achieving a stream channel length equivalent to the historical channel alignment would involve a great deal of excavation that would need to be transported offsite.

* 1. **How have lessons learned from completed projects or monitoring studies informed this project?**

Design and construction of the Crescent Harbor Salt Marsh project, just downstream of Crescent Harbor Creek, allowed us to develop a solid working relationship with Navy command, public works, and environmental affairs staff, which will be critical for successful completion of the Crescent Harbor Creek Project. Monitoring of the salt marsh project included electrofish surveys of Crescent Harbor Creek, allowing us to gain a better understanding of fish use and flow conditions in the creek (Beamer et al. 2016). Finally, our project design was informed by a feasibility study conducted by consultants to the Navy, for which a detailed assessment of historic conditions was conducted (EDAW et al. 2008).

* 1. **Describe the long-term stewardship and maintenance obligations for the project or acquired land.**

This project is intended to be self-sustaining, with little or no ongoing maintenance required. If any unforeseen problems arise, they will be dealt with using a data-driven adaptive management approach.

1. **Explain why it is important to do this project now instead of later.**

SRSC has developed and maintained a solid working relationship with NASWI personnel through the construction and monitoring of the SRFB-funded Crescent Harbor Salt Marsh Restoration project and the design phase of the Crescent Harbor Creek project. Currently, NASWI leadership is suportive of the Crescent Harbor Creek Restoration Project (see attached letter from the NASWI Commanding Officer). However, leadership on the base changes on a regular basis, so future support, though likely, is not guaranteed. It is therefore important to capitalize on current support for the project to build momentum towards completing restoration at the site. Additionally, pocket estuary restoration sites with a single supportive landowner are relatively rare within Island County and have a higher probability of successful completion.

1. **If the 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 is a standalone project, but will increase habitat quality, access, and water quality for fish moving throught the Crescent Harbor Creek restoration project (PRISM ID 04-1217).

1. **Describe the sponsors experience managing this type of project.**

SRSC has expertise managing a number of stream channel restoration projects, including a very similar project at Lone Tree Creek/Lagoon in Skagit County, alluvial fan restoration projects at Johnson Creek and Sandy Creek in Skagit County, and has ongoing floodplain/channel realignment projects taking place at Illabot Creek, Hansen Creek, Red Creek, and Barnaby Slough, also in Skagit County. SRSC was also responsible for data collection and design, along with engineering staff from the Whidbey Conservation District, for the Crescent Harbor Salt Marsh Restoration Project.

1. **List all landowner names.**

The US Navy is the sole owner of the property proposed for restoration. A landowner acknowledgement form is attached in PRISM.

1. **List project partners and their role and contribution to the project.**

The United States Navy is partnering with SRSC for permit preparation and construction oversight.

1. **Stakeholder outreach***.*

Additional stakeholder outreach will be conducted before the preparation of permit submittals. Upstream landowners will be contacted individually for personal face to face meetings regarding the project and the importance of land stewardship to the health and sustainability of the project.

### Supplemental Questions

#### Restoration Project Supplemental Questions

Answer the following supplemental questions:

1. Will the sponsor complete, or already completed, a preliminary design, final design, and design report (per Appendix D) before construction?  
   Choose an answer

A final design has been completed. Design drawings and a design report are available in PRISM.

1. Will a licensed professional engineer design the project?  
   Choose an answer

The project was design by a licensed professional engineer. Stamped design drawings are available in PRISM.

1. If this project includes measures to stabilize an eroding stream bank, explain why bank stabilization there is necessary to accomplish habitat recovery.

This project does not include measure to stabilize eroding stream banks.

1. Describe the steps the sponsor will take to minimize the introduction and spread of invasive species during construction and restoration.

Any erosion control materials such as hay bales or straw will be certified weed-free. Excavated soils will be reused or stored onsite. Heavy equipment and tools will be stored onsite during construction, and will be inspected and cleaned prior to entereing the project site, and again upon project completion before transport offsite.

### Comments

Use this section to respond to the comments received after the initial site visits, and then again after submitting the final application.

#### Response to Site Visit Comments

* In comments on the design grant for this project (13-1112), the review panel advised using reference conditions on the island to inform the design. Please describe how reference conditions were used in developing design features, such as degree of sinuosity, number of pools, etc.

*Comparable reference streams on Whidbey Island are not readily available. Crescent Harbor Creek has one of the largest watersheds on the island, but the stream channel itself is relatively low-gradient for much of its length. Nearby streams have been modified by human development or have steeper gradients. Channel design was developed using slope and sinuosity characteristics typical for such low-gradient systems (Vanoni 1977).*

* The proposal indicates that final designs are on PRISM, however the designs on PRISM are listed as preliminary. Please load final designs on PRISM. Please include the location of the existing dikes on all final design schematics and provide any information or data that substantiates the reasons for not removing and/or its lack of long term effects on channel migration.

*The design uploaded to prism is the final restoration design. The preliminary design that was developed for project 13-1112 was more detailed than is typical for a preliminary design, and no substantial changes were required for the final design. Some edits may be made to produce a 100% (construction-ready) design, but these are anticipated to be minor. We will indicate location on the 100% plan set. We do not anticipate a great degree of channel migration in this low-energy/low sediment input system.*

* The 100% (construction ready) design task should be included in the scope, it is currently reflected only in the budget.

*This has been added to the scope.*

* The proposal indicates that the channel will be relocated to the historic alignment. What resource was used to identify the location of the historic alignment? Does the historic alignment predate the dikes that are proposed to stay on the site?

*The historic alignment was identified via a topographic survey conducted for the project site. The historic alignment is visibly apparent at the Crescent Harbor Creek estuary, and the signature of the channel continues through the diked portion of the site, so it likely predates the dikes. The historic alignment identified in the Navy feasibility report corroborates the location indicated by our survey (EDAW et al 2008). The Navy feasibility has been added to PRISM.*

* We understand the desire to retain the mature trees and wetland/pond habitat associated with an old dike adjacent to the proposed alignment. A heron rookery is reportedly present at this location, however we did not see this part of the site. Has the sponsor explored ways to breach portions of the dike, working around large conifers and retaining some wetland portions? This would allow the potential for future stream movement in this part of the site, without impact to existing trees providing shade and habitat.

*We were unfortunately unable to visit this portion of the site during the site visit. In past years, 5-15 heron nests have been present in the conifers along the old dike. The navy feasibility explored removing the cross dike altogether, but it is our opinion that the negative impacts of reducing wetland size outweighed the benefits of dike removal and regrading of ponded areas. The project engineer believes it unlikely that substantial stream migration will occur given the low-energy and low sediment inputs of the system.*

* Include match amounts in budget.

*Match amounts have been added to our budget.*

* The proposal states that a 40-foot portion of the diked channel will be filled or plugged as the new channel is constructed; utilizing fill from the construction. Please provide information on how the extent and length of fill was decided upon. The deep incision of the current channel may warrant additional fill to reduce the chance the new stream channel could be recaptured into the diked channel as it migrates on the floodplain. As the construction spoils are planned to be wasted on site, backfilling the existing channel further should have minimal effect on the budget, but could provide greater long-term benefits to the project success.

*The extent and length of fill was selected to be long enough to fill the ditched channel to below the first major bend of the proposed channel. Given the nature of the soils present on site and the low energy of the system, leakage through the compacted plug is not anticipated. Similarly, recapture through lateral migration is not anticipated because the low energy environment indicates that a relatively stable channel is likely. The extent of the plugged region will be finalized during final design development and the permit review process.*

* The downstream salt marsh restoration, upon which this project builds, had a long and convoluted development, interrupted by funding challenges and the Iraq War among other things. As a result of the Navy Seabees being deployed overseas in the middle of the salt marsh project, some project elements identified in the Philip Williams and Associates 2003 feasibility assessment were not completed during initial salt marsh restoration. Per the SRFB Scope Amendment, SRSC and the Navy agreed to seek other funding sources to complete these actions. Has any additional restoration occurred since the completion of the initial salt marsh restoration? In developing the full tidal restoration alternative, did the feasibility assessment consider road abandonment of E. Pioneer Way between the current outlet and Solomon Drive, or relocating the city’s Waste Water Treatment Plantout of the salt marsh? Please attach the PWA 2003 feasibility assessment report to PRISM if you have a digital copy.

*No additional restoration work has occurred following completion of the Crescent Harbor Salt Marsh Restoration Project. Questions about alternative development are addressed in the feasibility and design documents for that project. SRSC has an excellent working relationship with Navy staff and conversations about additional restoration projects on Navy properties take place regularly. However, we are focused on completing the Crescent Harbor Creek restoration proposed here before moving on to other projects.*

1. **Review Panel Comments (*A response is not necessary*):**

This project does an excellent job of building on previous SRFB investment in project 04-1217, Crescent Harbor Salt Marsh restoration. Kudos to the sponsor for seeing the salt marsh restoration through despite the logistical challenges it faced. Sponsor did a nice job on the goals, objectives, scope and deliverables in the current application and has made excellent use of partnerships. In future proposals, please explicitly identify the responsible party for each task in the scope.

*Thank you. We have identified the parties responsible for each task in our scope.*

The idea was discussed in the field to consider plugging the outlet of the existing channel (ditch). We recommend that the outlet not be plugged, at least not at or downstream of current saltwater extent to allow for utilization during tidal influx.

*We agree with this assessment.*

It would strengthen the proposal and improve the understanding of the benefit to salmon if there was some discussion of conditions of habitat upstream of the project area and potential effects of water quality inputs from upstream agricultural land uses, as the stream is on the 303d list of impaired waters due to fecal coliform and dissolved oxygen levels. Could the creek’s degraded water quality negatively affect the benefits to salmon gained from this project?

*Further information has been added to this proposal. Work to improve upstream habitat conditions and land use practices could certainly improve conditions within our project site. This project will certainly improve conditions over what is presently available, and further work to explore improving upstream conditions will likely be explored.*

1. **Staff Comments:** By final application, please update the APE map to reflect the RCO-DAHP required elements.

*This has been added to PRISM.*

#### Response to Post-Application Comments

Please describe how the sponsor responded to the review panel’s post-application comments. *RCO recommends that the sponsor list each of the review panel’s comments and questions and identify the response. The sponsor may use this space to respond directly to the comments.*