

# **Puget Sound Acquisition and Restoration - High Priority Capital Projects Proposal**

## **WRIA 9 Duwamish Gardens Estuary Restoration**

August 31, 2012

### **Project Details**

Organization name: City of Tukwila

EIN/Tax ID: 91-6001519

City: Tukwila

State: WA

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Primary contact title: Senior Surface Water Management Engineer

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Project name (as used in Prism/HWS): WRIA 9 Duwamish Gardens Estuary Restoration

Watershed/Lead Entity: WRIA 9 – Green/Duwamish and Central Puget Sound Watershed, King County

Grant amount being requested: \$2.5 million

Total matching contributions: Up to \$1,100,000 (\$500,000 – King Flood Control District, secured; \$100,000 – City of Tukwila, secured; \$500,000 – ALEA – pending)

### **Narrative**

#### 1. Project overview:

- A. Describe the primary goal and objectives of this project.

The main goal of this project is to improve the ecological function of the Duwamish estuary by restoring habitat that is critical to the recovery of threatened Chinook salmon in the Green/Duwamish watershed. To this end, the City of Tukwila will construct approximately 1.3 acres of shallow water habitat on the 2.16 acre site on the right bank of the Duwamish River immediately downstream of river mile 7.0. The project site is in the high priority Duwamish Estuary "transition zone" between fresh and salt water, which provides the appropriate range of salinities for juvenile salmonids to transition from fresh water to salt water. Off-channel and shallow water habitats in the transition zone are limited, and only 3 percent of the historic estuarine wetland habitats remain. Research shows that lack of shallow water habitat in the Duwamish transition zone is a primary factor limiting Chinook productivity in the watershed. This project will create new habitat that will allow juvenile fish to move out of the main channel to an area where they can feed and rear. Longer residence times in the estuary allow for larger, healthier smolts prior to ocean migration. The property is among the largest available sites for habitat restoration remaining in the Duwamish corridor. When restored, it will be the largest off-channel habitat between the Codiga Farms restoration at RM 8.5 and North Wind's Weir restoration at RM 6.4.

The new shallow water habitat will be created by excavating an estimated 55,000 cubic yards of material to establish approximately 1.3 acres of shallow water mudflat and marsh habitat and approximately 0.8 acre of riparian area planted with native vegetation. Public access will be encouraged on the site, with a small parking lot, upland trail, and interpretive signs. The site is adjacent to Sound Transit's Link Light Rail line, with viewing opportunities by the public in trains that go by every 10-15 minutes.

- B. Describe the location of the project in the watershed, including the name of the water body(ies), upper and lower extent of the project, and habitat type (nearshore, estuary, main stem, tributary, off channel, or other location). Include vicinity and project maps as attachments

This project is located in WRIA 9, the Green/Duwamish and Central Puget Sound watershed (see attached vicinity map). The site is within the Duwamish subwatershed, which encompasses the lower 11

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miles of the Green/Duwamish River. The project area is located along the right bank of the Duwamish Estuary at approximately river mile 6.9 – 7.0. Approximately 1.3 acres of shallow water mudflat and marsh habitat and approximately 0.8 acre of uplands planted with native vegetation will be created. The project will include approximately 0.6 acres of the river channel (WADNR property). This project will create off channel habitat along the mainstem of the Duwamish.

- C. Provide an overview of the current project site conditions and the nature, source, and extent of salmon recovery problem(s) that the project will address.

This site is in the tidally influenced “transition zone” of the Green/Duwamish River. The Duwamish estuary transition zone is where fresh water and saltwater mix, and extends between river miles 9 and 3. Transition zone habitat is particularly important for juvenile Chinook and chum smolts making the physiological transition to salt water. In particular, off-channel shallow water habitats provide areas for juvenile fish to take refuge from high flows, rest and feed.

The Duwamish subwatershed is highly industrialized and altered from its historic condition. Records indicate that before European settlement, there were 1,310 acres of wetlands in the watershed; today there are less than 35 acres. The Duwamish estuary was straightened and dredged, and flow from two major tributary rivers (the Cedar River and the White River) was diverted elsewhere, leaving the river with approximately 1/3 of its previous flow. The limited availability of rearing habitat for juvenile salmonids in this subwatershed is thought to be a key limiting factor for their productivity. Land in the subwatershed is limited in availability and quality due to over 100 years of industrialization, and this project site was one of the largest remaining under-developed parcels available for restoration. This project would create approximately 1.3 acres of shallow water, off channel rearing habitat for juvenile salmonids, and the only such area between river miles 8.5 and 6.4 within the critical transition zone habitat. This represents 26% of the 10-year target for the WRIA 9 Salmon Habitat Plan of 5 acres of off-channel habitat in the Duwamish.

The site itself is 2.16 acres. The upland project area consists of industrial-zoned land. The soil is largely historic alluvium with approximately three to four feet of fill on the southern edge of the property along the bank. The topography is flat. Along the south property boundary is approximately 500 feet of 15-foot tall river bank that is relatively steep (>2:1 slope). The shoreline has some concrete debris in places but no designed or constructed armoring. Most of the riverbank is covered by a dense thicket of Himalayan blackberry (*Rubus armeniacus*). Approximately 15 feet below the top of the bank, there is an unvegetated mudflat that slopes down to the Duwamish River. There are several trees on the site that will be salvaged and used as large woody debris.

The project site was historically part of a farm called Duwamish Gardens and its past uses have included agriculture, residential, and small business. The two houses, a bunkhouse, and barn will be removed prior to construction. The site is currently fenced off and not used. Investigations indicate that the site has pockets of shallow (1-4 feet deep), low level contamination, primarily PAHs.

Cultural investigations are still ongoing, but preliminary investigations showed some native pre-contact use at the site. Pre-contact Native American evidence was detected about 3 feet below surface, and may be fairly extensive, and the design team is working with permitting agencies and tribes on next steps for mitigation and data recovery.

- D. Provide a detailed description of the project, including project size, scope, design, and how it will address the problems described above.

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The project site is 2.16 acres, adjacent to the Duwamish River at approximately river mile 6.9-7.0, which is critical transition zone habitat for juvenile Chinook salmon migrating to Puget Sound. The site configuration includes 500 feet of river bank. Design plans call for excavating 1.3 acres of off channel shallow water habitat that will be influenced by tides, yet sheltered from the fast flow of the main channel. The length of waterfront means a large opening will be created, giving salmon ample opportunity to enter the area. Projects with wide openings to the river appear to be more successful than those with narrow openings. Similar completed sites both upstream and downstream of this location have demonstrated food production and Chinook use within the restored off channel habitat was higher than the main channel.

The existing bank, including 3-4 feet of fill material, will be removed to create a gentle slope supporting mud flats, marsh, and riparian habitats. Elevations will be lowered as much as 25 feet from the existing bank height. Native trees, shrubs and groundcovers suited to the dry, upland conditions will be planted in the riparian habitat (approximately 0.8 acres). Marsh species including bulrush and sedges will be planted and protected from grazing by geese. Slopes will be constructed to be compatible with the highest tides without the use of armor or other structural means.

- E. Discuss how this project fits within the Puget Sound Chinook or Hood Canal Summer Chum recovery plans, three year work plans and/or local lead entity strategy to restore or protect salmonid habitat in the watershed (i.e., does the project address a priority action, occur in a priority area, address a key limiting factor)?

This project improves riparian habitat and adds 1.3 acres of shallow water, off channel habitat in the Duwamish at River Miles 6.9-7.0. In the WRIA 9 Salmon Habitat Plan, which was incorporated into the Puget Sound Chinook recovery plan, Project Duw-7 calls for creating up to 20 acres of shallow water habitat between river miles 7.0 and 5.5. The overall 10-year plan target is functioning habitats representing 30% of historical habitat area, including 173 acres of estuarine habitat in the Duwamish.

This project is on the WRIA 9 3-year work plan. Because the project addresses a key limiting factor in the Green/Duwamish watershed, it is strongly supported by the 17 jurisdictions in WRIA 9. Specifically, this project addresses the limiting factor of the lack of rearing habitat for migrating smolts in the Duwamish estuary.

- F. Has any part of this project previously been reviewed or funded by the SRFB? If yes, please provide the project name and SRFB project number.

This project has been reviewed by SRFB, and funds were awarded for design. Projects included:  
10-1605 – Duwamish Gardens Estuarine Rehabilitation Design  
10-1105 – Duwamish Gardens Estuary Rehabilitation Concept

- G. Does this project have any opposition or barriers to execution outside of funding? Have members of the community, recreational user groups, adjacent landowners, or others been contacted about this project?

Outside of funding, there is no known opposition to project completion. Members of the community have been notified through updates to the city's web site and articles in the local paper, the Tukwila Reporter. An article published in the Tukwila Reporter in March 2012 announced the project and formed a citizen group to provide input on project design.

In general, habitat restoration projects along the Duwamish have received strong community support. Twelve different sites along the Duwamish are tended regularly by nonprofit groups and volunteers, and

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since 2006, Duwamish Alive! has brought thousands of volunteers to clean up sites, remove invasive plants, and restore native vegetation. The city plans to partner with this program for ongoing maintenance and community support.

2. How does this project make progress toward a Puget Sound Action Agenda (PSAA) target for protection or restoration of habitat (e.g. shoreline armoring, eelgrass, land cover and land development, flood plains, estuaries, or water quantity)? Describe which target(s) are impacted and how much progress will be made through implementing this project using the metrics (acres, miles, etc) provided in the attached Puget Sound Ecosystem Recovery Targets document.
  - **Estuaries** – The 10-year salmon recovery goal for the Duwamish estuary is to restore 173 acres of off-channel habitat for Chinook salmon (WRIA 9 Salmon Habitat Plan). This project would contribute approximately 1.3 acres towards that goal, and towards the overall PSAA target of 7,380 quality acres restored. While 1.3 acres may seem small, it is one of the largest parcels still available for restoration in the critical estuarine transition zone, which juvenile Chinook salmon rely on to feed and grow while they acclimate to saltwater on their way to Elliot Bay. It is also a significant addition to the 3.5 acres that have been restored since the WRIA 9 plan was implemented in 2005.
  - **Land Cover and Land Development**—This site was formerly a small business and residence, with very few trees or native plants. The riparian bank of the Duwamish along this 500 foot stretch is dominated by invasive, non-native plants. Riparian vegetation on this parcel will be restored, contributing to the PSAA target of 268 miles. This will also contribute to the 10-year WRIA 9 target of restoring 3 miles of shoreline bank; only 0.75 miles have been restored since 2005.
  - **Chinook Salmon** – This project, by addressing a key limiting factor for productivity in Chinook salmon in the Green/Duwamish watershed, is intended to improve productivity and help reverse declines.
  - **Toxics in Fish**—The top one to four feet of soil on the site are slightly contaminated with PAHs. Much of this contaminated soil will be removed, and some will be capped. The result is that less contamination will reach fish in Puget Sound through groundwater leaching. The exact amount of progress towards this target cannot be estimated at this time.
3. How does this project address VSP parameters for listed salmon populations? Please describe the expected results to an improvement in abundance, productivity, diversity and/or spatial distribution for one or more populations from listed ESUs.

Duwamish Gardens will address VSP parameters for Chinook spatial structure (rearing habitat), diversity (juvenile life history), and productivity. This project will create approximately 1.3 acres of off channel rearing area where none currently exists. This directly addresses one of the highest priority conservation hypotheses from the WRIA 9 Salmon Habitat Plan, Duw-3: “Enlarging the Duwamish River estuarine transition zone habitat by expanding the shallow water and slow water areas will enhance habitat quantity and quality of this key Chinook salmon rearing area, leading to greater juvenile salmon residence time, greater growth, and higher survival.” Due to the loss of historic estuarine habitat, the Duwamish estuary/transition zone is believed to be a bottleneck for the productivity of the Chinook population, specifically for fry and smolts that rear in the lower part of the river. Rearing habitat for juvenile Chinook in the Duwamish transition zone was the top priority for funding in the WRIA 9 Salmon Habitat Plan because of its potential to contribute to VSP parameters.

This project will high create high quality off-channel marsh and riparian habitat that will increase prey resources. Sampling by King County (2010) indicated that lack of prey resources may be limiting growth

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of natural origin Chinook in the transition zone. The site will also provide much needed flood refuge habitat for overwintering juvenile salmonids and early hatched salmonids in a reach where fish have almost no ability to get out of the mainstem during flooding. Sampling in 2001-2003 in Elliot Bay near the mouth of the Duwamish found button-up fry that had been flushed downriver into the Bay. The increased habitat is expected to allow juvenile fish to spend more time feeding and growing in the estuary, which should lead to increased survival and life-history diversity. Post-construction sampling at similar projects in the transition zone showed they were used by juvenile Chinook.

- Describe the listed salmon and steelhead populations that would benefit from this project, including species, life history present at the site, ESA status, and life history targets for the project site.

Only the fall Chinook population remains in the Green/Duwamish River; it is listed as threatened under the ESA. Spring Chinook have been extirpated. This project will target the juveniles of the fall Chinook population by providing a sheltered, productive shallow water habitat where they will encounter abundant food and few predators. There are five known juvenile life history trajectories in WRIA 9; the potential impact of this project on each is shown in the table below.

Juvenile Life History Trajectory	Current Status	Project's Potential Impact
Estuarine-reared fry	Common	Benefit
Marine-direct fingerling	Common	Slight benefit
Lower river-reared fry	Uncommon	Benefit
Marine-direct fry	Uncommon	No impact
Yearling	Rare	No impact

Steelhead are listed as threatened in Puget Sound. Steelhead occur in WRIA 9, but it is not known whether this project would benefit them. Bull trout are also listed as threatened under the ESA. Bull trout have been encountered in the lower Duwamish during sampling efforts that occurred between 2000 and 2005. There is no known spawning population in the Green River system, but it is believed that they use the system for foraging. The impact of this project on bull trout is unknown at this time.

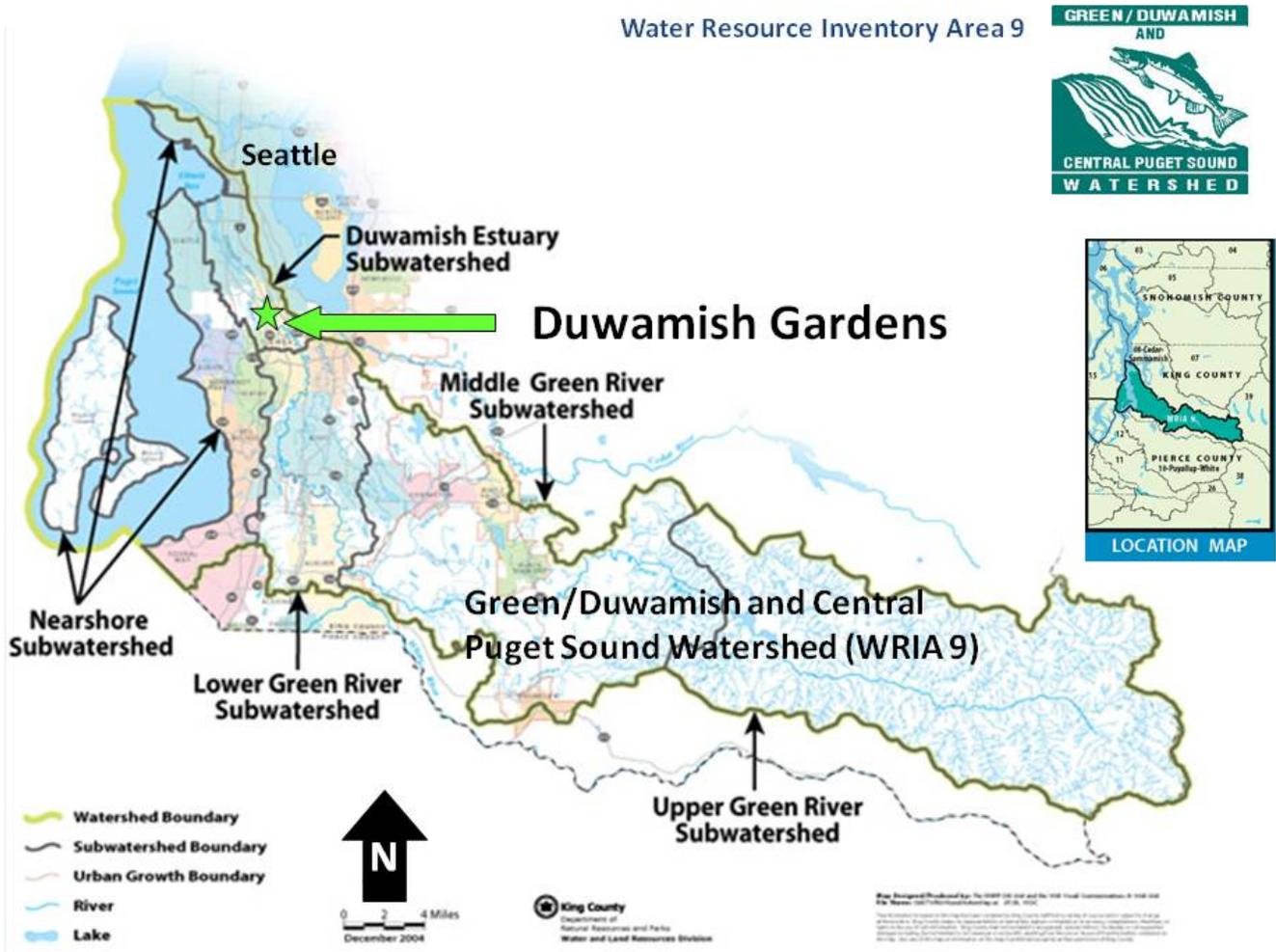
- For restoration projects, describe the level of design work that has been completed for the project. Refer to definitions of conceptual, preliminary and final design provided in Appendix D of Manual 18 for Salmon Recovery Funding Board Salmon Recovery Grants as you describe your level of design. What design work is still needed prior to construction? How confident are you in the cost estimate provided?

Conceptual design for this project was completed in 2011. A design and permit consultant team was hired in fall 2011. For this project, we intend to complete final design prior to going to construction. The cost estimate could fluctuate as much as \$500,000 depending on archaeological findings, final design, and construction bids. Final design and permitting will be completed in June 2013. Construction is planned for 2014.

- What level of match funding is available? This table gives details of each matching contribution:

Match Amount	Type	Source	Status	Notes
\$100,000	Cash	City of Tukwila	Secured	Project Sponsor Match
\$500,000	Grant	King Flood Control District	Secured, may expire 2015	Cooperative Watershed Management grant
\$500,000	Grant	ALEA	Pending, would expire 2015	Aquatic Lands Enhancement Fund

## Vicinity Map – WRIA 9 Duwamish Gardens Estuary Restoration



### Project Map – WRIA 9 Duwamish Gardens Estuary Restoration

