2011 SRFB/PSAR Full Project Proposal for

Willow Creek Daylighting Feasibility Study (11-1553)

August 26, 2011

Primary Project Sponsor: People For Puget Sound

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1. *Project Overview*

This project is to explore the feasibility of maximizing Chinook salmon rearing habitat in Edmonds Marsh through daylighting the connection between Willow Creek and Puget Sound. We propose to:

* Document the current topography and hydrology of the Edmonds Marsh complex
* Scope feasibility of three options for daylighting Willow Creek to connect directly to Puget Sound
* Assess the hydrology of a restored marsh system that identifies the freshwater and saltwater hydrology signal, average water elevation, seiment flux, maximum and minimum water levels and hydroperiod during tidal fluctuations

This information will help assess maximum size and ecological function for juvenile Chinook rearing habitat.

*Location:* Edmonds Marsh is located in the nearshore of the Lake Cedar/Sammamish watershed (WRIA8) within the City of Edmonds in the Central Puget Sound basin.

*Current Site Conditions:* Edmonds Marsh is a 24-acre remnant of a historical 53+ acre barrier estuary and marsh complex, one of the few remaining such ecological features in the Central Puget Sound basin. Edmonds Marsh receives year-round freshwater input from two small streams, Willow and Shellabarger creeks, which together drain an approximately 850 acre watershed, most of which is in a modified, wooded residential area (J. Shuster, City of Edmonds Stormwater Manager, *pers. comm*). The current outlet of the marsh is via a narrow, steep ditch that extends for 1200 ‘ along railroad tracks, transitions under the tracks through two 24” diameter pipe culverts, then enters a 1,400’ buried pipe that empties into Puget Sound at approximately -4.0’ MLLW. A modified flap tide gate is present, which is functional in summer months and is closed to tidal influx in winter months.

*Description of proposed project and primary objectives:*

*A case for restoration:* Research indicates that barrier estuary habitats, such as Edmonds Marsh, are an important habitat type for Pacific juvenile Chinook salmon (Fresh, 2006; Beamer, 2006). Significant losses of this particular habitat type have occurred along the WRIA 8 shoreline (Williams et al, 2001; Leschine, T. and AW Petersen, 2007). Brennan et al, 2004 recommends restoration of a diverse array of marine nearshore habitat types, and several studies specifically call out the need for restoration of barrier estuary complexes (Redman, S, 2005; Beamer, 2006). Reconnection of Edmonds Marsh to allow salmon access to rearing habitat represents a unique opportunity to increase the diversity of nearshore habitat types available to juvenile Chinook along the highly degraded WRIA 8 shoreline.

*Primary project objectives and description:*

The goal of this project phase is to utilize SRFB/PSAR funding to explore the feasibility of maximizing Chinook salmon access to rearing habitat, potential size of restored rearing habitat, and potential for successful rearing in Edmonds Marsh. This would be accomplished through the following objectives:

1. Scope three identified options for daylighting Willow Creek to connect directly to Puget Sound, address feasibility of each including functionality, self-sustainability, biological response and political feasibility, and perform initial cost/benefit analysis;
2. Determine initial considerations for successful juvenile Chinook rearing in a restored marsh system by modeling hydrology of a restored marsh, quantifying future juvenile Chinook rearing habitat area, and determining water depths and hydroperiod of potential rearing area;
3. Begin to address stormwater concerns by identifying outlets that drain the surrounding area into Edmonds Marsh, determine average and maximum water volumes, and determine quality of stormwater runoff entering the marsh system; and
4. Begin to address adjacent property constraints and unknowns that could inform project feasibility and final project design.
5. Identify a preferred alternative from the three options.

*Additional information by objective:*

*Objective 1*. Three alternative daylighting options have been discussed between project partners and the WRIA 8 Project Subcommittee: 1. from the SW corner of the project site to the south across Marina Beach; 2. on the W side of the project area across into the Port of Edmonds Marina; and 3. from the NW corner of the project site, north and connecting north of the Port of Edmonds Marina onto Sunset Beach.

Daylighting Willow Creek into the marina would require the support of the Port. The Port has provided a letter of acknowledgement (provided in PRISM) that they are aware of the feasibility study, however, this letter does not reflect the Port’s support of any potential results of such study.

A self-sustaining design of the channel opening must take into account net littoral drift, wind and wave energy to determine sustainability of the opening and year round access for juvenile salmon. Research to develop the Edmonds Crossing FEIS (Chapter 3.2.5- available on PRISM) recommended daylighting Willow Creek to the south onto Marina Beach. This study began initial feasibility and design of such a channel opening. Some information on marine hydrology, wind, wave and current data have been collated in the FEIS.

We propose to use available data to inform a hydrologic model of the system specific to determining the year round self-sustainability of a channel opening at all proposed alternatives and recommendations for armoring, if needed, to ensure an open channel and related maintenance of such structures.

*Objective 2.* Address uncertainties regarding Chinook access to and utilization of rearing habitat in Edmonds Marsh, and potential for expansion of useable rearing habitat in the system. Hydrology and topography are thought to be the primary variables that will drive ecosystem response to restoration of this system. We propose to identify hydroperiod and tidal prism of a restored marsh. This will be done through a contracted topographic survey to generate a digital elevation model (DEM) utilizing available LiDAR data, aerial photography and possibly survey data. The City of Edmonds Public Works department will assist with determining freshwater inputs to the system.

We propose a full topographic survey of the marsh, which we will pair with hydroperiod analysis to determine expected rates of erosion or accretion within the identified rearing habitat areas. This will inform average and maximum water depths within both rearing habitats and migration corridors through the marsh. The goal of this effort is to quantify juvenile Chinook ability to utilize rearing habitat within the marsh once access is restored.

Sediment accretion and erosion rates as they pertain to Chinook rearing habitat will be needed to evaluate potential for rearing use by juvenile Chinook. In a similar feasibility study project in Deer Harbor on Orcas Island, outputs of the hydrodynamic and sediment transport models both identified whether initial conceptual designs for restoration were adequate for juvenile Chinook use as well as pointed to design minima such as channel dimensions that would be necessary to accomplish the restoration goal of juvenile Chinook access and use.

*Objective 3.* It is the City’s position that the sedimentation in the Marsh is from poor stormwater management in the past. Since 1995, the City of Edmonds has had stormwater management regulations with lower thresholds for flow control than required by the current State Municipal Phase II NPDES Stormwater Permit. In 2010, the City modified its stormwater regulations to allow and encourage Low Impact Development (LID) and they are currently working on regulations that will make LID the norm.

A hydrodynamic model would help predict whether or not marsh channels will form and sediments will export to beach via tidal surge. Any decision on whether structural excavation would be needed is a design consideration that would be addressed in a future project phase. If it is determined that accumulated sediments need be removed to provide additional habitat, the current and planned future stormwater regulations would help prevent re-silting to current levels.

The majority of the City of Edmonds in-kind match (as identified in the attached project budget) will be to provide staff time and expertise that will contribute to understanding and quantifying freshwater input into the marsh system, including volumes draining from the surrounding properties and quality of water entering the system.

*Objective 4.* The project team discussed the potential risk that the now vacant Union Oil property represents to maximizing restoration efforts as they pertain to juvenile Chinook salmon access to the marsh and expanding rearing habitat. The project team will proactively use this early opportunity with SRFB/PSAR funding to work with both the current property owner, Chevron, and the likely future owner, WSDOT- Ferries Division to open discussions regarding the status of cleanup and remaining contaminants on the site, the unknown future ownership and use of the site and the potential for habitat restoration. As of this date, WSDOT Ferries Division does not currently own the property to the south of the marsh. The property is currently owned by Chevron, with option to purchase held by WSDOT- Ferries Division, following required environmental clean-up. The project team will continue to work with WSDOT- Ferries Division to update them on the proposed project and the potential value of the Chevron property to habitat restoration and will work towards obtaining a letter of acknowledgement from Ferries Division.

1. *Salmon Recovery Context*
2. *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) | ESA Coverage (Y/N) | Life History Target (egg, juvenile, adult) |
| Chinook salmon | none | n/a | Y | juvenile |
| Coho salmon | none | n/a | N | Egg, juvenile, adult |
| Sockeye salmon | none | n/a | N | juvenile |
| Pink salmon | none | n/a | N | juvenile |
| Chum salmon | none | n/a | N | juvenile |
| Cutthroat trout | Egg, juvenile, adult | unknown | N | Egg, juvenile, adult |

1. *Description of problem:*

Edmonds Marsh was historically 53+ acre barrier estuary complex that likely supported juvenile salmon rearing, specifically Chinook, and supported coho spawning. The current conditions of the site significantly limit fish access, and no evidence of juvenile rearing or adult coho spawning has been reported. Daylighting Willow Creek and addressing additional issues on and adjacent to the site, such as upstream fish passage barriers, potential stormwater volume and contamination, sedimentation and contamination of soils on adjacent properties, could allow for expanding and enhancing juvenile salmon rearing and secondarily adult coho spawning, as well as enhance the existing cutthroat populations.

1. *Evidence that the project is a high priority in a salmon recovery plan or lead entity strategy:*

The Willow Creek daylighting project is on the WRIA 8 three-year work plan. Project number and name = M233 Willow Creek daylighting (Edmonds Marsh Restoration). The project subarea is WRIA 8 nearshore, which has been categorized as a Tier 1 priority in the WRIA 8 Chinook Recovery Plan.

1. *Reasoning for conducting project at this time:*

The extensive loss in both size and quantity of coastal embayments in the Central basin of Puget Sound (includes WRIA 8 nearshore subarea) has been highlighted in historic change analysis studies (Collins and Sheikh, 2005). This section of shoreline is dominated by loss of freely available sediment sources, restricted fish access to small watersheds, and significant loss of historic backshore estuary, marsh and lagoon complexes. Non-natal habitat types like Edmonds Marsh have been found to be very important to Chinook salmon ocean-type life history strategies (Beamer et al. 2003, 2005, 2006). Preliminary studies suggest restored access to the upper watershed could support coho spawning, as well (Pentec, 1998).

 Timing is appropriate for this project. The City of Edmonds (property owner) is in full support of the project and an active project team partner. The project team has spent two years conducting outreach to the community, making it politically feasible at this time. In addition, both the City of Edmonds and People For Puget Sound are able to provide matching funds that exceed the grant requirements and are already seeking additional funding to both expand the current project phase and support future project phases.

1. *Project Design*
2. *Detailed Project Description*: The full scope of restoring Edmonds Marsh involves the need for construction of a new ‘daylighted’ tidal channel connection from Edmonds Marsh to Puget Sound, improvement of fish passage barrier issues upstream of the marsh complex, improving spawning habitat in the upper watersheds, eradicating invasive species, and addressing stormwater management as it pertains to the marsh and flooding of neighboring properties. Eventually, we intend the project to address social interests, such as access and recreation opportunities, economic and social value of a restored system in terms of climate change and sea-level rise preparedness, carbon sequestration capacity, and economic value of ecosystem services. A full project will engage the community through education and action opportunities in every phase, when possible, from feasibility through stewardship, particularly streamside property owners. In addition, the input from the stakeholders in the vicinity of the Marsh, Port of Edmonds, Washington Department of Transportation, and BNSF Railway Company and from the City of Edmonds, will be incorporated into the full project study.
3. *Current project phase:*  The project is currently in early feasibility phase. Current project scope has been scaled in response to the WRIA 8 Project Subcommittee’s review to address specific unknowns regarding potential use of the habitat by juvenile Chinook. The objectives described above are designed to address feasibility of options for a daylighted creek channel, to quantify total rearing habitat area, future water levels within the rearing habitat, sedimentation within the rearing habitat and ability for juvenile Chinook to access rearing habitat in a restored marsh system.
4. *Sequencing of identified phases of project, preliminary project schedule and deliverables:* Following the finalization of the early feasibility phase, the project will move forward into preliminary project design phase (30%), final project design phase (100%), permitting, construction, and into monitoring and stewardship.

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| --- | --- | --- | --- | --- |
|  **Task**  | **Phase**  | **Status**  | **Target Date**  | **Deliverable(s)** |
| Early Feasibility Study | Feasibility | Proposed  | 6/2013 | Topographic survey, DEM, hydrologic model |
| Final Feasibility Study | Feasibility | Future | 6/2014 | Alt. scaled plan view drawings and cost estimates; public engagement; selection of pref design alternative |
| Final Design  | Design  | Future  | 1/2015 | Design Report |
| Permits  | Design  | Future  | 8/2015 | Acquired permits |
| Monitoring/Stew-ardship Plan  | Design  | Future  | 8/2015 | Monitoring and stewardship plans |
| Contractor selection/bid award  | Implement  | Future  | 11/2015 | Bid selection process outline and const. contract |
| Construction  | Implement  | Future  | 11/2016 | As-builts |
| Monitoring  | Evaluate  | Future  | 11/2019 | Monitoring report |
| Reporting  | Admin  | Future  | 12/2019  | All project info submitted into PRISM and HWS |

1. *Project Development*
2. *Determination of cost estimates:*  Project cost estimates were determined through comparison with projects similar in scope within Puget Sound in the last three years. In addition, the project team discussed the scope of work with regional resource managers and the WRIA 8 Project Subcommittee to verify cost estimates. A detailed cost estimate and budget is attached in PRISM.
3. *Other approaches and design alternatives considered:*  Since this is an early feasibility project, no additional alternatives have been considered at this time. In addition to this proposal, People For Puget Sound has secured additional funding through NOAA/Restore America’s Estuaries to begin public outreach and education to support this initial feasibility study that will include a streamside property owners workshop series. The City of Edmonds is also seeking additional funding to enhance the current phase and/or initiate future project phases.
4. *Project Contribution Form:* The City of Edmonds has provided a Project Contribution Form (attached on PRISM) that details their role and match contribution to this project phase. In addition, the City of Edmonds Parks, Recreation and Cultural and Public Works Departments are scoping additional funding to enhance the current project phase and/or initiate future phases.
5. *Landowner Acknowledgement:* The City of Edmonds is the property owner and a Landowner Acknowledgement form has been provided on PRISM. The Port of Edmonds has provided a letter of acknowledgement as an adjacent property owner stating they are in communication with the project team and are aware of what is currently proposed in this early feasibility study.
6. *Project Management Experience:* People For Puget Sound staff have managed several nearshore restoration projects including estuarine and riparian vegetation planting, monitoring, and management; bulkhead removal and soft shore armoring on private property, pocket estuary creation and enhancement, backshore and beach nearshore processes enhancement, fish passage barrier removal, nearshore habitat assessments and prioritization modeling, comprehensive restoration, recreation and education projects, and volunteer-based restoration monitoring and adaptive management programs. All of our restoration projects contain a long-term monitoring plan utilizing our volunteer-based Sound Stewardship Program. Many of our projects, both public and private, have successfully implemented a robust public outreach and engagement program targeted toward diverse stakeholders and involving several partners. People For Puget Sound is currently not delinquent on any grants or contracts.

Awards of note include: NOAA/Restore America’s Estuaries Community Restoration Program annually since 2001, ESRP awards for Deer Harbor, East Bay and Snyder Cove in 2008, SRFB awards for Deer Harbor and East Bay, and ESRP and NFWF awards for Titlow Park in 2009.

1. *Tasks and Schedule*

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| --- | --- |
| Task: | Est completion date: |
| Finalize contractor bid process and award | 2/2012 |
| Existing data collection, gap analysis | 3/2012 |
| Topographic survey, DEM | 7/2012 |
| Additional data collection/surveys | 12/2012 |
| Hydrologic model | 3/2013 |
| Assessment of alternative channel options | 5/2013 |
| Final report | 6/2013 |

1. *Constraints and Uncertainties*

As the current project scope is an early feasibility study, the main goals are to identify and address unknowns and constraints that my impede realization of the final project. Known constraints to project success are identified throughout the proposal and accompanied by a detailed description of how the project team intends to address them. These constraints are: unknown future ownership and use of adjacent Chevron property, remaining contaminant levels on Chevron site, potential for site to be used to expand marsh restoration options, amount and quality of stormwater entering marsh system, ability for juvenile Chinook to access and successfully utilize rearing habitat. While this current project phase intends to address all of these known constraints, the main goal is to quantify the unknown ability for juvenile Chinook to access and successfully utilize rearing habitat.

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