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

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| **Project Number** | 18-1259 |
| **Project Name** | Meadowdale Beach Park &Estuary Restoration Project |
| **Sponsor** | Snohomish County |

List all related projects previously funded or reviewed by RCO:

|  |  |  |
| --- | --- | --- |
| Project # or Name | Status | Status of Prior Phase Deliverables and Relationship to Current Proposal? |
| 15-1056 | Completed | Prior phase deliverable was for Preliminary Design (permit ready dwgs); Current Proposal is for construction of restoration elements included in Preliminary Design |

Comments from the Review Panel are addressed at the end of the document.

1. **Project brief.**

SRFB funding, in the amount of $800,000 is requested for this restoration construction project which will replace an existing undersized 6 ft. wide culvert under the Burlington Northern Santa Fe (BNSF) railroad, remove 128 linear feet (lf) of armored embankment, remove 17,000 CY of fill, and install a multi-span railroad bridge to create a 90 ft. wide channel opening at the mouth of Lund’s Gulch Creek, a coastal salmon-bearing stream in Meadowdale Beach Park. The completed project will restore a 1.3-acre pocket estuary and freshwater habitats of lower Lund’s Gulch Creek, thereby providing productive rearing habitat for juvenile salmon, including Chinook, while also restoring natural creek meander, sediment transport and deposition processes in the project area. Additional habitat restoration contiguous with SRFB project elements which will also benefit salmon include restoration of 1.7 acres of nearshore and stream riparian buffers and restoration of 550 lf of creek in-stream habitat upstream of the estuary with large woody debris. Due to the park setting, the overall larger project will address public safety for the 65,000 annual park visitors, provide ADA saltwater beach access and expand environmental education opportunities for the K-College age programs currently using the site.

This project represents a Puget Sound recovery first with potential to be replicated along other segments of the shoreline impacted by 19th and early 20th century railroad infrastructure built at the time without knowledge of the ecological impacts of such large-scale shoreline alteration.

1. **Project location.**

Meadowdale Beach Park is located within the Water Resource Inventory Area (WRIA) 8 watershed just north of Edmonds (Figure 1) along a section of Puget Sound considered “most degraded” according to the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) as shown in Figure 2. This project is located partially in unincorporated Snohomish County and partially in the City of Edmonds. The project area includes 10 acres of the 108-acre park encompassing the Snohomish County owned tidelands, lower park area, limited access road, a portion of the BNSF railroad right of way, and the lower 875 feet of Lund’s Gulch Creek, a salmon-bearing coastal stream that winds through the park’s forested ravine carrying gulch-derived sediments to Puget Sound.

1. **Problem statement.**

The railroad embankment has significantly altered much of the historic creek mouth and pocket estuary habitats along much of the eastern shore of Central Puget Sound. In fact, Cereghino et al. (2012) reported that 14 out of the 15 barrier embayments between Commencement Bay and the Snohomish River on the eastern shore of Central Puget Sound – including all of WRIA 8 – have been lost (and the one remaining is a mapping error because it is no longer a tidal environment or accessible to fish in the nearshore). For out-migrating juvenile Chinook seeking the lower energy habitats along the Puget Sound shoreline, these habitats are generally unavailable. At this site, the massive infrastructure constructed during the railroad era – including shoreline fill and armoring, confinement of a coastal stream within a narrow culvert, and subsequent upland development fill – has disrupted natural hydrologic processes and sediment delivery, and reduced the availability of estuarine habitats preferred by juvenile Chinook (see Figure 3 for 1872 T-sheet of historic conditions at site). General salmon science in the region, including observations from the project site, are described in more detail in Section 4 and show that the shoreline habitats on the creek delta, the semi-protected pocket estuary-like habitats, and the lower stream reaches are all known to be consistently used by juvenile Chinook salmon originating in large river systems. The existing conditions (Figure 4) limit the availability and quality of these habitats at the site. Present-day conditions include pocket estuary habitat that forms waterward of the BNSF railway when longshore sediment drift turns creek flows to the north after exiting the culvert, forming a delta. However, this habitat is only intermittently available because the current constriction of creek flows during high flow events creates a “firehose effect” which can carve a channel straight through the beach berm. Such an event occurred in 2016, so currently the creek is routed straight across the delta and bypasses the area that provides pocket estuary-like habitats when the creek flows through it. In the coming years following restoration, the creek flow will most likely again turn north and re-create the pocket estuary habitat waterward of the BNSF railway.

For the portion of the creek in the box culvert through the railroad embankment, the channel is 49-inches wide with vertical sides and a concrete bottom. When the pedestrian grating is in place, the depth of the channel below the grating is only 2-feet. When sediments accumulate at the mouth of the culvert compromising fish passage, the grates are removed leaving an approximate 18-inch-wide surface (part of the culvert footing) for pedestrian beach access. The latter condition which is more the norm for the last decade (grates removed) prevailed from 2013-2016 due to creek backwatering, gravels in channel and knee-high water in the culvert. At all times, whether the grating is in place or not, the shared-use of the culvert by humans negatively impacts the quality of habitat used by fish, and combined with the insufficient width, likely reduces fish movement into the stream.

Currently, upstream of the railroad culvert, Lund’s Gulch Creek is armored for its lowermost 75 feet. The armoring narrows and straightens the creek, so conditions are more like a riffle in a flume than more complex instream habitat that would provide lower energy edge habitat for juvenile Chinook. Upstream of this reach, the creek habitat is in better condition, providing pool and riffle habitat. A series of large wood structures were installed by Adopt-A-Stream in the early 2000s. These structures form some pools, but much of the wood in the area is perched across the creek and not engaged during most flows. There is a lack of pool cover provided by large woody debris.

Upstream of the project area, the park continues to the east. According to the Puget Sound Tributaries Drainage Needs Report DNR No. 11 (Snohomish County 2002), Lund’s Gulch Creek extends approximately 1.9 miles from Puget Sound through a steep, deeply incised forested ravine. Additional watershed information is described in Section 2.0 of the Snohomish County (2002) report.

The proposed project provides a unique opportunity in this area because it has a perennial salmon-bearing stream, with documented non-natal juvenile Chinook use and a single large landowner (Snohomish County Parks) committed to working with BNSF and converting a large portion of the lower park area to a restored estuary. The proposed project provides the opportunity to begin to address the landscape-scale constraint of lost pocket estuary rearing habitats in a way that maximizes the restoration opportunities at the site.

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 | Variable among region’s watersheds | Y |
| Coho | Egg, juvenile, adult | Unknown | N |
| Chum | Egg, juvenile, adult | Unknown | N |
| Cutthroat Trout | All life stages | Unknown | N |
| Steelhead | Adult (none others documented) | Unknown | Y |

Several species of salmonids utilize Lund’s Gulch Creek including Chinook, coho, chum, steelhead (very limited use; only two adults reported anecdotally over several years), and sea-run cutthroat trout. Salmon spawning ground surveys document coho and chum salmon spawning each year.

This project focuses on Chinook salmon, specifically rearing by juvenile Chinook, but will also provide benefits for coho and chum salmon. The project improves the quantity and quality of habitats known to be used by juvenile Chinook as documented by the following studies. Chinook salmon is one of the most estuarine dependent of the Pacific salmon species (Healey 1982). Juvenile Chinook in the marine nearshore use shallow shoreline habitats until larger in size at which time they move further offshore (Fresh 2006).

Brennan et al. (2004) conducted a beach seining study at nearshore sites throughout WRIAs 8 and 9 along the eastern shore of Central Puget Sound. The study documented regular use of nearshore habitats by juvenile Chinook throughout the spring outmigration months. Meadowdale Beach Park was one of the study sites and, in two years of sampling, juvenile Chinook were regularly captured during spring sampling events.

More recently, a study by Beamer et al. (2006) documented that the juvenile Chinook use of shoreline habitats such as those sampled by Brennan et al. (2004) is surpassed by the Chinook use of pocket estuary habitats providing lower energy rearing opportunities. Beamer et al. (2006) found higher densities of juvenile Chinook in pocket estuaries than other nearshore habitats.

A four-year study published in 2013 by Beamer et al. reported that juvenile Chinook not only use the estuarine portions of the nearshore and estuaries, but will even move into the freshwater portion of small streams. Lund’s Gulch Creek was one of the 63 creeks sampled by Beamer et al. (2013) and juvenile Chinook were found in freshwater habitats during 75% of sampling events. This was the 9th highest presence rate among the 63 sites sampled. This is a very relevant finding for the proposed restoration as it documents that a portion of the juvenile Chinook who out-migrate from large rivers and estuaries, migrate into Puget Sound, then choose to move back into freshwater rearing habitats provided by non-natal coastal streams.

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

One of the limiting factors for juvenile Chinook salmon, specifically along the Seattle to Everett shoreline, is the lack of nearshore and low energy rearing habitat. Historically, the Puget Sound shoreline was dotted with numerous small creek mouths and barrier embayments that provided unique rearing opportunities for juvenile Chinook salmon early in their outmigration from their natal rivers. These small Chinook stay close to the Puget Sound shoreline for migration and rearing, until attaining larger sizes and progressively moving further offshore (Fresh 2006). Throughout the eastern shore of Central Puget Sound, the natural conditions that provided diverse rearing opportunities, including low energy pocket estuaries, have been severely impaired by shoreline development, including the railroad. In fact, Cereghino et al. (2012) reported that 14 out of the 15 barrier embayments between Commencement Bay and the Snohomish River on the eastern shore of Central Puget Sound – including all of WRIA 8 – have been lost (and the one remaining is a mapping error because it is no longer a tidal environment or accessible to fish in the nearshore). The proposed project provides a unique opportunity in this area because it has a perennial salmon-bearing stream, with documented non-natal juvenile Chinook use and a single large landowner (Snohomish County Parks) committed to working with BNSF and allowing maximum estuary restoration on their land. The proposed project will restore a historic pocket estuary that will provide rearing habitat along the marine nearshore. The proposed project will also improve the lower reaches of Lund’s Gulch Creek and its transition into the upper estuary- both of which are habitats that recent research has documented are used by non-natal juvenile Chinook.

Another limiting factor for Chinook is disrupted sediment processes. Currently, sediment transport is a significant problem in Lund’s Gulch Creek. Due to the undersized box culvert and a transition in creek slope, large quantities of gravel and cobble accumulate upstream of and within the box culvert. This restricts fish access into and out of the creek. In addition, the abundant sediment limits the availability of lower velocity margin habitats. The sediment is deposited both within the stream channel and on the adjacent park areas. Historically after high flow events during the winter, the sediment gets removed from the stream system and stockpiled elsewhere in the park. This affects fish habitat, fish passage, and water quality during the removal.

In consideration of salmon population recovery from Endangered Species Act threatened and endangered classifications, NMFS developed the concept of “viable salmonid populations” or VSP (McElhany et al. 2000). NMFS identified four population metrics that are necessary for a population to be viable: 1) abundance, 2) productivity, 3) spatial structure, and 4) diversity. The proposed project will contribute to both the productivity (lifetime survival rates to return to spawn) and diversity metrics of the populations’ viability. The anticipated benefits to productivity are related to providing juvenile Chinook with productive restored pocket estuary and non-natal stream habitats that increase their growth before they migrate to the ocean. The diversity benefits relate to providing favorable rearing habitats for the subset of juvenile Chinook in Puget Sound whose life history includes rearing in pocket estuaries and non-natal streams. While not all Chinook do this, it should be considered an important life history strategy because the diversity of life history strategies adds to the resilience and viability of the population to disturbances.

1. **Project goals and objectives.**
   1. **What are the project’s goals?**
2. Restore non-natal estuary and stream habitat in Lund’s Gulch Creek to contribute to recovery of juvenile Chinook salmon and to meet 50% of the WRIA 8 Recovery Strategy goal for “Reconnecting Backshore Areas and Pocket Estuaries”.
3. Restore natural transition from Lund’s Gulch Creek to Puget Sound, including widened creek mouth, restored sediment transport processes, to benefit juvenile Chinook in the lower stream, upper estuary, and outer pocket estuary, as well as adjacent shoreline habitats that may receive sediment from Lund’s Gulch Creek.
   1. **What are the project’s objectives?**

**The following objectives will be completed with SRFB funds to address the project goals:**

1. Remove undersized railroad culvert and replace with a 128 linear feet (lf) railroad bridge providing a 90-foot channel opening by the year 2021.
2. Remove 17,000 cubic yards (CY) of fill upstream of the railroad to restore a 1.3-acre estuary of Lund’s Gulch Creek by year 2021.
3. Restore natural creek sediment transport conditions in the estuary to deliver approximately 80-250 CY annual sediment to estuary and marine nearshore by year 2021.
4. Remove 128 lf of marine and 75 lf of streambank hard armoring (approx. 2,000 CY) (railroad embankment and streambank armor) by 2021.

**Additional salmon related objectives to be completed by the overall larger project**

* Restore 1.7 acres of nearshore and stream riparian buffers with native vegetation by 2021.
* Restore approximately 550 lf of creek in-stream habitat conditions with large woody debris between existing pedestrian bridge near Park Ranger residence and anticipated upstream extent of estuary by 2021.
  1. **What are the assumptions and constraints that could impact whether you achieve your objectives?**

The primary constraint is funding for the overall larger project which is estimated at $16,000,000, including a Construction and Maintenance Agreement with BNSF (est. $2M). The County Executive and Council acknowledge this is a high priority project for the County and have shown leadership to move this project forward as evidenced by increasing funding above the Park’s CIP Request in 2014. The County has/or will invest (subject to 2019 budget process) approximately $2,110,000 for the feasibility, design, permitting, and bid phase of the overall larger project. Council-matic bonds obtained in 2019 would be required for any short-falls from grants not awarded. However, use of bonds will impact future funding available for other priority park projects in the future. Parks is seeking grant funding from a multitude of funders for the overall larger project including ESRP, WWRP-Water Access, LWCF, ALEA, and Federal Rail Administration. An application was made for NOAA Coastal Resiliency funding, but that Program was not funded in 2018 by Congress. Private funding sources are also being considered.

Because this project is proposed within a second party’s right of way (BNSF Railway), the willingness of BNSF is included as a factor that could affect achieving project objectives. However, the process with BNSF has gone incredibly well. The County involved BNSF Public Works Coordinator early in the feasibility stage; hired BNSF vetted railroad subconsultants for the bridge design and geotechnical work; and has adhered to stringent BNSF review processes which have all contributed to project success to date. The County’s Consultants have addressed preliminary and 30% review comments; and are currently addressing 60% comments from BNSF. BNSF approached the County in January 2018 about the possibility of using BNSF bridge crews rather than a third-party contractor to ease operation impacts of the project. The Construction and Maintenance Agreement is currently being drafted by BNSF and will include the costs for their bridge crews to construct the bridge. The County anticipates this approach will save standby and coordination time with BNSF and will also have the benefit of BNSF quality control. The County anticipates executing this agreement by the end of 2018. Three BNSF staff were present at the site visit in July 2018 with US Representative Rick Larsen and provided comments quoted in the subsequent Herald Article stating “The proposed bridge will allow for the separation of the pedestrian walkway and channel, while also helping to restore a small estuary east of our mainline”; and “This project is a win for the county, the public, the railroad and the environment.” Based on progress to date, and present dialogue, the County believes that property ownership will not be the limiting factor for this project to move forward.

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

The existing 6-foot-wide culvert through the railroad embankment will be replaced with a five-span, dual-track bridge. The bridge will be 128 feet long to create a 90-foot channel to restore the natural sediment and hydrologic processes between the creek and Puget Sound. The creek delivers on average 80 CY per year with a maximum of approximately 250 CY which will now be naturally deposited on the beach. The benefits of the restored sediment processes will extend beyond the project site and include northerly beaches that will receive the sediment through longshore drift processes. The bridge will provide ample capacity for tidal and creek channels and habitats to adapt to changing climatic and upland drainage conditions. Ecologically, the project will create high-functioning, sustainable rearing habitat for non-natal juvenile Chinook salmon.

The creek’s estuary will be restored by removing 17,000 CY of fill landward of the railroad embankment which will restore 1.3 acres of pocket estuary habitat (Figure 4). The restored estuary will re-establish the creek’s estuary under and upstream of the railroad bridge and provide a natural transition from the freshwater to brackish habitats. The restored estuary will allow for natural development of a network of meandering tidal channels. Over time, as sea levels rise, the restored estuary will have enough buffer area (initially freshwater marsh) for additional areas to be tidally inundated and transition to brackish, tidal marsh habitats.

The project will remove 128 lf of armored shoreline along the Puget Sound shoreline and 75 lf of armor within the lowermost reach of the creek. Additional restoration for Chinook benefit, funded through other non-SRFB funding includes the area upstream of the estuary. An additional 550 lf of Lund’s Gulch Creek will be enhanced through the placement of large woody debris; and 1.7 acres of nearshore and stream riparian buffers will be planted with native vegetation, which will improve habitat conditions, increase protection from predators, and increase terrestrial insects to feed salmonids..

In addition to restoration goals of the project, various changes will be made to the park to improve the park user experience. For the community, the project addresses the public safety issues and provides ADA accessibility for some 65,000 annual park visitors to one of only three Snohomish County Parks with saltwater access in what is the fastest growing region of Puget Sound. The nature-minded users who enjoy the forested gulch hike leading to views of Puget Sound, along with the many students attending science-based programs held at the park will benefit from the additional habitat improvements and will have access to eleven viewpoints of the restored estuary, nearshore and riparian areas.

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

The following restoration/construction tasks will be completed by the qualified contractor selected through the County bid process; and BNSF Bridge Crews, as appropriate.

* + - 1. Construct Temporary Facilities

Lund's Gulch Creek will be temporarily diverted through multiple pipes to the beach area during the approved in-water work window. This diversion would allow for stream work to be conducted in the dry and minimize potential impacts to water quality. With the stream diversion in place, the beach area adjacent to the railroad bridge would be temporarily graded to accommodate the temporary work areas needed for railroad bridge construction. Streambed substrate would be removed and salvaged. Temporary work pads consisting of quarry spalls capped with crushed surfacing base course will be placed on both sides of tracks. These temporary embankments would be approximately 30 feet wide along the length of the new railroad bridge alignment and a 50- by 50-foot section would be brought up to the rail elevation south of the proposed bridge location on the beach side of the embankment. Laydown areas within a 30-foot boundary on both sides of the temporary embankments would also be required for staging bridge components. Temporary staging and stockpile areas on the lower lawn area where the estuary is proposed would be needed during railroad bridge construction. A second temporary staging and stockpile area for equipment and material would also likely be needed on the upper lawn (outside of existing wetlands) during estuary construction.

* + - 1. Construct Railroad Bridge to Provide 90’ Channel Opening

Railroad bridge construction would be sequenced to maintain live track conditions throughout construction, and the bridge would be constructed one track at a time. Temporary shoring would be installed between the tracks to allow excavation during construction of the first half of the bridge. Approximately 40 steel H-pile bridge foundations would be driven during BNSF work windows. No in-water pile driving is proposed for the Project; the pile driving would occur in upland areas or during low tide above the water line. The remainder of the bridge would be constructed using BNSF standard precast concrete components. Approximately 2,000 cubic yards (CY) of existing railroad embankment material (sand and rock of varying size) would be removed along with the existing box culvert.

* + - 1. Install Starter Channel and Restore Nearshore

Once the railroad bridge is constructed and the regulatory work window opens for the marine environment, the new channel would be graded out into the estuary and the beach area would be regraded to support the widened creek mouth. The beach area would be restored with sand substrate and revegetated with backshore/supratidal vegetation. Grading of the new channel and estuary areas would occur during low tide cycles

* + - 1. Restore Estuary

The estuary tidal marsh restoration would include excavation of nearly 17,000 CY of material landward of the railroad. Excavation in the estuary area may require materials sorting for disposal. Estuary excavation would require removal of at least 40 trees. Material placement within the pocket estuary would include gravel/cobble streambed substrate, sand/gravel fish mix substrate, beach sand, and topsoil for wetland plants. All removed trees would be used as large woody materials (approximately 19 uncut logs with rootwads and 34 cut logs of rootwads or tree tops) or reinstalled as snag features (10 features) within riparian planting areas. Twelve of the largest woody debris pieces would be placed within the pocket estuary, with an additional 15 pieces placed near the bridge abutments; 22 medium-size pieces would be located within the existing stream channel, and 4 within the restored pond. These large wood features would provide additional habitat structure and complexity, providing pools and slow-water habitat that is supportive to juvenile salmonids. Eight snag features would be installed north of the existing creek channel and two south of the creek; all snags would be located within riparian habitat areas as habitat for cavity-nesting birds. The estuary and riparian areas would be revegetated with native vegetation.

The project will be bid summer 2019 with procurement of materials and construction coordination occurring through spring of 2020. On-ground construction activities will occur during fish and BNSF work windows with anticipated completion early 2021.

Project deliverables will include development of as-built record drawings based on a final survey and field markups from the contractor. The as-built drawings will be developed/revised and submitted monthly during construction. Thirty days after substantial completion of construction, the contractor will submit field markups so the Consultant can conduct a final survey and prepare record drawings.

Following construction, biologists will conduct baseline monitoring of habitat enhancement areas, and produce an as-built monitoring report. The habitat enhancement areas will be monitored for performance in years 1, 3, and 5. Final as-built drawings, photographs, and post-planting monitoring reports will be submitted as project deliverables by Snohomish County.

* 1. **Explain how the sponsor determined cost estimates.**

A 60% cost estimate (attached in PRISM) was developed by the consultant team including Anchor QEA (habitat and park amenities), Hanson Professional Services (railroad), and Shannon & Wilson (access road improvements) for the overall larger project. Costs were estimated based on project team experience on similar projects and input from material suppliers. In addition, a vetted railroad bridge contractor provided input on equipment and material mobilization, staging, and construction sequence. Project costs include mobilization, sales tax, construction management, administration, architectural and engineering costs and allowances for inflation.

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

During the feasibility study- which included a stakeholder and public process to inform selection of the preferred alternative - seven initial concepts were presented with three conceptual alternatives selected for full feasibility evaluation. Several Evaluation Criteria were considered for the alternatives including fish habitat restoration, coastal processes, public safety, parks and rec benefits, Stakeholder support, BNSF coordination, climate change/sustainability and funding. Each alternative entailed replacing the undersized creek mouth culvert with a bridge. The alternatives differed in the width of the opening and size of the estuary upstream of the railroad embankment. The 3 widths in the alternatives were 40-ft, 60-ft, and 90-ft creek openings. The minimum restored width proposed (40 ft) met a minimum hydraulic engineering criterion calculated by the project engineer of the necessary width to transport the sediment loads from the watershed to Puget Sound. The restored estuary size of each alternative corresponded with the bridge opening width such that the widest opening was paired with the largest restored estuary. An addendum, subsequent to selection of the preferred alternative, was prepared to flesh-out alternatives initially discounted, including an overpass, additional culverts and tunneling options, in an effort to perform due diligence on a project with a large capital cost. The outcome still favored the original preferred alternative.

The alternative with the widest opening/largest estuary was selected as the preferred alternative. The selected alternative provides the maximum restoration of the estuary and associated ecological processes. Snohomish County is committed to the extensive restoration proposed for the site in order to contribute to regional recovery efforts. The selected alternative was also the one preferred by stakeholders and the community. Additional information can be found in the Preliminary Design Report and Addendum (attached in PRISM).

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

The proposed project is strengthened by experience gained through other completed habitat restoration projects throughout the Puget Sound region including the Seahurst Park Ecosystem Restoration, Snohomish Nearshore Restoration, Strawberry Plant Park Restoration, and Eddon Boatyard Park Restoration. This experience has informed all aspects of the project, including: successful stakeholder, tribal, landowner (BNSF), and public outreach; scientific studies of juvenile Chinook habitat use and estuary restoration; restoration engineering; and technical specifications and bid document support. All of this experience is being applied in an effort to construct a restoration project that provides immediate and long-lasting benefits for juvenile Chinook salmon. Additionally, valuable insights on costs and constructability were obtained from working with a rail bridge contractor, and selecting railroad engineering consultants with excellent working relationships with BNSF Railway to help build an effective dialogue with the railroad.

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

Since this is a County park, continued, regular maintenance of the site is planned. Monitoring of wetland and riparian planting areas by professional biologists and Habitat Specialists will identify corrective actions to be implemented by the County.  This park has several volunteer groups that engage in vegetation maintenance. In addition, the multiple environmental educational groups have a vested interest in this project and have expressed interest in volunteer opportunities.   The C&M agreement between the County and BNSF will include provisions that ensure BNSF has adequate resources to maintain the bridge long term.

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

The proposed project provides an important opportunity to improve habitat conditions for juvenile Chinook salmon who have migrated out of their natal rivers. The importance of doing the project now is based on the need to advance restoration through a proper balance of river and nearshore projects. The proposed project is one of only a few opportunities in the estuary and marine nearshore of WRIA 8 that is ready to move forward in the coming years and this project will achieve 50% of the habitat goal identified in the plan for pocket estuary restoration.

The timing is right because the project has momentum and support through the participation and outreach to BNSF conducted to date. At this time, the project is fully supported within the County and BNSF is actively participating in project development activities, including working with the County on an O&M agreement for the project. Stakeholders and the public are very interested in the project moving forward at this time.

Finally, the proposed project provides a groundbreaking template of opportunity for addressing the impacts of one of the most significant major infrastructure elements affecting Eastern Puget Sound, the BNSF Railway. The project’s location is significant in that Lund’s Gulch Creek is one of the only creeks between the Lake Washington and Snohomish River systems that provides estuary and lower creek rearing opportunities for juvenile salmon, including Chinook. Five species of salmonids have been documented in Lund’s Gulch Creek, including non-natal Chinook salmon. The restored habitats are anticipated to provide important rearing opportunities to support Chinook life history diversity and productivity to improve the population’s viability. The precedent-setting nature of the opportunity increases the importance of the benefits to salmon that the proposed future restoration would provide. Rail traffic is only anticipated to increase in the future based on current trends, making this project urgent in light of the difficulty of constructing with increased train traffic. If successful, this project could be an impetus for additional future nearshore restoration projects of similar nature that should be implemented sooner than later to address railroad impacts.

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.**

The proposed project along with the upstream riparian enhancement provides for complete restoration available at this site. The project would make precedent-setting progress towards a regional strategy for restoration on Puget Sound shorelines bordered by the railroad. Puget Sound Partnership has recently recommended this project for adoption into the 2018-2022 Action Agenda for the Shoreline Armor Removal (SA3.3) strategy with a ranking of 3. The proposed project could be the first (or one of the first) in Puget Sound to restore a creek mouth and estuary by removing shoreline armoring and constructing a railroad bridge to. This would add to an emerging portfolio of project types in which restoration is occurring along the railroad that reflects process-based objectives, sustainability, and fish life history requirements.

1. **Describe the sponsor’s experience managing this type of project.**

Snohomish County Parks is the largest landowner in the county, managing major park projects including Brightwater-funded sites, multiple regional trail corridors (Rails to Trails) along critical areas with historic railroad bridges spanning major rivers (North/South fork of the Stillaguamish), and working with stakeholders including DNR, WDFW, Forterra. In addition, Snohomish County Public Works Surface Water Management brings an extensive track record of habitat restoration design, construction, and maintenance, including in estuarine and marine nearshore environments and culvert replacement projects. Most recently, Snohomish County led two significant projects that serve as relevant examples of their ability as a sponsor to successfully complete the project. One project is the marine nearshore beach restoration at Howarth Park, supported by Marine Resources Committee. This project included beach nourishment along the BNSF right-of-way at several locations between Mukilteo and Everett. The other project example is the Smith Island restoration, which is a major restoration in the Snohomish River estuary. The Smith Island project entailed not only complex engineering and working within constraints of infrastructure that is to remain post-restoration, but also with successfully piecing together funding through a diverse portfolio of grants and other funding. Additionally, the project sponsor is technically supported by a highly experienced team of environmental, railroad, geotechnical, and landscape consultants with BNSF experience who are able to address all aspects of the project’s design, engineering, science, permitting, and monitoring requirements.

1. **List all landowner names.**

* Snohomish County – Park property including the tidelands
* BNSF – 100-foot right of way (Land Owner Acknowledgement attached in PRISM)

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

Partners for the project include Snohomish County’s Marine Resources Committee (MRC), and WRIA 8. Members of MRC provide support as key stakeholders given their role and interest in marine conservation. In addition, they've facilitated communication and partnerships between Parks and nearshore restoration funders. MRC also partnered with Parks on funding a portion of the Feasibility and the Benefit Cost Analysis that included an Ecosystem Valuation (Attached in PRISM). WRIA 8 recognized potential of this project even prior to the Feasibility Study, when the project was initially included on the WRIA 8 Four-Year Work Plan. As a Partner, WRIA 8 has provided technical input and guidance in developing the project elements to ensure the project reflects the priorities of the local salmon recovery plan and consults with the sponsor on funding strategy.

1. **Stakeholder outreach***.*

There is no opposition to this project and no barriers to completion for the project, besides funding. Stakeholders have expressed support, Snohomish County Council and the Executive identify this as a high-priority Puget Sound Initiative project, and BNSF continues to review the project according to their process and is in the process of initiating the C&M agreement.

Under current conditions, a serious public safety concern exists with the only beach access provided by the under-sized culvert, which is problematic when grates are removed to accommodate fish passage and when the culvert is flooded. Park users choose to trespass across BNSF rail line in spite of signage and fencing. This project will separate pedestrians from the critical estuary and creek habitat and provide ADA-accessible access to the beach, thereby addressing this public safety issue.

Stakeholder and Tribal outreach occurred during feasibility and design development and included meetings with the community (open public meetings and with representatives from BNSF Railway; Amtrak; Tulalip, Suquamish, and Stillaguamish Tribes; the cities of Lynnwood and Edmonds; Sno-King Watershed Council; Edmonds Community College; Washington Water Trails; Friends of Meadowdale; Snohomish County MRC; and the Washington Utilities and Transportation Commission. Feedback predominantly included enthusiasm and awe for the project’s forward movement.

### 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
2. Yes
3. Will a licensed professional engineer design the project?  
   Choose an answer
4. Yes
5. If this project includes measures to stabilize an eroding stream bank, explain why bank stabilization there is necessary to accomplish habitat recovery. *Bank stabilization criteria required to meet SRFB eligibility is in Section 2 of   
   Manual 18.*

Not applicable.

1. Describe the steps the sponsor will take to minimize the introduction and spread of invasive species during construction and restoration. *Specifically consider how the sponsor will use un-infested materials and clean equipment entering and leaving the project area.*

There is a fairly limited amount of invasive plant species within the project site. Invasive plants that are cleared and grubbed will be contained and disposed off-site. Topsoil stripping, salvage, and reuse is planned for the project; this practice will not be permitted in areas containing invasive plant species. Stockpiles of salvaged topsoil will be protected from weed infestation through plastic coverings.

Imported topsoil materials and hydroseed mixtures will be certified free of seeds, rhizomes, and roots of State-listed noxious weeds, and submittals will be inspected of these materials. Imported container plants will be inspected to be weed-free at the time of planting. The contractor shall weed planted areas during the maintenance period of the project, with the County assuming plant maintenance after Physical Completion.

**Comments**

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

Response to Site Visit Comments

Please describe how the sponsor responded to the review panel’s initial site visit comments. *List each of the review panel’s comments and questions and identify the response. Use this space to respond directly to their comments or refer to changes in the proposal.*

***Comment #1:*** *We recognize the unique opportunity to create a small pocket estuary in association with Lund’s Gulch Creek given the disconnection between the shoreline and uplands due to the Burlington Northern railroad grade. We also understand that juvenile chinook and other salmon species are likely to utilize the restored estuary area. The project is well designed to maximize the available habitat. Unfortunately, the restored estuarine area is just over an acre in size and has an overall price tag of nearly $14 million (with a $2 million SRFB grant request). The cost-benefit ratio for restoration of 1.3 acres of habitat is about $10.6 million per restored acre. As outlined in the 2015 Review Panel comment form for the design grant (15-1056), the cost-benefit ratio is far higher than any other SRFB-funded shoreline restoration project. We believe that the Review Panel will again consider this proposal a project of concern due to the high cost relative to the anticipated benefits for the recovery of Puget Sound chinook salmon.*

**Response to Comment #1:** Thank you for noting that the project is well designed to maximize the restoration opportunity. Regarding cost, please note that the SRFB request was reduced to $800,000.

The project entails several work items as the site is transformed from park lawn with a constrained stream mouth to a maximally-sized salt marsh and estuary. This includes the railroad bridge which is expensive, but allows for process-based restoration of the site. We assert that consideration of the value of the restoration should consider both the salmon benefits of the project and the importance of the project. These benefits include each of the following which are described in more detail below:

* Restores the habitats that juvenile Chinook need after out-migrating from rivers
* Contributes to ESA recovery of Puget Sound Chinook Distinct Population Segment
* Restores habitat type that is rare compared to historic times
* Project is a unique opportunity in a unique location
* Quality of the watershed
* Project is precedent-setting

Restores Habitats that Chinook in the Nearshore Need

This project provides multiple types of habitats that recent research on juvenile Chinook demonstrates is highly utilized during their early marine life history (a noted critical period or “bottleneck’ in their marine survival [Beamish and Mahnken 2001; Duffy 2009 full references below]). The project restores:

* + Lower stream freshwater habitats – documented by Beamer et al. (2013) as habitats used by non-natal juvenile Chinook. The study included sampling at Meadowdale Park (see answer #4 for details) and documented consistent Chinook presence. Restoring the habitat is to support even more Chinook use.
  + Pocket estuary habitats – documented in multiple studies (e.g., Beamer et al. 2005, 2006) as used in higher densities by juvenile Chinook.
  + Beach nearshore habitats – well documented use by juvenile Chinook (e.g., Fresh 2006), including Brennan et al. (2004) study that included sampling at Meadowdale Park (see answer #4 for details) and documented high Chinook and coho presence. Juvenile Chinook, especially those originating in central Puget Sound, need improved nearshore habitats such as those proposed in this project.

Contribution to ESA recovery

The NMFS “viable salmonid populations” identifies four population metrics that are necessary for a population to be viable (McElhany et al. 2000): 1) abundance, 2) productivity, 3) spatial structure, and 4) diversity. The proposed project will contribute to both the productivity (lifetime survival rates to return to spawn) and diversity metrics of the populations’ viability.

The anticipated benefits to productivity are related to providing juvenile Chinook with productive restored pocket estuary and non-natal stream habitats that increase their growth before they migrate offshore and ultimately to the ocean. Duffy (2009) documented a strong positive relationship between size of juvenile Chinook in Puget Sound and their survival to adulthood (i.e., early marine growth drives survival). The proposed restoration will provide the habitats used by rearing juvenile Chinook and substantial prey production, especially in the restored estuary.

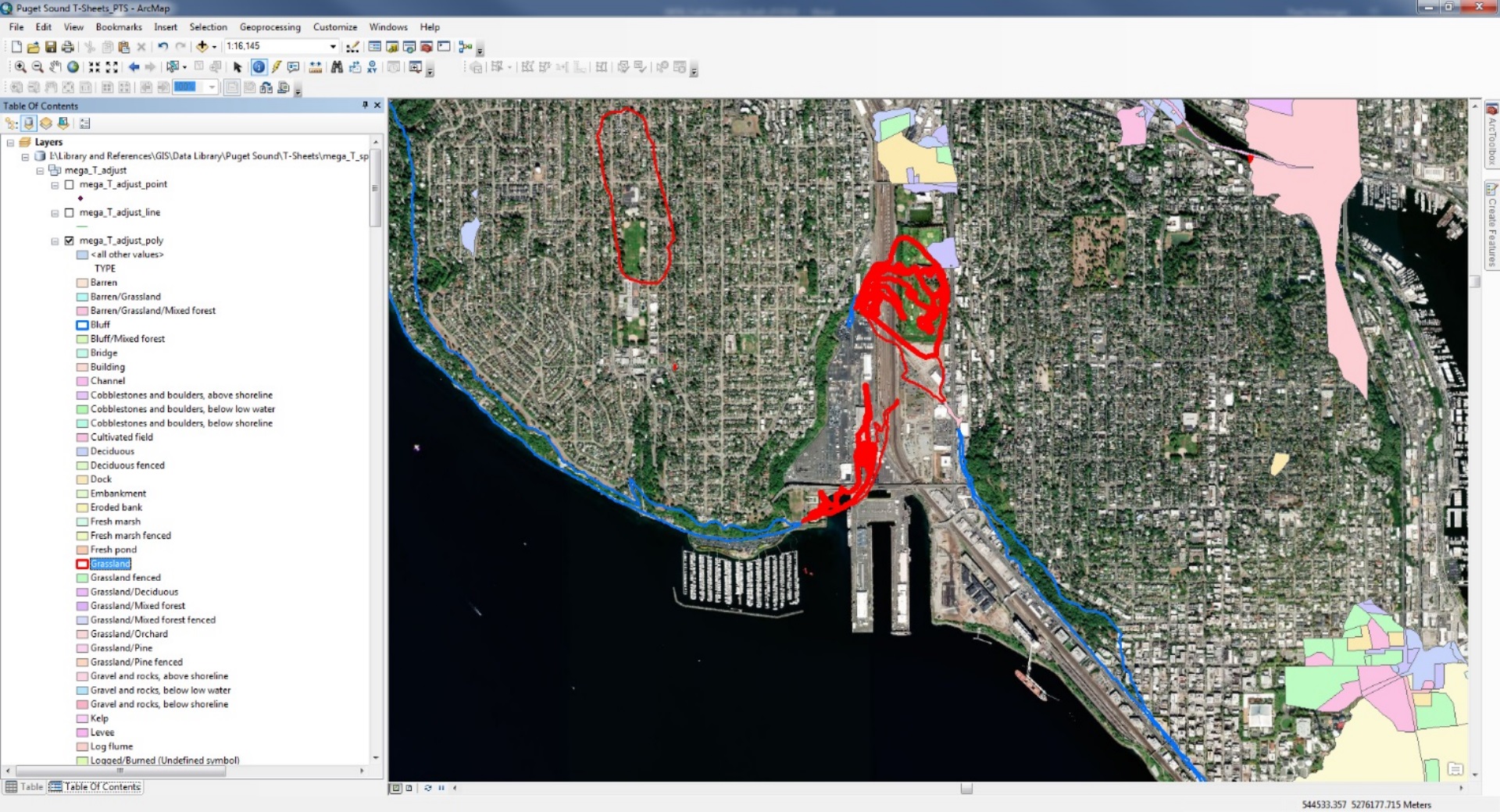
The diversity benefits relate to providing favorable rearing habitats for the subset of juvenile Chinook in Puget Sound whose life history includes rearing in pocket estuaries and non-natal streams. While not all Chinook do this, it should be considered an important life history strategy because the diversity of life history strategies adds to the resilience and viability of the population to disturbances.

This project targets three priority recovery strategies identified in the “Lake Washington/ Cedar/Sammamish Watershed Chinook Salmon Conservation Plan 10-Year Update” (2017) : 1) reconnect backshore areas and pocket estuaries, 2) restore natural marine shorelines, and 3) protect and restore functional riparian vegetation (Appendix E, pages E-2, E-14, E-15). Additionally, implementation of the Meadowdale project will achieve 50% of the habitat goal of reconnecting two pocket estuaries to the nearshore by 2025 (Appendix D, page D-2 – D-3).

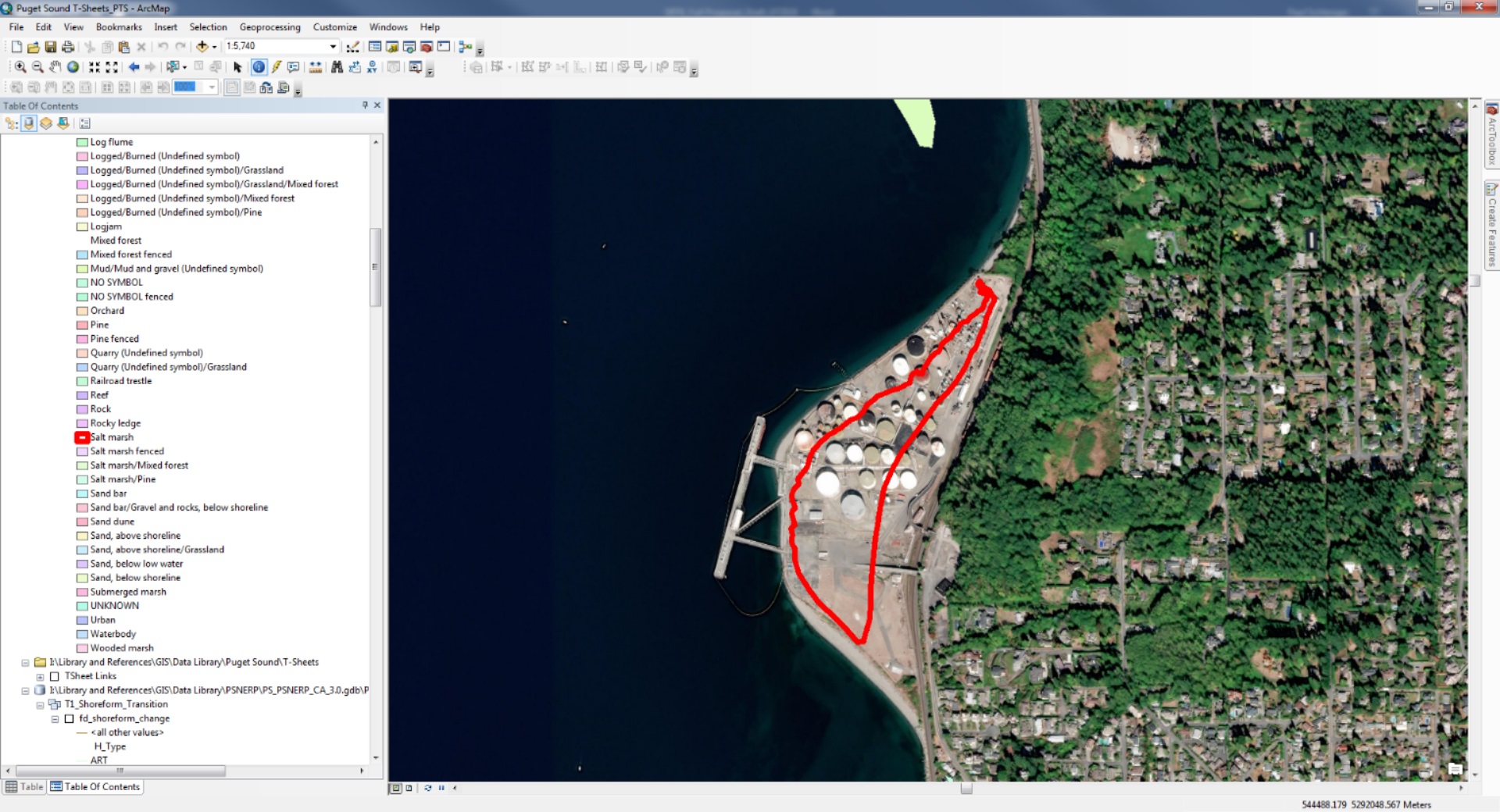
Rarity of the Site

Unfortunately, the estuaries of coastal streams in central Puget Sound have been largely obliterated through shoreline development. The types of protected habitats the proposed project will provide has been lost compared to what was historically present. In fact, Cereghino et al. (2012) reported that 14 out of the 15 barrier embayments between Commencement Bay and the Snohomish River on the eastern shore of Central Puget Sound – including all of WRIA 8 – have been lost. As noted above, the science indicates the importance of these habitats for juvenile Chinook, but the habitats are largely not available to them.

Uniqueness of the Opportunity

The lost embayment sites identified in Cereghino et al. (2012) are not all opportunities for future restoration. The development around many of these sites has been intense and irreversible. Two examples are provided below of historic embayment sites that have been heavily modified and are not realistic sites for restoration.

Smith Cove in Elliott Bay Seattle – Site owned and actively used by Port of Seattle and other private users. Red shows outline of historic saltmarsh. Blue shows historic bluff which helps show the historic shoreline configuration.



Point Wells in Woodway (Snohomish County) – Site redevelopment of the oil tank farm does not include restoration due to value of site for retail/residential development. Red shows outline of historic saltmarsh embayment.

The Meadowdale Park opportunity is unique because County Parks owns the entire site except for BNSF corridor and is fully supportive of the maximum restoration opportunity. County Parks is allowing large-scale conversion of the lower park area from recreation to habitat restoration purposes. Many other sites can expect to have multiple landowners upstream of the railroad who will all have to support restoration. Often times, the presence of multiple landowners leads to constraints that limit the restoration opportunity at a site.

Protected Watershed

Meadowdale Park and the Lund’s Gulch Creek watershed provide a very high level of intact, contiguous forested habitat without development or road fragmentation compared to other Eastern Puget Sound creek systems. The watershed drains approximately 1,440 acres and includes substantial areas of protection, especially among those lands closest to the stream mouth. The total creek length is 2.4 miles, of which 1.9 miles (70%) are in protection and/or a forested ravine. The creek flows more than 0.75 miles through the 108 acres of protected lands in Meadowdale Beach Park. Immediately upstream of the park, the creek flows 1.15 miles through a forested ravine. In addition, 99 acres of land adjacent to the park is in protection status through City of Lynnwood and community-based conservation efforts.

Precedent-Setting Restoration

Snohomish County Parks has made progress unlike any other project sponsor trying to work on process-based restoration along the railroad lining the eastern shore of Puget Sound. The County has worked with BNSF for years planning towards restoration of the park. These efforts have been successful in getting BNSF participation in stakeholder meeting throughout the planning and design, BNSF review of interim design materials, and most recently BNSF’ decision to use their crews for the construction of the railroad bridge.

Working with BNSF on restoration has long been of interest to restoration planners working to recover Puget Sound and ESA-listed Chinook salmon. It has been a strong topic of interest when the Corps’ Puget Sound General Investigation (PSNERP) began and has continued with multiple attempts by Puget Sound Partnership to gain traction on regional planning. This project has made it far beyond the other efforts at getting restoration done with BNSF.

In addition to the salmon recovery benefits described above, the project provides significant recreation benefits, including ADA saltwater beach access, public safety improvements associated with illegal railroad trespass due to culvert conditions (this also provides rail safety by diminishing risk of derailment associated with collision or rapid braking due to trespasser), additional and enhanced ecosystems for public and educational group enjoyment and demonstrated government leadership by addressing long-term resilience of site to sea level rise.

***Comment #2:*** *Please provide greater detail/justification for costs outlined in the overall riparian/estuarine planting element listed at $461,000 as this per acre cost appears quite high for 1.7 acres of riparian and 1.3 acres of estuarine area and includes large amounts for coir matting and goose enclosures. Is the estuarine area expected to be high energy or high slope necessitating the coir matting? Was a more passive restoration approach for the intertidal/tidal marsh portion of the estuary considered?*

**Response to Comment #2:** The riparian planting approach has been adjusted to reduce costs. We anticipate this may require a more adaptive approach to riparian and salt marsh establishment at the site in the years following construction. The County is committed to implementing adaptive improvements (such as additional planting and invasive species control) following initial construction.

The riparian/estuarine planting costs are now $84,000. The changes made to the riparian/estuarine planting costs are as follows:

* In the pre-proposal provided for the site visit, several line items contributing to the $461,000 estimate were not truly riparian/estuarine planting costs but rather earthwork items. For example, moving these soil, mulch, and geotextile fabric line items, resulted in a planting-only cost estimate of $272,000 in the version presented at the site visit. Further reductions have been made to the coir fabric extents (only used within the tidal marsh area) reducing this line item cost from $98,000 to $59,000. Eliminating the coir fabric completely is problematic; if soils do not hold the first season and tidal emergent plants do not establish there is no existing tidal marsh seed source on-site to replace plants that do not thrive.
* Reduced planting density by increasing the spacing between emergent plants from 2-ft On Center (O.C.) to 2.5 ft O.C. and reconfiguring tree/tall shrub placement to preserve select views
* Included use of seeding in a portion of the freshwater wetland area previously planned to only include container plants
* Reduced size of some plant materials (i.e., now 1 or 2 gallon size instead of 5 gallon).
* Removed use of coir fabric to stabilize planting surface within upper/freshwater marsh areas
* Removed goose enclosure/herbivory protection item
* Use volunteers from surrounding community under professional supervision to install riparian trees and shrubs

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Response to Post-Application Comments

Please describe how the sponsor responded to the review panel’s post-application comments. *List each of the review panel’s comments and questions and identify the response. Use this space to respond directly to their comments or refer to changes in the proposal.*