Swan Lake Engineering Feasibility Assessment

1. Project Overview

The Skagit Fisheries Enhancement Group (SFEG) proposes to work with the Swan Lake watershed preservation Group (SLWPG) to develop a project that would improve salmonid rearing habitat and saltmarsh habitat functions in Swan Lake. The overall objective of the Swan Lake Restoration Project is to improve the habitat quality and ecological function of Swan Lake. The Swantown Sub-basin is the sixth largest drainage in WRIA 6, covering about 18.0 sq km. It is located on the west side of north Whidbey Island west of Oak Harbor and south of Ault Field (Figure 1). The project is located in a coastal marsh currently not accessible to unimpeded tidal flushing or salmonid access, known as Swan Lake (or also "Swantown Lake", "Swantown Marsh", "Bos lake", "West Beach Lake"). Swantown Creek flows into the coastal wetland therefore the project occurs in a pocket estuary.

Swan Lake is a large saltmarsh/historic pocket estuary. The lake is currently classified as a closed lagoonal marsh, which is defined as a back-barrier wetland free of a persistent tide channel (Shipman 2008). The lake receives substantial seasonal inflows from Swantown Creek. Historically the lake was mapped as open water surrounded by extensive saltmarsh vegetation, implying a relatively frequent tidal connectivity (Johannessen and Waggoner 2010). A previous SRFB project (#09-1459) funded a preliminary feasibility study that focused on the historic character and function of Swan Lake. That work, completed in the fall of 2010, was considered the first step in the completion of a larger engineering feasibility assessment to identify potential restoration alternatives, and confirmed additional investigation was warranted.

Work to be undertaken in support of completing the engineering feasibility assessment will include more detailed topographic and bathymetric mapping, wave and littoral drift assessment, wetland functional assessment, inlet analysis, reference site analysis, infrastructure analysis, and development of conceptual plans for several alternatives.

2. Salmon Recovery Context

A. Fish resources targeted by this project.

Pocket estuaries are valued for the fish and wildlife habitat they provide as well as the many other wetland functions. Such habitats are particularly vulnerable to the pressures of development and land use changes, which has resulted in a decrease in their frequency and abundance throughout the Puget Sound region, and particularly in the greater Whidbey Basin (Shipman 2008). These shoreforms are of particular value to juvenile salmonids which utilize them for refuge from predation, foraging and osmoregulation.

Admiralty Inlet is the northernmost portion of Puget Sound, and is bounded to the west by the mainland of the Olympic Peninsula and to the east by Whidbey Island. No large estuaries drain directly into the Admiralty Inlet; however, numerous small streams and protected coastal lagoons such as Swan Lake provide a diversity of rearing habitats for the salmonids of Puget Sound and Hood Canal as they migrate to marine waters in the Pacific. The majority of habitat along the west shore of Whidbey Island is high-energy exposed shoreline, most of which is in relatively undisturbed condition.

Extensive beach seining efforts were conducted along the west side of Whidbey Island in 2005 and 2006, by Wild Fish Conservancy (Wait et al. 2007). The beach west of Swan Lake was one of ten beaches

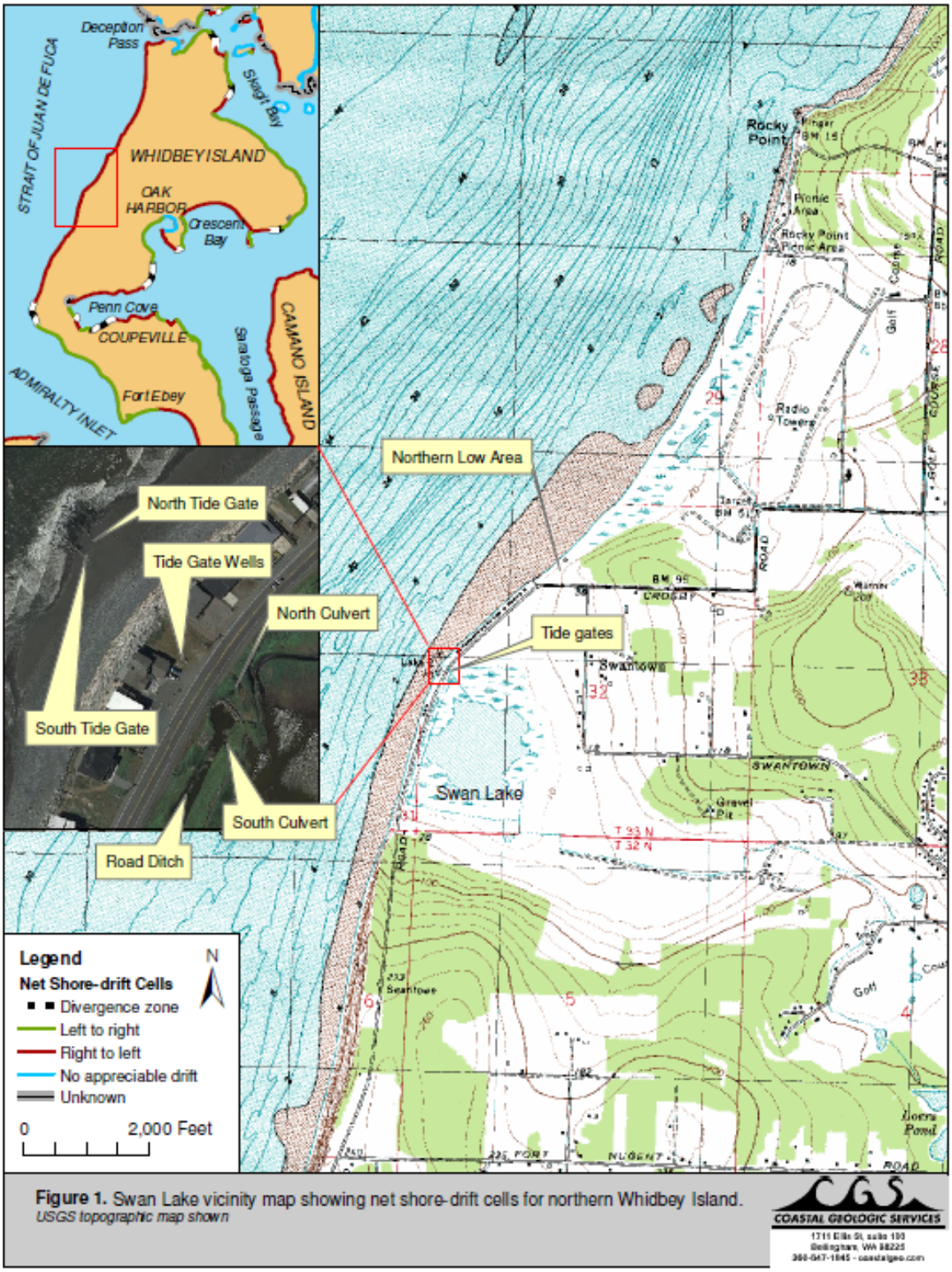

Figure 1. Swan Lake vicinity map showing net shore-drift cells for northern Whidbey Island.
USGS topographic map shown

regularly sampled. Thousands of migrant juvenile salmon were sampled at the Swantown beach site during this period. Six species of juvenile salmonids were present: Chinook, chum, pink, and coho salmon, and occasionally cutthroat trout, and steelhead. Chum and pink salmon were the most abundant species present. Wild juvenile Chinook were observed at the site from May through August, with peak catches in both years in July. Subsequent sampling of the lake conducted by Meridian and Associates in 2007 also failed to document salmonids in Swan Lake, although saltwater dependant species such as staghorm sculpin were present (Shappart 2007).

Puget Sound Chinook, Hood Canal summer chum, Coastal-Puget Sound bull trout, and Puget Sound steelhead trout are all listed as threatened under the federal Endangered Species Act (ESA). Coho salmon are a federal species of concern and a Washington State Candidate Species. While WRIA 6 contains no streams large enough to support independent Chinook populations, the county lies on the migration corridors of all 22 independent Chinook populations in the Puget Sound region (WRIA 6 TAG 2005). The Wild Fish Conservancy Fish Use Assessment of the West Side of Whidbey Island reported that recovered tagged fish were from 16 of the 22 independent populations that make up the Puget Sound Chinook ESU. The report concluded that it is likely that some or all of these fish are present in the west Whidbey Nearshore, and utilize these habitats for some portion of the year. Overall, north sound salmonid stocks are declining, except for pink salmon (Table 1). The 2002 SaSI report (latest available data) indicated that 12 of 13 Chinook stocks, and 17 of 22 steelhead stocks had a “depressed” or “unknown” stock status. Most chum and coho were listed as healthy as of 2002, but recent returns in north sound have been poor (Barkdull. pers comm. 2010)

Habitat degradation along the west Whidbey shoreline affects the recovery of all the stocks that utilize these habitats, links the functions of those river basins with the nearshore of Whidbey Island. The coded wire tag data generated by this study suggests that salmon recovery projects on the west side of Whidbey Island would primarily benefit Chinook stocks from the Whidbey Basin, but would also conserve and/or improve habitat for Chinook from the Hood Canal, north Puget Sound, central Puget Sound, and east Kitsap Peninsula.

On October 14, 2010 the Washington Department of Natural Resources formally designated Smith and Minor Islands, located just west of Swan Lake, as a state aquatic reserve intended to protect a diversity of physical habitats, including one of Puget Sound’s largest bull kelp beds. Swan Lake is a key linkage between the freshwater stream system of Swantown Creek and the valuable marine habitats associated with the Smith and Minor Island Reserve.

Protection of lands surrounding Swan Lake, limitations on ongoing development in the watershed, and the proximity to existing aquatic reserves all reduce the likelihood of future development pressure. Given the protected status and the fact that Swan Lake is currently free of invasive species and supports extensive existing saltmarsh vegetation, restoration of tidal connectivity at Swan Lake is likely to result in long-term benefits to ESA-listed salmon.

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Table 1. Salmonid species and lifestages targeted by the Swan Lake Engineering Feasibility Assessment Project.

Species	Life History Present (egg, juvenile, adult)	Current Population Trend (decline, stable, rising)	ESA Coverage (Y/N)	Life History Target (egg, juvenile, adult)
Chinook	juvenile	decline	Y	juvenile,
Steelhead	juvenile	decline	Y	juvenile,
Bull trout	juvenile	decline	Y	juvenile
Coho	juvenile	decline	N	juvenile
Chum	juvenile	decline	N	juvenile
Pink	juvenile	stable	N	juvenile

B. Problem Description.

Swan Lake is located on the west side of Whidbey Island, west of the city of Oak Harbor. The primary cause of impaired ecological processes and habitat features at Swan Lake is an inadequate culvert and tidegate system that currently prevents adequate water flow in and out of the embayment, limits normal marine flushing, and is hypothesized to completely prevent fish access to and from this refuge. The culverts also inhibit prompt draining of the embayment during winter storm events. The current culverts are too small in diameter and too long to allow healthy exchange of marine and fresh waters. Both the diameter and velocity within the culverts combined with their length preclude nearly all fish passage.

Swan Lake is hypothesized to historically have been connected to the marine environment by an ebb tidal delta (Johannessen and Waggoner 2010). The ebb tidal delta may have been intermittent, in response to large precipitation/runoff and/or storm wave events. In 1871, Swan Lake was surrounded by saltmarsh vegetation, as mapped by the US Coast and Geodetic Surveyors. Overwash of the berm occurs periodically under present tide gate conditions, and the failing tide gates allow some volume of marine water to enter the lagoon. Saltmarsh vegetation is widespread around the lagoon at present, including pickleweed (*Salicornia virginica*) and saltgrass (*Distichlis spicata*), such that conditions obviously already support this vegetation community and would not need to be substantially altered for enhancement of habitat conditions.

The preliminary feasibility study completed by Coastal Geologic Services (CGS) identified a suite of opportunities and constraints that affect the long-term sustainability of the proposed project. That list is presented in the supplemental information packet, and is described in detail in the Preliminary Feasibility Study Report (Johannessen and Waggoner 2010).

C. Relationship to regional recovery plan

Puget Sound nearshore habitats including estuarine embayments and closed lagoonal marshes such as Swan Lake are considered a Priority Habitat by the Washington Department of Fish and Wildlife (WDFW 2008). Hydraulic modifications to restore tidal connectivity are a targeted ecological process and management measure identified by PSNERP. Restoration of tidal connectivity at Swan Lake will improve saltmarsh function and provide access to over 150 acres of pocket estuary and saltmarsh habitat within the salmon rich waters of West Whidbey Island and Swan Lake.

Island County's goal for salmon habitat restoration is to balance the rights of property owners with creating a sustainable environment for future generations of people and fish. The county has already purchased +/-300 acres of property surrounding the lake including +/-100 acres of wetland with Conservation Futures Funds and there will be no "take" of uncompensated property rights of citizens. Neighboring private and public uses and surrounding environment will be studied in the feasibility study and protected. There are willing landowners. There is no adverse impact to the naval operations. There is potential for a significant benefit to juvenile salmon including Chinook. All of these are elements of the WRIA 6 lead entity's strategy and regional recovery plan.

Protection and Restoration of Swan Lake was initially identified as a high priority project in the Island County Estuarine Restoration Program prepared by Sheldon and Associates in 2001. The project is also identified in the WRIA 6 Limiting Factors Analysis completed by the Washington Conservation Commission in 2000, which described the tidal connectivity and habitat surrounding the lake as impaired and included recommendations for addressing limiting factors to improve habitat for salmonids (WSCC 2000).

Swan Lake is located in an area identified by the WRIA 6 Salmon Recovery Plan (WRIA 6 TAG 2005) as a medium priority geographically (Geographic Area 2) for protection, restoration and enhancement of salmon habitat. However, the WRIA 6 Salmon Strategy gives high priority to projects such as the one proposed here that address physical and habitat forming process by removing the artificial impediments for tidal flushing and fish passage. Pocket estuaries and coastal marsh habitats such as Swan Lake are also one of the highest priority habitats for restoration, enhancement and protection according to the WRIA 6 Salmon Strategy. The Swan Lake Engineering Feasibility and Design is listed on the WRIA 6 3-year work plan for 2011-2013.

D. Consequences of not conducting this project.

Not taking advantage of the opportunity to evaluate the potential for providing fish passage to and from Swan Lake could preclude future opportunities to do so. The current tidegates are not functional and in need of repair. In the absence of evaluating the feasibility for providing fish access Island County may need to replace or upgrade the current system in place without incorporating a habitat restoration component. Once this work has been completed it would be more difficult to secure matching funds from the County or generate community support for alternative approaches.

3. Sources of information

Johannessen, J. and J. Waggoner. 2010. Swan Lake Restoration Preliminary Feasibility Study - Final Report. Consultant report prepared by Coastal Geologic Services for the Skagit Fisheries Enhancement Group, Mount Vernon, Washington.
http://hwsconnect.ekosystem.us/project.aspx?sid=200&id=2249&stat=on.

Shappart, J., 2007. Swantown Lake fish presence survey results, Meridian Environmental, Seattle, WA.

Sheldon and Associates 2001. Island County Estuarine Restoration Program.

Shipman, H., 2008. A geomorphic classification of Puget Sound nearshore landforms. Puget Sound Nearshore Partnership Report No. 2008-01. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, WA.

Wait, M., Buehrens, T., and Trim, B., 2007. West Whidbey Nearshore Fish Use Assessment 2005-2006. Wild Fish Conservancy, Duvall, WA.

Washington Department of Fish and Wildlife (WDFW). 2008. Priority Habitat and Species List. Olympia, Washington. 176 pp.

Washington State Conservation Commission, 2000. Salmon habitat limiting factors, Water Resource Inventory Area 6, Island County, Washington State Conservation Commission, Olympia, WA.

WRIA 6 Salmon Technical Advisory Group, 2005. Water Resource Inventory Area 6 multi-species salmon recovery plan, Board of Island County Commissioners, Coupeville, WA..

4. Project Design

A. Project Description

An initial feasibility assessment is required in order to determine if natural processes are sufficient to support a hydrologic connection between Swan Lake and the Strait of Juan de Fuca that would provide for salmon passage in this high energy, human modified environment and be sustainable over the long-term. A previous grant from the SRFB (#09-1459) allowed us to initiate the feasibility assessment in 2009. The preliminary step involved collection of current and historic information of the lake configuration and geomorphology, and resulted in a report that concluded that continuing the assessment had merit, and that the feasibility analysis should be completed. In 2010, Island County allocated funding to initiate collection of baseline hydrologic data that will be required to support further technical analyses and complete the feasibility assessment. As a result we will be ready to begin data analysis immediately after securing funding for the project.

The feasibility assessment requires completion of a number of technical analyses, including: more detailed topography/bathymetry and habitat mapping; wave and littoral drift assessment; development of a water balance model for the lake and associated wetland; inlet analysis; reference site analysis, and infrastructure analysis. The work will culminate in the identification of one or more alternatives for improving hydrologic connectivity. Alternatives h will be shared with stakeholders and the local community for public input. A preferred alternative will be chosen based on this process.

Completion of the **Feasibility Study** includes the following elements:

1) Technical Assessment:

   a) Conduct topographic/bathymetry survey to create map for basin geometry and to get potential tidal prism and stage storage curve

   b) Water balance model. Water level recorders were installed in the lake and Swantown Creek in January 201 to collect hydrologic data necessary to develop a hydrodynamic model of water balance. Estimate rainfall runoff using available precipitation, watershed data, and hydrology calculations. Apply a one-dimensional hydrodynamic model of the lake, the adjacent drainage channel, culverts and Strait. A simplified model focused on the hydraulics of the culverts and water balance will be used. Rainfall and runoff, evaporation, and overtopping will be considered. The utility of the model will be gauged with available data. The overall objective is to understand the relationship between rainfall-runoff, discharge and water level in the lake, determine the volume and frequency of surface discharge from the lake to the sound that would be expected under current and future climatic conditions, and to develop a tool to evaluate the expected hydraulics of alternative inlet configuration (e.g., larger culverts, open channel, overtopped barrier).

   c) Assess wave climate and littoral transport. Conduct a wind wave generation hindcast analysis using Smith Island wind data. Use available maps to characterize wind wave generation fetches. Develop a wind wave climate. Analyze data from NOAA NNDBC Buoy 46088 to confirm the wind wave climate and characterize penetration of waves from the ocean. Apply the wave climate to characterize wave power incident to the site in order to address inlet closure/ stability, longshore sediment transport and wave overtopping.

   d) Perform inlet analysis: wave power vs. runoff power and tidal prism to estimate breaching frequency. Applied geomorphology indexes will be used to investigate the likelihood of an inlet remaining open. Given the strong wave exposure and small tidal prism, but large runoff and wave overtopping, the natural system was probably intermittently open. This analysis will address the feasibility of an inlet and its characteristics.

   e) Identification of infrastructure constraints (including septic, roadway, fill, buried utilities, and foundation) for two or three potential locations of structures/open channels. Identification of parcel ownerships, easements, covenants, and projected for several potential locations of structures/open channels due to changed tidal regime.

   f) Wetlands functional assessment. Identification of current marsh habitats, wildlife species using these habitats, and projected impacts due to changed tidal regime.

2) Conceptual Design

Once the technical analyses are complete SFEG, affected landowners and the engineering consultant will work together to identify potential project alternatives and develop conceptual designs for each alternative.

   a) Identification of various alternatives for achieving the project objectives (each alternative will be presented as a plan view drawing located on an accurately-scaled site plan

   b) Evaluation of the various alternatives and discussion of the pros and cons of each alternative including a rough construction cost estimate

c) A conceptual design will be developed for the preferred alternative based on the outcomes of Tasks 1 and 2. The design will be sufficient to move forward to with seeking funding for Phase 2 of this Project – Design and permitting.

3) Outreach

SFEG and SLWPG will convene a series of community meetings to solicit feedback and address community concerns throughout the project period. At a minimum we envision hosting three outreach events including:

a) Project kickoff in January 2012 to introduce the goals and objectives of the overall restoration project and to solicit feedback on community concerns

b) Presentation of results from Technical Analyses

c) Presentation/Discussion of Proposed Alternatives

In addition SFEG and SLWPG will work closely with landowners, including Island County and the Washington Sate Parks Department to ensure that the project is consistent with their needs. We envision that this will require periodic meetings/site visits with landowners.

Deliverables:

The overall goal of the project is to determine the best approach for restoring ecosystem processes at Swan Lake. Specific work products are listed above under technical assessment tasks. Deliverables will also include convening three public meetings. The results of tasks completed in support of the technical assessment, and the outcomes of community meetings leading to the selection of a preferred alternative will be presented in a final report. The final report will include conceptual designs for the preferred alternative that are suitable for seeking funding to support project design (Phase 2).

B. Project Sequencing

The Swan Lake Project is being conducted as a Phased Project. The phases include: 1) Feasibility Assessment; 2) Design; and 3) Construction. A previous grant from the SRFB (#09-1459) allowed us to initiate the feasibility assessment in 2009. The preliminary step involved collection of current and historic information of the lake configuration and geomorphology. In 2010, Island County allocated funding to initiate collection of data that will be required to complete technical analyses and complete the feasibility assessment. The proposed project represents a continuation of Phase 1, and will result in sufficient information determine whether or not to proceed with the work as a salmon restoration project. If the results of this study indicate that a cost-effective project is possible, SFEG and SLWPG will work together to seek funding for Phases 2 and 3.

5. Project Development

A. Determination of Cost Estimates.

Cost estimates for technical analyses were developed in consultation with Coastal Geologic Services, a consulting firm specializing coastal processes and beach management. Jim Johannessen of Coastal Geologic Services will lead the consultant team undertaking technical analyses and engineering design. Mr. Johannessen is a recognized local expert in the field of coastal geomorphology, and has been

monitoring coastal processes and assisting with the development of coastal restoration processes at a wide variety of sites in Puget Sound.

Similar feasibility studies have recently been funded at Deer Lagoon ($171,650) and Crescent Harbor, both located on Whidbey Island. The Deer Harbor project studied the feasibility of restoring up to 450 acres of saltmarsh habitat. The Crescent Harbor Project ultimately required approximately $731,192 for design and construction, and restored approximately 200 acres of salt marsh habitat. Our cost proposal is on the same order of magnitude as these projects, and would restore a similar amount of habitat.

B. Alternatives

Alternatives to the project include taking no action and allowing the existing tidegate system to fail or implement repairs that may or may not provide for fish passage and other ecological functions. This alternative would provide no benefits to ESA-listed salmonids, and would likely preclude future restoration opportunities that might support creating or enhancing fish habitat both in Swan Lake, and in Swantown Creek.

Even if the feasibility analysis is completed it may conclude that no cost-effective means exist for providing fish passage into and out of Swan Lake. In this case SFEG would not continue to pursue salmonid habitat restoration and enhancement projects at the site. However, the SLWPG has a long-term commitment to working with Island County to ensure that Swan Lake property is managed to maximize ecosystem benefits. As a result SLWPG would likely continue their efforts to restore and protect the lake and associated wetland habitats via volunteer efforts and/or other grant programs such as the ERSP.

C. Partners

The Swan Lake restoration project was initially identified in the Island County Comp Plan and WRAI 6 Salmon Recovery Plan, but has since been championed by local non-profit groups including SFEG, SLWPG, and the Whidbey Audubon Society. SFEG is partnering with SLWPG on this proposal, and Island County has allocated funds in support of the project as it will aid in their ongoing management of the Swan Lake property, which was purchased in 1999 with Conservation Futures Funds and since designated as a Habitat of Local Importance.

Jim Johannessen of Coastal Geologic Services will lead the consultant team undertaking technical analyses and engineering design. Mr. Johannessen is a recognized local expert in the field of coastal geomorphology, and has been monitoring coastal processes and assisting with the development of coastal restoration processes at a wide variety of sites in Puget Sound. Coastal Geologic Services completed the preliminary feasibility assessment, is currently under contract to Island County to collect baseline hydrologic data, and has assisted with project planning and cost estimation.

D. Landowners

There are five major landowners in the vicinity of the Swan Lake Project site, as well as a number of small private parcels immediately west of the lake (Figure 2). Island County owns the parcel containing Swan Lake and is supportive of the project. A landowner acknowledgement and letter of support have been uploaded to PRISM. Affected landowners to the north include Alice Sorenson, and GT Group Telecom (USA) LLC, Washington State Parks (Joseph Whidbey State Park). Ms Sorenson and the Parks

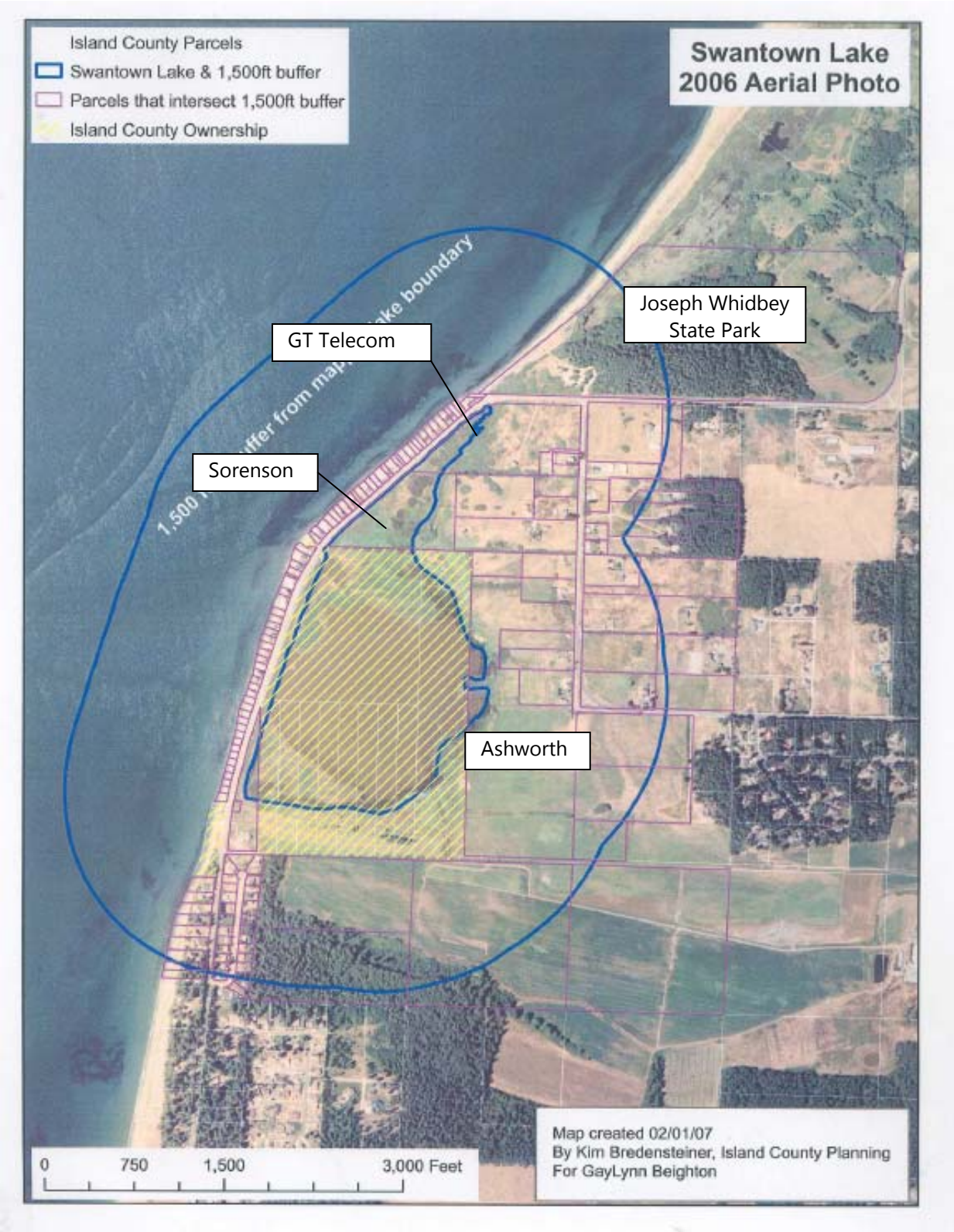


Figure 2. Map of Swan lake area landowners

department have both signed landowner acknowledgement foms (in PRISM) and expressed verbal support for the project. Phone calls to GT Group Telecom have not been answered, but a copy of the landowner acknowledgement form has been sent to the Company's business office via certified mail.

Other landowners surrounding the lake are supportive and interested in the project. The largest private landowner of Swan Lake water frontage to the east is the Ashworth Family. Two letters of support for the original 2009 grant application from individual members of the Ashworth Family have been uploaded into PRISM. The Acworth's are active members of the SLWPG, and have provided ongoing support for the project and related activities in the form of volunteer time and cash donations. Many of the landowners along West Beach Road west of the lake are also members of SLWPG and supportive of the project.

Signatures from 251 local resident and supporters were obtained on a petition in support of restoration of Swan Lake. In addition, the Island County Smart Growth Coalition recently disbanded, and decided to grant $242 to SLWPG in support of their ongoing efforts on behalf of the local community.

E. Experience managing this type of project.

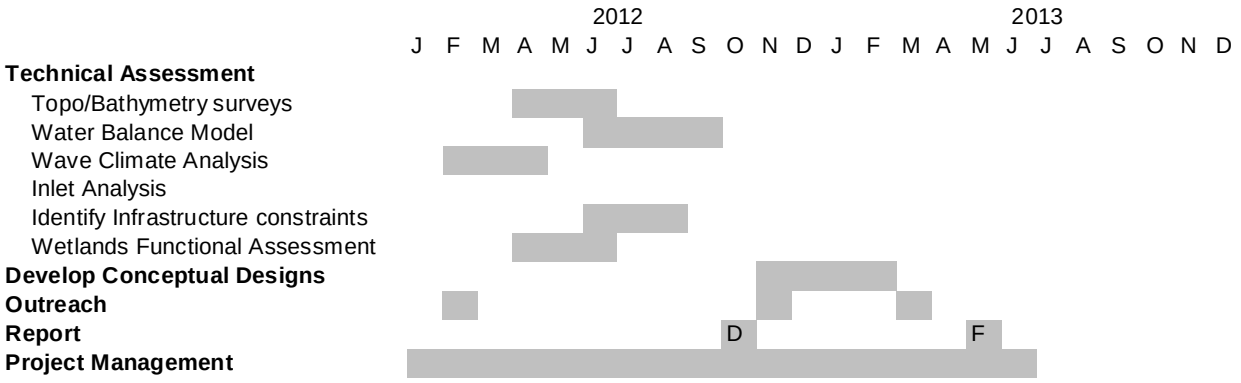
The Skagit Fisheries Enhancement Group is one of 14 Regional Fisheries Enhancement Groups in Washington State. SFEG has been a leader in implementing restoration projects throughout the Skagit/SanJuan/North Whidbey Service area 1990, including several aimed at restoring nearshore habitat for salmonids and forage fish. Specifically, SFEG managed the McElroy Slough Estuary Restoration Project from feasibility phase to construction which involved the removal of a tide gate system under a County owned road and the replacement with a new tide gate structure which involved a self regulating tide gate. We are also currently working on a project on Blakely Island that will remove wood waste and improve forage fish habitat in a small bay. Project design and permitting are complete, and construction will be initiated as soon as sufficient funding is secured. SFEG's Executive Director, Alison Studley has over 10 years experience with salmon restoration projects and has managed SRFB grants since the SRFB was created in 1999.

Our project manager for this project will be Sue Madsen. Ms. Madsen joined Skagit Fisheries Enhancement Group in 2009. Prior to joining SFEG she worked an a consulting geomorphologist for R2 Resource Consultants. Ms. Madsen has over 15 years experience in managing large assessment and restoration projects. Her experience as a consultant provides the insight and expertise needed to effectively manage contracts and consultants retained to complete the proposed project.

6. Tasks and Schedule

SFEG and CGS are in the process of collecting data and will therefore be able to initiate work as soon as funding becomes available. Work will commence with a public meeting to inform the public about the project. Topography and bathymetric surveys are required prior to initiating water balance modeling, and will be completed as soon as weather and lake level conditions allow. Other technical analyses will be initiated as dictated by seasonal requirements (e.g. wetland surveys are best completed in early summer while plants are flowering) or data needs. Technical analyses and begin a discussion of project alternatives by late fall of 2012. Additional public meetings will be held in late 2012 and early 2013 to solicit feedback on project alternatives and present the results of technical analyses. Our goal is to complete work on this project by the summer of 2013 in order to support request for grant funding to develop designs and complete construction (Figure 3).

Figure 3. Proposed schedule for Swan Lake Engineering Feasibility Assessment Project



7. Constraints and Uncertainties

There are several known constraints to developing an effective salmonid habitat restoration project at the Swan Lake site. First and foremost, any proposed project must have neutral or beneficial effects on adjacent properties in terms of flooding or adverse effects to infrastructure (i.e. septics, wells etc). The following list of opportunities and constrains was identified during preliminary feasibility work completed by CGS in 2010:

Opportunities

• Adding a more direct and fish passable connection from Swan Lake to the Strait of Juan de

Fuca would add on the order of 120 acres or more of coastal lagoon/estuarine habitat and also make habitat improvements on Swantown Creek possible.

• The relatively large potential tidal prism at Swan Lake suggests that some type of channel to the Strait may be quite feasible.

• Improving tidal exchange such that lagoon levels do not exceed water levels in the Strait of Juan de Fuca would help ameliorate upstream flooding issues caused by stormwater backing up at the tide gates.

• If an open channel is deemed infeasible with further analysis, then constructing a bridge or other means of engineered fish-passable structures could be used.

Constraints:

• Developed lots on the beach berm make it difficult to locate an open channel there as the channel may tend to be dynamic. The migration would likely be northward, such that placement along the developed portion of the berm may not be feasible.

• This reach of shore likely has a high littoral drift rate and high wave energy, which will require additional analysis and engineering assessment.

• Any channel would need to pass under West Beach Road, requiring a bridge or other engineered structure.

• Easement/Acquisition on the parcels located north of Swan Lake would need to be secured before a channel could be located to the north.

• The northern property is the location of a communications cable, so special consideration of the cable would need to be made if it is still in use.

It is our hope that constraints, uncertainties, possible problems, delays or unanticipated expenses that may hinder completion of the project will be identified during the feasibility study phase and we will deal with said issues as they arise according to each individual challenge.

Another anticipated issue includes ensuring the local landowners are bought into the restoration project. We hope to address these concerns by engaging the local community throughout the process and utilizing the community based support garnered to date by SLWPG.

8. Detailed project cost estimate.

The proposed project is expected to cost $192,654. We are requesting $163,654 from the SRFB. An Excel spreadsheet containing a detailed cost estimate has been uploaded to Prism.

SLWPG has submitted a grant application to the Island County Conservation Futures Fund to provide matching funds for this project. To date the CFF Technical Advisory Group and CFF Citizen's Advisory Group have both unanimously voted to approve some level of funding for the project. However, the amount of funding available for such projects is limited, and will not be known for several months. In addition final approval for funding lies with the Board of County Commissioners, and thus the amount of funding available from this source (if any) will not be known this project will not be known until later this year. The CFF grant request of $66,000 included approximately $30,000 in funds that could be used to provide additional match for the Swan Lake Project. Since those funds are not yet secured we are not comfortable reducing our SRFB request; however, if CFF funding is secured we may be able to apply some of that funding to this project and thus reduce the overall SFRB request.