LIVINGSTON BAY POCKET ESTUARY RESTORATION PROJECT APPLICATION FOR SRFB/PSAR GRANT – 2009 WRIA 6 SUBMITTED BY: THE NATURE CONSERVANCY – JULY 13, 2009

PROJECT OVERVIEW

Explain your project overall and include the following elements:

a) List your primary project objectives, such as how this project will improve or maintain habitat conditions and habitat forming processes.

The Livingston Bay Pocket Estuary Restoration Project will restore ecological process, tidal flow, to a 10 acre pocket estuary in Livingston Bay. The proposed restoration is the third phase of a larger conservation effort initiated in 2005 by the Whidbey Camano Land Trust and the Washington Department of Fish and Wildlife (WDFW), in which more than 3,000 acres of tidelands were acquired for permanent protection. The project site and the Phase I tidelands acquisition are contiguous with The Nature Conservancy's Port Susan Bay Preserve. Acquired in 2001, the Port Susan Bay Preserve includes 4,122 acres of salt marsh, tide flat, and beach habitat. Collectively, these efforts will protect and restore over 7,100 acres of critical estuarine, marine, and nearshore habitat that will be managed under a comprehensive restoration and conservation plan.

This proposal describes all project components necessary to achieve effective conservation of Livingston Bay and seeks funding to implement Phase III of the project. Project phases are:

- 1. Phase I: Fee acquisition of 3,000+ acres of tidelands completed by the Whidbey Camano Land Trust (see SRFB Project # 05-1479).
- Phase II: Fee acquisition of 43 acres of nearshore and marine riparian habitat including a 10-acre pocket estuary proposed for restoration below. The Phase II acquisition is being proposed in a companion proposal for consideration by WRIA 6 in the 2009 SRFB/PSAR funding round. A Waiver of Retroactivity has been approved by RCO for the proposed acquisition and closing is expected to occur on or before July 15, 2009.
- Phase III: Pocket Estuary Restoration (this proposal) Following acquisition of the 43 acre property, the Conservancy will restore tidal flow to the 10 acre pocket estuary located on the site. To be implemented by The Nature Conservancy in 2010-2012.

An anticipated future phase will include_acquisition of an adjacent five acre parcel with marine riparian and shoreline habitats (proposal submitted to the U.S. Fish and Wildlife Service National Coastal Wetlands Conservation Grant program in June 2009).

The primary objectives of this restoration project are to:

- Restore tidal flow to the 10-acre pocket estuary via dike breaching and modification
- Improve access for juvenile salmonids and other fish
- Restore salt marsh habitat

The proposed project will restore ecological functions and improve access for salmon and other fish to one of the highest value habitats in the WRIA 6 "priority geographic area 1" of Port Susan Bay. Chinook populations as well as other salmon species, such as bull trout and steelhead that originate in watersheds on the north Puget Sound mainland, depend on the nearshore habitats of Port Susan Bay to forage and rear as juveniles before heading into the ocean as adults. With more than 60% of Island County's coastal lagoons isolated from natural tidal processes, the opportunity to complete a relatively simple restoration of the 10-acre pocket estuary in Livingston Bay directly aligns with Island County's highest priorities for multi-species salmon recovery. The adjacency of the project site to over 7,000 acres of mudflat habitat acquired and protected by The Nature Conservancy and the Whidbey Camano Land Trust further contributes to the ecological benefits of the restoration project. Conservation ownership of the restoration site and surrounding area will help ensure that the benefits of restoration are self-sustaining.

b) State the nature, source, and extent of the problem that the project will address, including the primary causes of the problem, not just the symptoms. Explain how achieving the project objectives will help solve the problem. (Fish Passage projects and Diversions and Screening projects should refer to the supplemental questions later in this worksheet for further guidance on information to include in their problem statement.)

There has been extensive loss of estuarine habitat in the Stillaguamish, Snohomish and Skagit River deltas which has significantly impacted the quality and quantity of habitat available to salmonids and other fish and wildlife species. The very small amount of estuarine habitat remaining in Puget Sound is limiting the number of juvenile Chinook and other salmon that can successfully rear in the region.

Functioning pocket estuaries are important rearing habitats for juvenile Chinook salmon (Beamer et al. 2003, 2005) and other estuarine fishes, offering refuge from high energy environments and abundant prey resources. The organic matter generated by barrier salt mashes and exported to other nearshore habitats yields wide-ranging benefits to many species, including salmon and other fishes, shellfish and marine birds. Given the extensive losses of wetland habitat in the region's major river deltas, pocket or barrier estuary habitats have become increasingly important for providing juvenile salmonid habitat. Healthy, functioning pocket estuaries are important for salmon in early life stages as they provide refuge, support food production and provide a transition area between fresh and salt water habitats. Many of the regions pocket estuaries and barrier lagoons have been altered and tidal access limited.

Approximately 80 years ago, a dike was built across the north end of the Livingston Bay pocket estuary for the purpose of grazing livestock on the interior. The eastern edge of the pocket estuary was also built upon and rip rap installed along much of its length. The dike has limited fish access and reduced the functionality of the site. A natural breach along the eastern dike occurred during a storm event several years ago and has resulted in infrequent tidal inundation and large woody debris capture in the lagoon. The site appears to be gradually filling in with large wood, thereby reducing the quality and amount of salt marsh habitat.

The Nature Conservancy proposes to breach the northern dike and restore tidal processes to the interior lagoon. Removal of additional material from atop the eastern dike, thought to historically be a natural spit, is also anticipated. Removing a large section of the artificial enclosure will allow these natural processes to continue on a more regular basis, and contribute to eliminating possible negative consequences, such as fish stranding. The pocket estuary restoration will restore tidal flow and improve fish access to the site by removing a portion of a fish passage barrier (dike). As tidal flow is restored, a more appropriate balance of large wood and salt marsh habitat is expected, which will improve the ability of the site to provide estuarine

rearing habitat for salmonids and to provide better habitat for waterfowl and shorebirds. Once restored, this site will be the only properly functioning pocket estuary/barrier lagoon in Port Susan Bay (Puget Sound Action Team 2005). Additionally, protection of the intact habitat directly adjacent to and upslope from the pocket estuary will maintain important system inputs, such as large woody debris, groundwater, shoreline vegetation and sediment delivery and prevent future shoreline development that would directly impact or limit the benefits of the pocket estuary restoration.

c) Describe the fish resources (species and life history stages present, unique populations), the habitat conditions, and other current and historic factors important to understanding this project. Be specific--avoid general statements. Which salmonid species and life cycle stage(s) are targeted to benefit by this project.

This project will benefit the following locally occurring at-risk salmon species: Chinook salmon – Puget Sound Evolutionarily Significant Unit (ESU), ESA Threatened Species (State Candidate species); coho salmon – Puget Sound/Strait of Georgia ESU, ESA Species of Concern; steelhead trout – Puget Sound ESU, ESA Proposed Threatened Species; and bull trout – ESA Threatened Species (State Candidate species).

The shorelines of the greater Port Susan Bay including Livingston Bay are within the top priority geographic area in WRIA 6 due to their proximity to the mouth of the Stillaguamish River. The Stillaguamish River Delta, as well as the Skagit and Snohomish river deltas are the areas utilized by the largest number of Chinook fry migrants during their early nearshore migration (WRIA 6 2009 RFP, WA Salmon Recovery Funding Board Grants).

Restoration of the pocket estuary will provide opportunities for estuarine fishes to access and utilize nearly 10 acres of tidal habitat. The importance of estuaries as rearing environments for some species of Pacific salmon has been documented in a number of watersheds throughout the Pacific Northwest (Reimers 1973; Levy et al. 1979; Levy and Northcote 1981; Miller and Sadro 2000; Cornwall et al. 2001; and Beamer et al. 2005). Juvenile salmon use estuaries as productive feeding areas, marine predator refuges, and physiological transition zones (Bottom et al. 2005).

Restoration actions in the Whidbey Basin are believed to provide significant benefits to juvenile salmon originating from watersheds in the vicinity, primarily the Skagit, Stillaguamish, and Snohomish rivers. It is also hypothesized that estuary and nearshore restoration actions in the Whidbey Basin may provide some benefit for juvenile salmon originating from other Puget Sound watersheds (e.g. Hood Canal, Lake Washington, Green, Puyallup- White, and Nisqually) (Island County Water Resources Advisory Committee 2005).

d) Discuss how this project fits within your regional recovery plan or local lead entity strategy (i.e., does the project address a priority action, occur in a priority area, or target priority fish species?).

The project fulfills restoration recommendations outlined in multiple local and regional species recovery, conservation, and management plans. It is consistent with Goal 1 of the WRIA 6 Multispecies Salmon Recovery Plan's ten-year implementation plan, which calls for the protection, enhancement, and restoration of ecosystem processes and salmon habitat (Island County Water Resources Advisory Committee 2005). Livingston Bay is specifically identified in the Whidbey Basin's Multi-species Salmon Recovery plan as a very high nearshore habitat protection priority for juvenile salmon and as a very high nearshore habitat restoration priority.

The project is also aligned with specific recommendations put forth in Regional Nearshore and Marine Aspects of Salmon Recovery in Puget Sound (Puget Sound Action Team 2005). The Livingston Bay Pocket Estuary project will restore one of 17 pocket estuaries (or barrier lagoons) identified in the Whidbey Basin that are important for ecosystem function and process. Specifically, the project undertakes recommended improvement actions for Whidbey Basin (Table 6-13) by restoring a pocket estuary that is not properly functioning. The site is designated as a priority conservation area in the Willamette Valley - Puget Trough - Georgia Basin Ecoregional Plan (Floberg et al. 2004).

e) Has any part of this project been previously reviewed and/or funded by the Salmon Recovery Funding Board? If yes, please provide the project name and SRFB project number (or year of application if a project number is not available). If the project was later withdrawn for funding consideration or was not awarded SRFB funding, please describe how the current proposal differs from the original.

Previous SRFB funding was obtained by the Whidbey Camano Land Trust for the acquisition of 3,000 acres of tidelands adjacent to the site (See Project # 05-1479).

2) PROJECT DESIGN

a) Describe the location of the project in the watershed, including the name of the water body(ies), upper and lower extent of the project (if only a portion of the watershed is targeted), and whether the project occurs in the nearshore, estuary, main stem, tributary, off channel, or other location.

Livingston Bay is located in the Stillaguamish Watershed in the northwestern corner of the greater Port Susan Bay (Township 32N Range 3E Sections 29 and 32). The project encompasses a 10-acre pocket estuary, tidelands, and upland habitats (see attached maps and photos).

b) Describe the project design and how it will be implemented. Describe the extent of the project. Describe specific restoration methods and design elements you plan to employ. If restoration will occur in phases, explain individual sequencing steps, and which of these steps is included in this application. (Acquisition-only projects need not respond to this question.)

This restoration is proposed as a design-build project which will include development of a preliminary design followed by final design and permitting and then restoration. The design process will be informed by modeling including development of a simple 1-D hydraulic model to examine the relationship between channel width, water velocity and anticipated duration, frequency and area of inundation in the pocket estuary The 1-D hydraulic model will be used to predict the expected impact of our restoration on the duration, frequency and tidal inundation within the pocket estuary as well as likely vegetation response.. Based on LIDAR data for Island County we expect a majority of the area would be flooded at a 10-11 foot tide. The remnant channels that will be reconnected to the new tidal opening would likely be a foot or two lower than the marsh plain, and would thus be accessible to fish at 8-9 ft tides. Elevations here are within the mid to upper range of those observed in other pocket estuaries on Whidbey and Camano Islands.

The current conceptual design for restoration includes the following:

1. <u>Dike breaching</u>- A new tidal opening will be created at the north end of the pocket estuary by breaching the dike to allow tidal flow and fish access into the interior. Additional excavation will be done to connect remnant tidal channels to the new opening.

- <u>Re-contouring of eastern dike</u> that was built upon a natural spit. According to the 19th Century Coast Survey topographic sheets (T-sheets) made available through the Puget Sound Rivers History Project website (<u>http://riverhistory.ess.washington.edu/</u>), this segment of the shoreline was historically a long spit Additional historic photos will be sought to assess how dynamic the original spit was and to guide the design process in determining how much material will be removed. Material would likely be removed to the elevation of the natural backshore and beach face.
- 3. <u>Filling and plugging of the interior ditches</u> with material from the eastern dike and imported material as needed for the plug. The existing material from atop the eastern dike will be used to fill the existing ditches but clay plugs at the ends may be desirable to keep the primary water flow out of the ditches and into the channels.
- 4. <u>Removal of rip-rap</u> along the eastern dike
- 5. <u>Re-vegetation</u> as needed around the new channel opening and restored shoreline
- c) Describe the scale and size of the project or property(s) to be acquired, and its proximity to protected, functioning, or restored habitats. (Fish Passage only projects and Diversions and Screening only projects [i.e., not a combination] need not respond to this question.)

N/A – This proposal is for restoration only.

d) Describe the long-term stewardship and maintenance obligations for the project or acquired land. For acquisition and combination projects, identify any planned use of the property, including upland areas.

The project site will be under long-term ownership and management of the Conservancy and managed as part of a 7,000 acre conservation area in Port Susan Bay. The site will be managed by the Conservancy's Port Susan Bay Program Manager with assistance from additional stewardship and science personnel as needed. Maintenance obligations are expected to be minimal and primarily consist of weed control.

3) PROJECT DEVELOPMENT

a) List the individuals and methods used to identify the project and its location.

Port Susan Bay and the Stillaguamish and Skagit River deltas have been indentified as priority areas for restoration and conservation in a variety of regional management, conservation, and species-specific recovery plans. These plans are the products of substantial efforts by many participants with diverse technical expertise, and restoration and protection of nearshore and estuarine habitats were consistently identified as actions critical in the recovery of at-risk species.

The Livingston Bay pocket estuary was identified as one of 17 pocket estuaries (or barrier lagoons) in the Whidbey Basin that is important for ecosystem function and processes. In addition, the larger Livingston Bay project site was included in successful proposals submitted by the Washington Department of Fish and Wildlife (WDFW), The Nature Conservancy and Whidbey Camano Land Trust to the National Coastal Wetlands Conservation Grant program and the Salmon Recovery Funding Board. These proposals were reviewed and approved by interdisciplinary technical panels whose members have expertise in the areas of salmon recovery, water bird ecology, and estuary and wetland conservation.

b) Explain how the project's cost estimates were determined.

The project cost estimates were determined by Conservancy staff based on cost estimates from similar projects and based on the expertise of restoration staff. As is customary with all restoration projects cost estimates will be further refined as the design process progresses and final design and cost estimates are calculated.

The A&E includes costs for project management including development of a monitoring plan, volunteer recruitment and management, hiring and oversight of contractors and stewardship/weed control. Restoration costs are itemized in the attached restoration budget worksheet. Costs were calculated using unit costs from our Port Susan Bay restoration project where information was available and based on similar projects completed by the Conservancy.

c) Describe other approaches, opportunities, and design alternatives that were considered to achieve the project's objectives.

Conservancy ecologists and project managers considered the following restoration approaches:

1) Full removal of the north dike

Full removal of the north dike was not feasible based on landowner negotiations. The Conservancy is currently in the process of acquiring approximately 7 acres of the 10-acre pocket estuary and adjacent tidelands and uplands. An access agreement with the current owner has been negotiated as an element of the proposed acquisition and allows removal of up to 100 feet of the levee on the north end of the pocket estuary as shown in the attached photos.

2) Breaching of the north dike

Due to the access agreement, dike breaching was selected as the preferred restoration approach. Dike breaching will re-establish a connection with Livingston Bay and restore tidal process to the salt marsh. Comparisons with other nearby marshes and review of LiDAR data suggest that the restoration is feasible and that the 100' restriction would be adequate for restoring natural tidal flow into the site. See Constraints and Uncertainties section below for more info.

d) Describe the consequences of not conducting this project at this time. Consider the current level and imminence of risk to habitat in your discussion.

Not advancing restoration at this time will result in continued impaired access to the site for juvenile salmon and likely increased impairment to the saltmarsh habitat. With a breach in the southern portion of the pocket estuary and the dike in place at the northern end, large amounts of wood are being trapped and are changing the dynamics of the site and reducing as its habitat value for salmon and other species.

e) Describe any concerns about the project raised from the community, recreational user groups, or adjacent land owners, and how you addressed them.

No concerns about the project from the community, recreational user, groups or adjacent landowners have been expressed to the Conservancy. The Conservancy has contacted all landowners immediately adjacent to the pocket estuary and informed them of our protection and restoration efforts. All are supportive of the restoration and two will be directly involved as volunteers in the monitoring. As evidenced by the attached landowner form, the adjacent landowners are willing to participate in the restoration as needed.

f) Include a Partner Contribution Form, when required, from each partner outlining its role and contribution to the project. This form may be downloaded off the SRFB Web site. State agencies are required to have a local partner that is independently eligible to be a project sponsor. A Partner Contribution Form is also required from partners providing third-party match.

Several local government, community, and state agency partners have given their support, and in some cases are contributing directly to this project. Partners include Skagit Audubon, and Washington State University (WSU) Beach Watchers. Island County Commissioner John Dean has provided a letter of support for this project as has the Skagit Audubon Society (project site neighbors are on the Audubon board). Audubon volunteers will be directly involved in monitoring bird use on the property. WSU Beach Watchers will assisting with fish monitoring at the project site, associated with restoration of the pocket estuary. The Department of Ecology and the Department of Fish and Wildlife have both given their support to the project as well.

g) List all landowner names. Include a signed Landowner Acknowledgement Form (available on the SRFB Web site) from each landowner acknowledging their property is proposed for SRFB funding consideration. If a restoration project covers a large area and encompasses numerous properties, Landowner Acknowledgement Forms are not required. For sponsors proposing work on their own property, this form is not required. For multi-site acquisition projects involving a relatively large group of landowners, include, at a minimum, signed Landowner Acknowledgement Forms for all known priority parcels.

Restoration actions will primarily occur on areas being acquired by the Conservancy although access to and across neighboring properties during restoration and monitoring is desirable. Pending final design, minimal restoration activities (e.g. revegetation, removal of rip rap and re-contouring of the eastern levee) may occur in the southern area of the pocket estuary which is privately owned. However, this work is not critical to the dike breach which is the primary restoration action. As evidenced by the attached form, the landowner to the south (Cook) is willing to participate in the restoration as needed. Other landowners (Peras) will be participating as volunteers and will provide access as needed. A landowner form signed by another neighbor (Magelssen), who owns the western shoreline of the pocket estuary is forthcoming.

For the pocket estuary itself, the Conservancy has exercised our option on the property and closing is expected to occur on or before July 15, 2009.

h) Describe your experience managing this type of project. List the names, qualifications, roles, and responsibilities for all known staff, consultants, and subcontractors who will be implementing the project. If unknown, describe the selection process.

The restoration element will be managed by Betsy Lyons (Marine Conservation Project Manager) who has over 7 years of direct experience managing, planning, implementing, and monitoring restoration projects in western Washington. Other Conservancy staff members that will contribute directly to various stages of the project include Danelle Heatwole (Estuarine Ecologist) who spent three years studying the ecology of Island County pocket estuaries to develop predictive tools for their restoration, Roger Fuller (Landscape Ecologist), and Kat Morgan (Port Susan Bay Program Manager). A contractor will be selected through a competitive process to develop design plans and implement the restoration.

The Nature Conservancy has been involved in habitat conservation for over 50 years. Our mission is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Using the most up-to-date scientific principles, we

identify high priority, ecologically valuable areas and build partnerships with federal and state agencies, non-profit organizations, and private landowners to protect these native species and systems.

TASKS AND SCHEDULE Proposed project period: January 1, 2010 – December 31, 2012

The proposed list of tasks and schedule for completion of project objectives is:

- (1) Summer 2010 --- Fall 2011 Complete restoration design and submit permit applications
- (2) Summer-Fall 2012 Implement restoration
- (3) Spring 2010 Fall 2012 Develop monitoring plan and conduct pre-project monitoring and one year of post-project monitoring.

CONSTRAINTS AND UNCERTAINTIES

Each project should include an adaptive management approach that provides for contingency planning. State any constraints, uncertainties, possible problems, delays, or unanticipated expenses that may hinder completion of the project. Explain how you will address these issues as they arise and their likely impact on the project.

The exact pre-development opening/mouth of the lagoon is not known and the historic T-sheets for the site do not show an opening at the north end of the site. However, many barrier lagoons cycle between open and closed states, depending on the timing and scale of annual storm events and whether the net response was a scoured opening or a large sand berm in the entrance. Depending on the timing of the T-sheet survey, surface connectivity could have been absent or not obvious. Alternatively, the surveyors could have missed this detail at the site. Regardless of the accuracy of the T-sheets, based on known land use history and existing conditions, the site must have been tidally influenced at least on a semi-regular basis. It has clearly been diked at the northern end and built up and armored along the eastern edge, and these modifications would not have happened if regular tidal flow did not previously occur. The drift cell in the project location carries sediment from feeder bluffs in the south to the north, creating a natural sand spit similar to, but at a smaller scale than, nearby lverson Spit. Based on the direction of sediment movement, a tidal opening would naturally occur on the north end of the lagoon.

Full removal of the north dike was not feasible based on landowner negotiations. Therefore, we have chosen breaching of the dike as our preferred restoration approach. This approach will re-establish a channel connection with Livingston Bay and restore tidal process to the salt marsh. As described above, comparison with other nearby marshes and review of LiDAR data suggests that the restoration is feasible and that the 100' restriction would be adequate for restoring natural tidal flow into the site. For example, a pocket estuary at the end of Francisco Lane on Whidbey Island was identified as a potential reference site. It is similarly sized and oriented, but 1-2 feet lower in elevation, than the Livingston Bay site, and its tidal channel was estimated at 20-40 feet wide. Also, the design for restoring the 240-acre Crescent Harbor marsh on Whidbey Island found a stable inlet width of 92 ft—still smaller than the 100 ft breach possible at this site. The 1-D hydraulic model will be used to predict the expected impact of our restoration on the duration, frequency and tidal inundation within the pocket estuary as well as likely vegetation response.