

**Island County Conservation Futures Program
Maintenance and Operations Funding
Project title: Swan Lake Noxious Weed Management
Application Year: 2016**

Applicant's Name: Island County Noxious Weed Control Board

Applicant's Address: P.O. Box 5000, Coupeville, WA 98239

Contact Person: Janet Stein

Phone: 360-678-7992 (office); 360-969-3988 (cell)

E-mail: j.stein@co.island.wa.us

Property Owner Name: Island County

Property Owner Phone: 360-679-7331

Address of Property: West Beach Road, Oak Harbor, WA 98277

Tax Parcel Number(s): R13332-067-0100, R13332-067-0240, R13332-067-0400, R13332-067-0580, R13332-067-0750, R13332-067-0900, R13332-067-1070, R13332-067-1230, R13332-132-1530, R13332-188-0750, S770-00-0000B0, S8385-00-0000B0

Acres or Square Feet of Property: +/- 100 acres

Percentage of Property Affected by Project: Approx. 25 acres

Summary of Proposed Project Costs and Budget: The Amount Requested is **\$25,414** for two years of noxious weed control work. The amount requested would cover a noxious weed survey, mapping, and control work in 2016 (\$15,785) and additional control work in 2017 (\$9,629).

Included with Application:

Attachment B – **Estimated** Project Budget

Attachment C – Budget Detail

Figure 1. Map showing location of Swan Lake

Figure 2. Photos of hairy willow-herb (*Epilobium hirsutum*)

Report: Swan Lake Stewardship Plan Recommendations

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Project Description:

Swan Lake was purchased with Conservation Futures Funding in 1999. Swan Lake is an Island County Habitat of Local Importance (HOLI). HOLIs are places of unusually high value that are sensitive to human disturbance. Swan Lake is a coastal lagoon that is home to a rich community of wildlife and native plants. It is listed as one of fifteen birding hot spots on Whidbey Island by the Whidbey Island Audubon Society.

During the summer of 2015 the Island County Noxious Weed Program Coordinator discovered the noxious weed hairy willow-herb (*Epilobium hirsutum*) amongst the wetland plants in an area between West Beach Road and the northwest shore of the open water portion of the Lake. Hairy willow-herb is listed as a Class B Regulated noxious weed in Island County meaning that it is the landowner's legal responsibility to control the weed. Hairy willow-herb was first discovered on Whidbey Island in 1996 in the wetlands associated with Crockett Lake. At this time the infestation appeared to be approximately 20 square feet (Horton, 2004). Concern over the highly invasive nature of the plant prompted the Washington State Weed Board to list the species as a Class B noxious weed in 2004 and it was also added to the WSDA plant quarantine list. The inability to secure the necessary funding to control the initial infestation at Crockett Lake allowed the spread to continue unchecked. It is now estimated that hairy willow-herb covers over 100 acres in the Crockett Lake area and is considered the single largest invasive species threat to the ecological health of the Crockett Lake ecosystem (Whidbey Camano Land Trust and Natural Systems Design, 2016).

It is imperative that the current infestation of hairy willow-herb at Swan Lake be controlled immediately before it continues to spread and becomes the same ecological threat it has become in the Crockett Lake area. Although it is not believed to be widespread in the Swan Lake wetland complex at this point, a more thorough survey of the area needs to be completed to confirm the extent of the infestation.

In addition, while researching background information for this grant application, the presence of smooth cordgrass (*Spartina alterniflora*) was found in a report that described the vegetative communities in the Swan Lake wetland (Sheldon & Associates, 1991). Smooth cordgrass is listed as a Class A noxious weed in all of Washington State. Class A noxious weeds are the highest priority in the state due to their significant potential impact and limited distribution. Property owners in Washington are required to eradicate Class A weeds.

The goals of this project are:

- Conduct a survey of noxious weeds in the Swan Lake wetland complex to determine the extent of the hairy willow-herb infestation as well as the presence of all other listed noxious weeds;
- Confirm or negate the presence of smooth cordgrass at the site; and
- Eliminate all of the hairy willow-herb found in the Swan Lake wetland complex and begin control of other listed noxious weeds

The survey would be conducted during year one of the project and control of the hairy willow-herb infestation would begin. In year two of the project, the eradication of the hairy willow-herb would be completed and control of other regulated noxious weeds discovered during the year one survey would be initiated.

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Maintenance and Operation Project Evaluation Criteria

Criteria A. Ecological integrity

Evaluation Element: Degree to which the project reduces or eliminates a serious threat to ecological integrity, a developing ecological threat or invasive species threat.

Hairy willow-herb is an aggressive non-native aquatic species capable of disrupting the ecology of wetlands by altering food chains, hydrologic cycles and floral composition. It spreads by wind dispersed seeds, and by a root system that produces rhizomes which facilitate vegetative spread. Hairy willow-herb is listed as a Class B regulated noxious weed in Island County meaning that it is the landowner's legal responsibility to control the weed. An original small infestation of hairy willow-herb was first discovered near Crockett Lake on Whidbey Island in 1996. The infestation was not controlled and the plant quickly spread. Today the infestation is estimated to cover well over 100 acres in the Crockett Lake area and Island County now has the largest population of this listed noxious weed in the state. Hairy willow-herb is considered the single largest invasive species threat to the ecological health of the Crockett Lake ecosystem (Whidbey Camano Land Trust and Natural Systems Design, 2016). The recently completed Crockett Lake Drainage and Vegetation Management Plan (Whidbey Camano Land Trust and Natural Systems Design, 2016) presents options for controlling the hairy willow-herb in the Crockett Lake area. Due to the large area of the infestation, herbicide treatment will be the most practical and cost-effective method for initial control but will still costs tens of thousands of dollars.

The hairy willow-herb infestation at Swan Lake discovered during the summer of 2015 is still relatively small and covers less than one quarter acre. If this project were to be funded, the infestation at Swan Lake could be eradicated within a couple of years using primarily mechanical means (pulling or digging of plants) and eliminating the need to use herbicides in this critical area. It is imperative that history not be allowed to repeat itself and that Swan Lake's ecological diversity not become negatively impacted by large monotypic stands of hairy willow-herb as has happened at Crockett Lake. The funds needed to complete the control work now at Swan Lake are minor in comparison to the tens of thousands that would be necessary in the future if Swan Lake was to become another Crockett Lake situation.

Criteria B. Hazard or Liability

Evaluation Element: Degree to which the project removes or eliminates a significant hazard or liability.

Washington's noxious weed law (RCW 17.10) requires landowners, including city, county, and state land agencies, to control or eradicate certain noxious weeds that occur on their property. Hairy willow-herb is a Class B regulated noxious weed in Island County, meaning that control by the landowner is legally mandated. The survey component of the proposed project would determine if other regulated noxious weeds are present in the study area. Since private citizens are equally responsible for controlling listed noxious weeds on their properties, the county could be liable and legally challenged for not obeying the same state laws. The noxious weed control work proposed for Swan Lake will insure compliance with noxious weed laws.

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Criteria C. Special status

Evaluation Element: Degree to which the project protects, restores, or enhances a species or plant community with special status

Swan Lake is designated as a Habitat of Local Importance and the lake and surrounding wetland habitat are protected by the Island County Critical Areas Ordinance. This designation is given to habitats that provide important fish and wildlife habitat as well as protect water quality and hydrological functions. It is listed as one of fifteen birding hot spots on Whidbey Island by the Whidbey Island Audubon Society. Many resident bird species nest in the area and the lake attracts many migratory species as well.

Noxious weeds are a threat to the diversity of habitats and native plants that provide an abundance of nesting and foraging options to birds and other wildlife. Monotypic stands of hairy willow-herb have been allowed to spread in Crockett Lake to the south and have already displaced large areas of more diverse native vegetation. This project would protect Swan Lake from becoming another Island County critical area where a noxious weed has become the predominant plant community.

Criteria D. Habitat values not previously covered

Evaluation Element: Degree to which the project provides habitat protection, restoration, or enhancement in ways not covered in Criteria A-C.

The Swan Lake Watershed Preservation Group (SLWPG) has been working at the north end of Swan Lake to remove noxious weeds and restore maritime prairie habitat to bring the endangered Taylor's Checkerspot Butterfly to the area. This project would augment the noxious weed removal being conducted by the SLWPG and prevent the dispersal of weed seeds from the project area to habitat already being maintained by this group.

Criteria E. Public Access

Evaluation Element: Degree to which the project increases or enhances public access to the property

Once monotypic stands of noxious weeds are allowed to develop, public access to trails surrounding the lake as well as egress to the open water areas may become limited. The noxious weed survey component of the project would identify where infestations of noxious weeds such as Canadian and Bull thistles, poison hemlock, and Himalayan blackberry are limiting access to public areas.

The removal of any poisonous noxious weeds such as poison hemlock would be prioritized in public areas during the second year of control work to insure that visitors would not come in contact with the plant which can result in skin and respiratory irritation.

Criteria F. Management Plan

Evaluation Element: 1. Project includes a proposal to develop a site-specific management plan if one does not already exist. OR 2. The property has an existing site-specific management plan and the degree the project is supported by this management plan.

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The Swan Lake Stewardship Plan Recommendations Report was prepared by the Skagit Fisheries Enhancement Group and the Swan Lake Watershed Preservation Group in October 2010. This plan was funded by an Island County Conservation Futures Grant. The Specific Stewardship Plan Objectives Include:

- Identify and describe existing ecological resources of the site;
- Recommend management measures that will maintain or improve fish and wildlife habitat;
- Conserve native vegetation communities and prevent the incursion of invasive plants; and
- Provide opportunities for non-motorized recreation (hiking, birdwatching, etc.)

The plan's specific actions to control invasive species (p. 12) include:

- Conduct annual survey/inspection to identify invasive plant species. The Noxious Weed Control Board Weed Coordinator should lead these efforts on publicly owned land and be responsible for treatment of invasive species when and if they are identified there.
- SLWPG should continue organizing volunteer work parties to help control invasives, and coordinate with People for Puget Sound to conduct annual *Spartina* surveys.
- Complete an evaluation of the upland habitat and develop a plan for restoring native grassland and plant communities in that area as needed to support Priority Species associated with maritime meadows.

This project would support the objectives of the existing Stewardship Plan. The noxious weed survey component would identify and describe where the problem areas are and the control component would eradicate the current hairy willow-herb infestation. The surveys would determine if any *Spartina* species (all listed as Class A noxious weeds in WA) are present in the Swan Lake wetland area and if discovered would be eliminated immediately. Depending on the findings of the survey work, control work would be initiated on other listed Island County noxious weeds discovered in the project area during Year 2 of the project.

Criteria G. Supported by Community Plans

Evaluation Element: Degree to which the project is supported by one or more federal, state, regional, or local plans

Island County invested over \$400,000.00 in 1999 to purchase Swan Lake and adjacent uplands using Conservation Futures Funding. In 2000 the site was designated as a Habitat of Local Importance and the lake and surrounding wetland habitat are protected by the Island County Critical Areas Ordinance. The Island County Estuary Restoration Program identifies protection/restoration of Swanton Lake as a specific goal and the WRIA 6 Salmon Strategy of the Island County Salmon Recovery Plan has indicated that the Swan Lake area is a medium priority area in Geographic Area 2 for protection, restoration and enhancement of salmon habitat.

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The SLWPG is a 501c(3) not-for-profit group of community members working to preserve the watershed and estuarine wetland of Swan Lake. In partnership with the Skagit Fisheries Enhancement Group (SFEG), they applied for and received a Washington State Salmon Recovery Funding Board (SRFB) grant of almost \$25,000 for a preliminary study of the feasibility of establishing an enhanced tidal connection. This study was completed Sept. 14, 2010 by Coastal Geologic Services Inc., of Bellingham. It outlines the considerations surrounding several options ranging from no action to an open channel or an engineered opening through the berm.

This proposed project would support the ongoing desire of the public/private partnerships to protect the initial investment and preserve this unique habitat.

Criteria H. Existing Infrastructure

Evaluation Element: Degree to which the project protects existing infrastructure vital to the property within the context of the CFF Program

N/A

Criteria I. Develops infrastructure

Evaluation Element: Degree to which the project provides new infrastructure vital to the property within the context of the CFF Program

N/A

Criteria J. Long Term Viability

Evaluation Element: Degree to which, in the long term, the result of the project can be reasonably managed and will remain viable.

The control of noxious weeds is never completed and there will always be a need to monitor and conduct some level of noxious weed control work at Swan Lake. However, the eradication of the hairy willow-herb is anticipated to be completed in two years if funded by this grant. After this it will be important to conduct yearly monitoring of the site to make sure that no re-infestation has occurred but this monitoring could be reasonably managed by the Island County Noxious Weed Program Coordinator as part of their regular Island County noxious weed responsibilities using only current expense funding with no additional CFF M&O funding needed. The support of the SLWPG and other volunteers will also help to manage future noxious weed infestations.

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Criteria K. Other Resources

Evaluation Element: Degree to which the project utilizes matching funds or additional resources not from the CFF Program

The current Island County Noxious Weed Program (ICNWP) Coordinator possesses a WSDA pesticide applicator's license (No. 84304) with aquatic and right-of-way endorsements. The ICNWP Coordinator is responsible for keeping the license current by earning the required number of recertification credits each year. The ICNWP Coordinator also has the necessary National Pollutant Discharge Elimination System (NPDES) permit to be able to use appropriate herbicides in aquatic areas. The ICNWP Coordinator is knowledgeable about plants, their life cycles, ecosystem function, and integrated pest management techniques. In addition the ICNWP Coordinator has the physical dexterity to implement mechanical control strategies and knows how to use the appropriate tools. The Island County Noxious Weed Control Board owns many of the tools that would be needed for the control work including weed wrenches, shovels, back pack and hand held sprayers. In addition, as part of a cooperative working agreement with WSU Extension in Island County, the ICNWP Coordinator has access to GPS units, computers and software needed for continued monitoring and mapping of noxious weed infestation areas. The ICNWP Coordinator has an Island County issued vehicle for use, as well as a laptop computer that was purchased with general weed program M&O funds.

Members of the SLWPG have been involved with the preservation of the natural resources of Swan Lake since its acquisition in 1999. They have donated many hours of volunteer time to projects such as removing noxious weeds and restoration of cleared areas with native plants. They also have partnered with Oak Harbor High School Ecology Club students that have helped with conservation projects at the Lake. It is anticipated that some of these volunteers will provide assistance with the hairy willow-herb removal and other noxious weed work presented in this application.

Criteria L. Public Ownership

Evaluation Element: Degree to which the property is owned by the public. Fee simple public ownership = 5, Fee simple public ownership with someone else owning CE = 4, Public CE only = 3, Public trail only = 2, Public deed of right only = 1

Swan Lake is a fee simple public ownership property

ATTACHMENT B
ESTIMATED PROJECT BUDGET
 ISLAND COUNTY CONSERVATION FUTURES FUND
 PROPOSED PROJECT APPLICATION

PROJECT NAME = Swan Lake Noxious Weeds YEARS: 2016-2017

	Category	CFF	Other Funding Sources	Total Funding
Planning	Salaries and Benefits	\$ -	\$ -	\$ -
	Consultants/Sub-Contracting	\$ -	\$ -	\$ -
	Goods and Services*	\$ -	\$ -	\$ -
	Travel & Per Diem	\$ -	\$ -	\$ -
	Other	\$ -	\$ -	\$ -
	Total Planning	\$ -	\$ -	\$ -
Maintenance and Operations	Salaries and Benefits	\$ 6,900.00		\$ 6,900.00
	Consultants/Sub-Contracting	\$ 11,000.00		\$ 11,000.00
	Goods and Services*	\$ 600.00		\$ 600.00
	Travel & Per Diem	\$ 2,900.00		\$ 2,900.00
	Other	\$ -	\$ -	\$ -
	Total Maintenance / Operations	\$ 21,400.00		\$ 21,400.00
Management & Administration	Salaries and Benefits	\$ 3,689.00		\$ 3,689.00
	Consultants/Sub-Contracting	\$ -	\$ -	\$ -
	Goods and Services*	\$ -	\$ -	\$ -
	Travel & Per Diem	\$ -	\$ -	\$ -
	Other	\$ 200.00		\$ 200.00
	Total Management & Admin	\$ 3,889.00		\$ 3,889.00
Equipment	Technology Capital Items*	\$ -	\$ -	\$ -
	Technology Supplies*	\$ -	\$ -	\$ -
	Equipment*	\$ 125.00		\$ 125.00
	Other	\$ -	\$ -	\$ -
	Total Equipment	\$ 125.00		\$ 125.00
Property Acquisition	Fee Simple Acquisition Costs**	\$ -	\$ -	\$ -
	Conservation Easements Costs	\$ -	\$ -	\$ -
	Other Acquisition Costs	\$ -	\$ -	\$ -
	Total Acquisition Costs	\$ -	\$ -	\$ -
	Total Budget	\$ 25,414.00	\$ -	\$ 25,414.00

* For all line items listed with "**", please provided an attached detailed list of items and costs

SWAN LAKE NOXIOUS WEED MANAGEMENT
Budget Attachment C

Budget Item:	Work Year 2016	Work Year 2017
Salary for IC Noxious Weed Program Coordinator (No. of Hrs.x\$42/Hr.)		
Project Planning	\$420	\$420
Management of Consultants/Sub-contractors	\$1,008	\$1,008
Coordination of Volunteers	\$672	\$672
Field Time	\$1,680	\$1,020
Consultant/Sub-contractor Salaries		
Noxious Weed Survey Work	\$4,000	
Hairy Willow-herb Control Work *	\$2,625	\$1,750
Other Noxious Weed Control Work*	\$875	\$1,750
Map Preparation	\$600	
Other Equipment & Materials**		
Tools	\$75	
Trash Bags	\$25	\$25
Travel Costs		
WCC Crew Food	\$500	\$500
WCC Crew Lodging	\$900	\$900
Noxious Weed Coordinator Fuel	\$50	\$50
Noxious Weed Coordinator Interfund Insurance	\$100	\$100
ST=	\$13,530	\$8,195

WSU Administration Overhead	\$2,255	\$1,434	
Total	\$15,785	\$9,629	Total For 2 Years = \$25,414

* It is anticipated that most of the noxious weed control work would be done by Washington Conservation Corps Crews assisted by the IC Noxious Weed Program Coordinator. Community volunteers would be engaged when possible.

** Equipment & Materials: Most of the equipment necessary for the control work will be supplied by the IC Noxious Weed Program Coordinator. The \$75 will be to purchase two cutter mattock tools. Large trash bags are needed for the disposal of noxious weeds.

SWAN LAKE EPILOBIUM HIRSUTUM LOCATION



FIGURE 2. Photos of hairy willow-herb (*Epilobium hirsutum*)

Top Left: Photo of hairy willow-herb flower

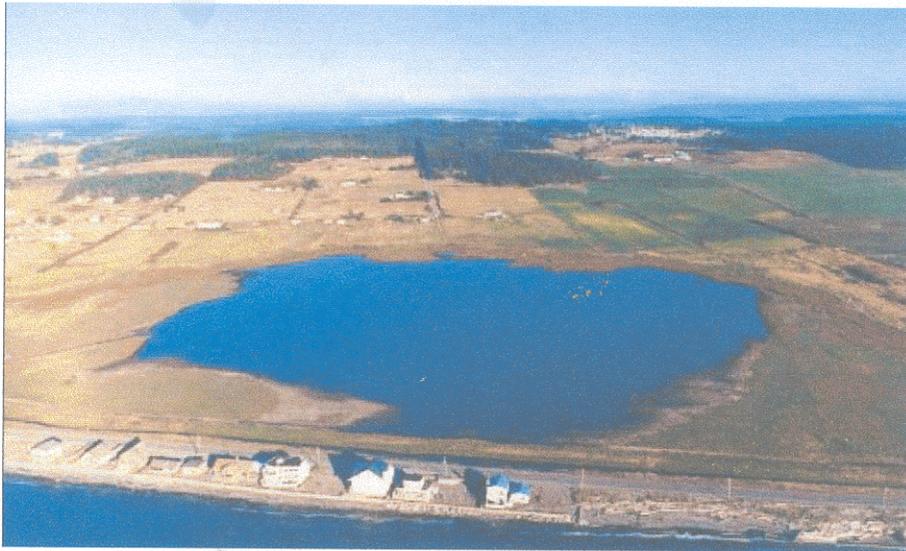
Top Right: Photo showing extent of hairy willow-herb infestation in the Crockett Lake area (pink areas are hairy willow-herb)

Bottom Left: Island County Noxious Weed Coordinator and Washington Conservation Corp member pulling hairy willow-herb on private landowner's property on Camano Island

Bottom Right: Washington Conservation Corp crew pulling hairy willow-herb off Wanamaker Rd., Coupeville, WA



M.C.



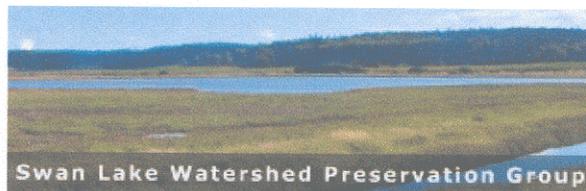
SWAN LAKE STEWARDSHIP PLAN RECOMMENDATIONS

Prepared for:
Island County Department of Public Works

Prepared by:
Skagit Fisheries Enhancement Group
and
Swan Lake Watershed Preservation Group

October 2010

Funding for this project was provided by an Island County Conservation Futures Grant



1 Purpose of the Stewardship Plan

As a community resource Swan Lake offers many benefits and values to residents and visitors. Swan Lake has been designated a habitat of local importance by Island County, and has been nominated as a national "Important Birding Area" by the Whidbey Audubon Society. In addition to providing important fish and wildlife habitat and protecting water quality the property offers scenic views of the rural landscape, lake basin, and Puget Sound. The site includes walking trails, opportunities for birding and dog-walking, wildlife habitat, and a place for peaceful reflection. People value Swan Lake for many different reasons. Most of these are complementary benefits, although more intensive human uses will coincide with diminished habitat values. A thoughtful and careful approach is needed to managing the resources and public uses at Swan Lake given the soils, slopes, habitats, level of use, and proximity to Puget Sound. Several management issues have surfaced since Island County acquired the property, such as habitat connectivity and lake water levels, hunting access, mowing fields, trail maintenance, and managing dogs and their waste. New issues emerge as the level of use increases, invasive species are found, fish and wildlife concerns change or emerge, and the public desires change or expanded use.

1.1 Goals and objectives

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). Protection of Swan Lake was first recommended in 1999 as part of the Island County Estuarine Restoration Program (Sheldon 2001). The goals of that program were to:

1. Provide long-term protection for the large wetland-stream system;
2. Restore open saltwater flow to the wetland; and
3. Restore anadromous fish access to the marsh and enhance the fish and wildlife habitat of both wetland and stream.

Property surrounding Swan Lake was purchased in 1999 using funds from the Island County Conservation Futures Fund (CFF). The CFF provided an additional grant to the Swan Lake Watershed preservation group (SLWPG), and requested that part of that funding be used to develop recommendations for a Stewardship Plan. The CFF grant, with additional funding from the Island County Department of Public Works and Washington State Salmon Recovery Funding Board, is supporting public outreach to inform local citizens about the lake ecosystem, and collect data to complete an assessment of the feasibility of restoring or improving connectivity between the lake and Puget Sound in order to improve habitat for fish and wildlife species that are dependant on nearshore habitats for all or part of their life cycle.

The goal of this Stewardship Plan is to understand and appreciate the values of Swan Lake and to guide the use and management of these resources over time. A brief description of the soils, topography, habitats, waters and wetlands, and public uses that

occur on the property is included since this affects many of the management decisions at Swan Lake.

Specific Stewardship Plan Objectives include:

- Identify and describe existing ecological resources of the site;
- Recommend management measures that will maintain or improve fish and wildlife habitat;
- Conserve native vegetation communities and prevent the incursion of invasive plants; and
- Provide opportunities for non-motorized recreation (hiking, birdwatching etc.)

1.2 Responsibilities

Island County has the ultimate decision-making authority for the Swan Lake property. The County requested SLWPG include development of a Stewardship Plan as part of their recent CFF Grant to provide guidance on how to manage the property. All of the maintenance, management, and oversight of activities at Swan Lake to date have come under the auspices of the Island County Public Works Department.

The SLWPG contracted with the Skagit Fisheries Enhancement Group to develop recommendations for future management and stewardship activities on the Swan Lake Property. The stewardship of a community resource such as Swan Lake is a long-term commitment by County government and dedicated community members working together. The following stewardship recommendations provide a foundation for moving forward on enhancing and maintaining this valuable public fish and wildlife conservation area. This plan is intended to be a living document to be reviewed and updated as part of the long-term stewardship of Swan Lake.

Stewardship recommendations were developed by examining available information on physical and biological environment of Swan Lake, reviewing the goals of local salmon recovery plans and documentation related to the acquisition of the Swan Lake Parcel and the designation of the area as Habitat of Local Importance, and discussions with the SLWPG Board and Public Works Director. This plan draws heavily on materials developed in support of a preliminary assessment of the feasibility of restoring hydrologic connectivity that was recently completed by Coastal Geologic Services (Johannessen and Waggoner, 2010), as well as on two recent technical papers "*Protecting Nearshore Habitat and Functions in Puget Sound*" (Envirovision et al 2007), "*Management Measures for protecting and restoring the Puget Sound Nearshore*" (Clancy et al. 2009). The recommendations contained within this plan are not exhaustive but represent our ideas for the most significant actions for the County to consider, given the existing site conditions and the capacity of the resources to provide the desired benefits. Several of the recommended action items suggest further consultation with or assistance from other resource professionals and agencies or organizations.

2 Site Description

2.1 Location and general description

Swan Lake is a large saltmarsh/historic pocket estuary located on the west side of Whidbey Island, Island County, WA (Figure 1). The majority of the property immediately surrounding the lake is in public ownership. In 1999 Island County purchased approximately 300 acres of property surrounding and including Swan Lake using funds provided by the CFF. The intent of this acquisition was to protect wetland and wildlife habitat; improve stormwater and flood control; maintain low impact and minimally developed parkland; and provide opportunities for low impact recreation.

2.2 Landscape setting

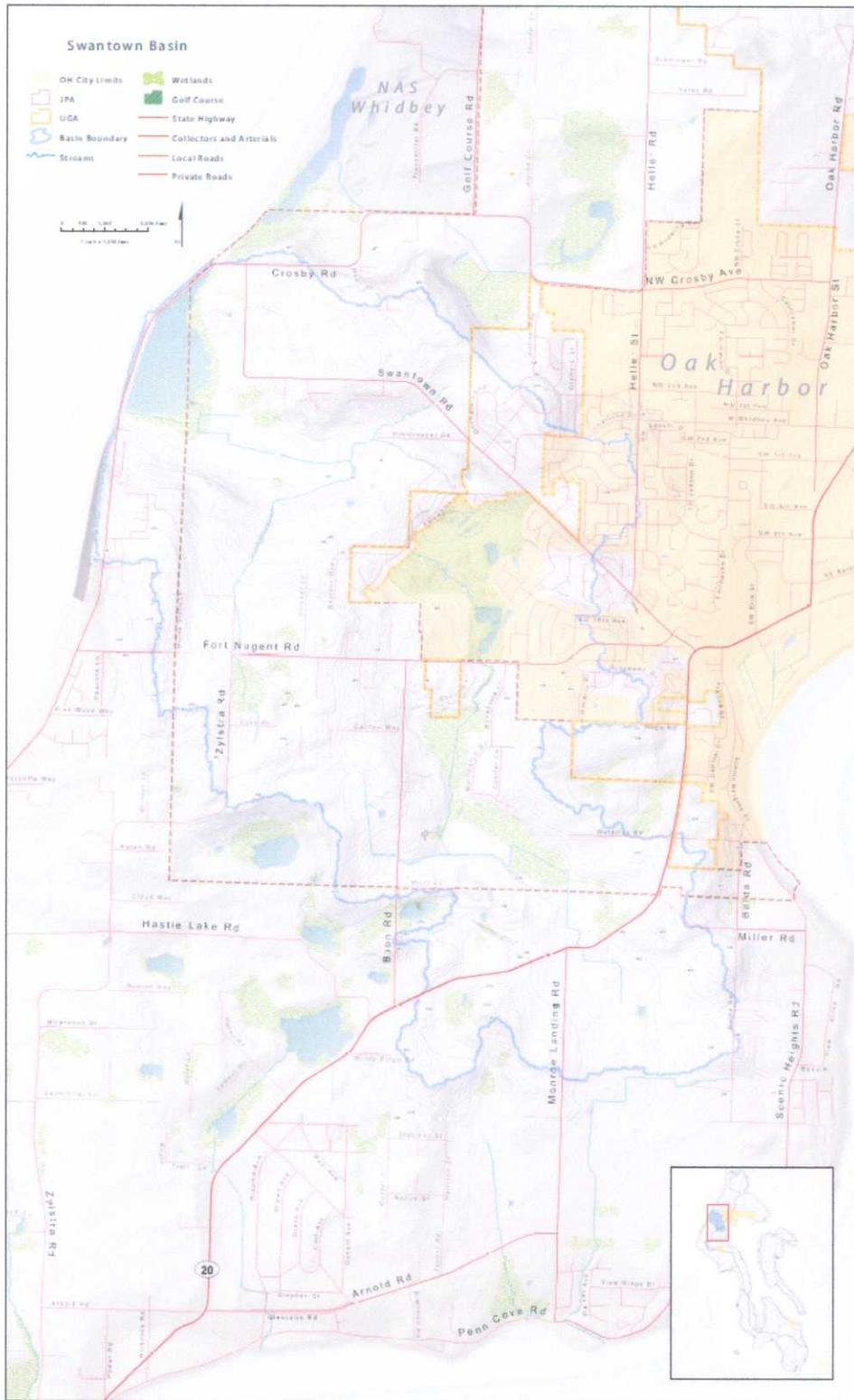
Swan Lake is located at the terminus of approximately 7 square miles of watershed, the sixth largest in Island County. The majority (95%) of the watershed was reported as being in agricultural or forestry land use designation by Island County Public Works (1997). The lesser, developed portion of the watershed however, includes a golf course and a rapidly expanding residential population (WSCC 2000). The lake is fed by Swantown Creek.

Swan Lake has been heavily altered by development in the surrounding areas since at least the late 1800's. Mapping completed in 1871 shows the open water area at approximately 75 acres. Aerial photographs from 2007 show the open water area as approximately 45 acres. An estimated 17% of the total marsh area was lost between 1871 and 2007. A large portion of the eastern extent of the 1871 lagoonal marsh area was directly converted to uplands for pasture following construction of the ditch, dike, and tide gate system. A tide gate and culverts currently provide an anthropogenic connection between the wetland and the marine environment. The tidegates are currently inadequate and are not functioning in a manner that maintains natural environmental processes... A detailed discussion of historical changes in Swan Lake is provided in Johannessen and Waggoner 2010.

A narrow gravelly beach/berm separates Swan Lake from the Strait of Juan De Fuca. West Beach Road overlays fill placed on the berm. The road on the berm appears to have been constructed some time between 1939 and 1942. The berm currently supports a number of houses. Construction of those houses began in the 1950s.

2.3 Topography and soils

Swan Lake lies within a relatively low-relief drainage basin. The lake elevation is approximately sea level, while the high point in the basin is 292 feet above MSL. The entire lower Swantown Creek valley was inundated by marine waters during the last glaciation, approximately 12,000 years ago. Coastal geomorphic interpretation indicates that a gravel and sand spit very likely grew northeastward across the mouth of a former embayment, eventually closing off the area and forming Swan Lake (Johannessen and Waggoner 2010).



P:\Projects Figure 1. Swan Lake basin.
10/28/2010

Soils in the area consist of Dugualla muck (formerly Tacoma peat) in the wetlands surrounding the lake, Coveland/Coupeville loam on the eastern wetland margin, and Indianola loamy sand (formerly Townsend sandy loam) on the upland area at the south end of the Island County parcel (Figure 2; updated soil names from NRCS 2010). The Dugualla muck occupies tidal flats and depressions and supports high saltmarsh vegetation. Coupeville soils occupy low terraces and valley bottoms, and developed under sparse Sitka spruce and red alder forests. Indianola soils are derived from coarse to fine textured glacial drift and typically supported western hemlock-western red cedar forests prior to land clearing, although vegetation types identified on the 1878 T-sheet identify the area as supporting "Pine", which likely refers to shore pine (*Pinus contorta*) (Figure 3)

2.4 Water features and wetlands

Swan Lake is a closed lagoonal marsh, which is defined as a back-barrier wetland free of a persistent tide channel (Shipman 2008). These types of embayments are valued for the fish and wildlife habitat they provide as well as the many other functions that wetlands bestow. Embayments appear to be 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. These shoreforms are of particular value to juvenile salmonids which utilize them for refuge from predation, foraging and osmoregulation when they are connected to marine nearshore environments.

The lake is fed by Swantown Creek. Much of Swantown Creek, which empties into the southeastern corner of the lagoon, has been channelized. Two stormwater detention ponds at the golf course approximately one mile southeast of the lake cause the flow in Swantown Creek to be intermittent. Development within the watershed, and operation of the detention ponds has altered the stream hydrology. Like many small streams draining urban areas in Puget Sound, flows in Swantown Creek tend to be higher in the winter due to rapid runoff from impervious surfaces and lower in the summer because of reduced groundwater replenishment (Booth et. al 1993). In Swantown Creek the situation is exacerbated by pumping of stormwater to maintain storage capacity in Loers Pond during the winter, and retention of flow in the summer for irrigation at the golf course.

Water quality monitoring undertaken by SLWPG measured salinity in the lake between 2007 and 2009. All 124 lake and ditch samples showed at least brackish conditions (greater than 0.5 ppt). Salinities generally ranged between 10 and 25 ppt (parts per thousand); in contrast, seawater has a salinity of around 35 ppt. Salinities below 5 ppt were seen in January 2009 after heavy rain and snow during a period when stormwater runoff was being pumped from Loers pond into Swan Lake. Highs above 30ppt are observed in the late summer months when evaporation is high and inflows are artificially low. In contrast, seawater has a salinity of around 35 ppt. SLWPG's volunteer water quality monitoring program is ongoing, and includes measurements of other parameters

SWANTOWN WATERSHED
Soil Mapping Units

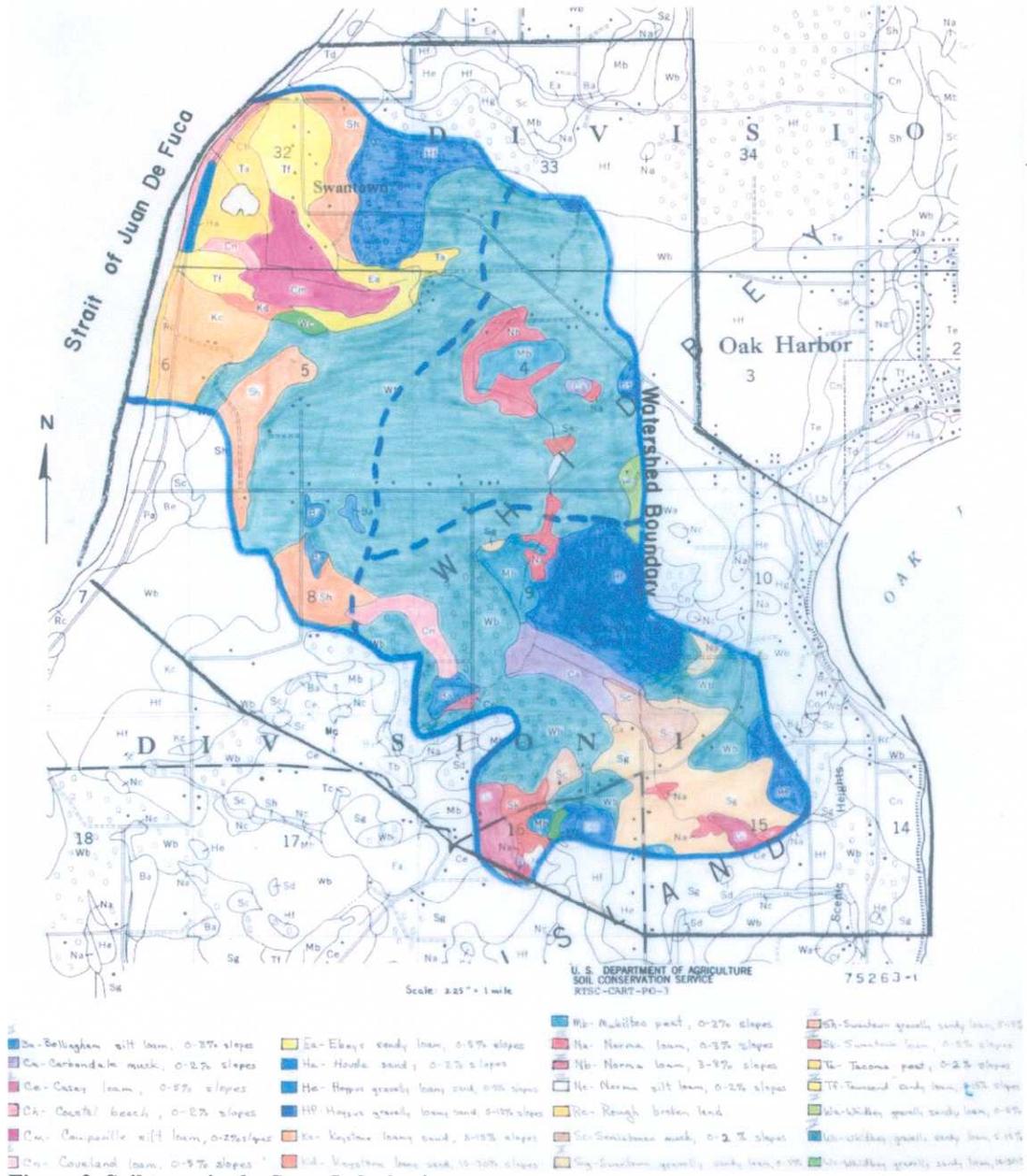


Figure 2. Soil types in the Swan Lake basin.

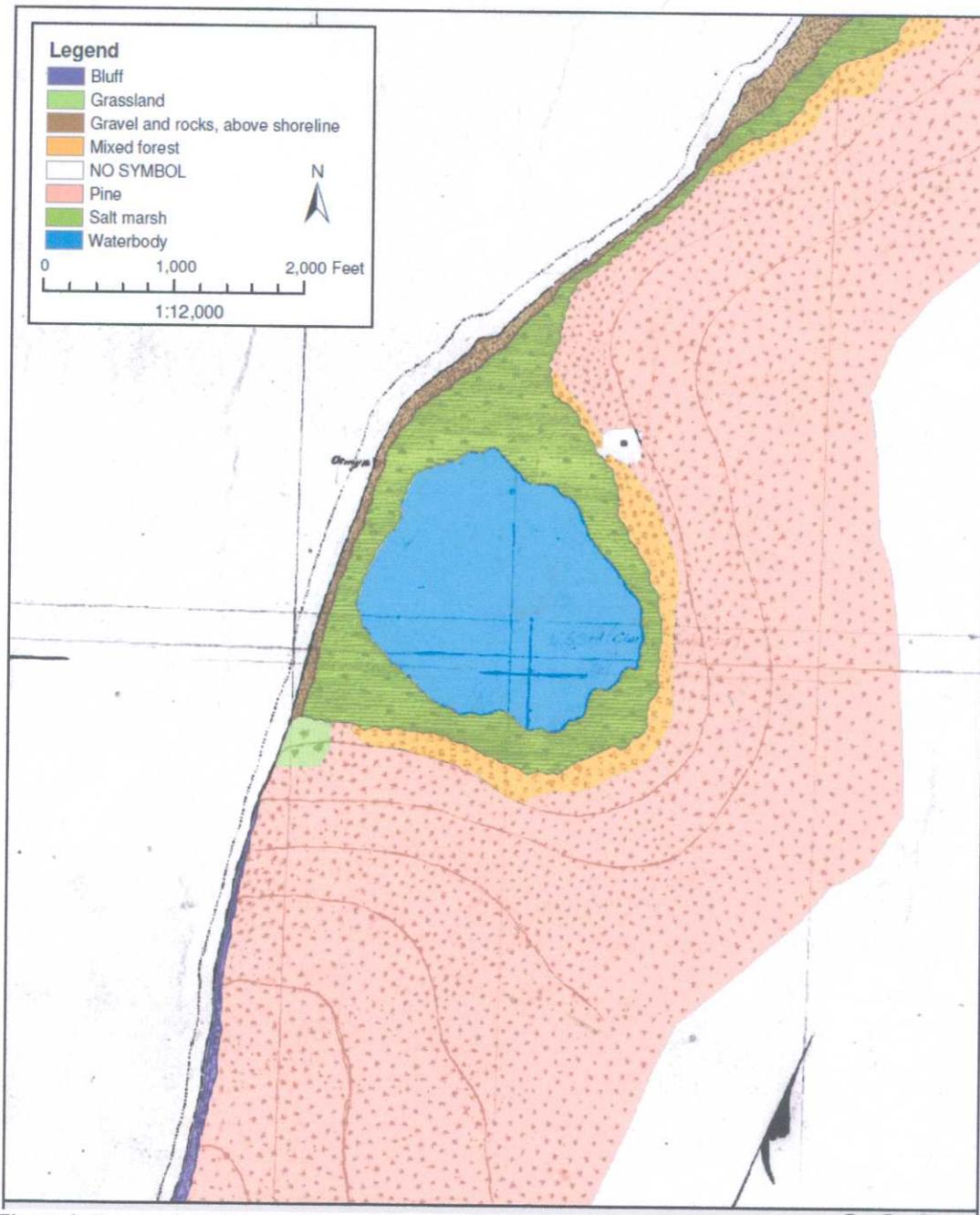


Figure 3. T-sheet # 1253 from 1871 with interpretation by the Puget Sound River History Project, University of Washington (2005). Figure from Johannessen and Waggoner 2010.

including temperature, DO, nitrates, phosphates, copper. Data are submitted to Ecology and are available in the states EIM database at <http://apps.ecy.wa.gov/eimreporting/GISViewer/viewer.asp?strSessionID=184522887>.

Swan Lake is surrounded by wetlands. When last surveyed about 40% of the wetland supported saltmarsh habitat, the remainder being freshwater marsh (40 %) and mudflat (20 %) (Sheldon and Associates 1999). The saltmarsh was described as "dominated by saltmarsh bulrush" during early surveys; however, more recent observations suggest that pickleweed (*Salicornia virginica*) is abundant along the lake margins. The mudflat surrounding the open water was dominated by saltmarsh bulrush, Virginia glasswort, seashore saltgrass, and Halberd-leaf saltbush. Virginia glasswort, seashore saltgrass, Halberd-leaf saltbush, and silverweed dominated the westernmost ditch and berm. The north extension of the wetland was dominated by silverweed, Olney's bulrush, cattail, and soft rush. Saltmarshes are considered one of the most productive ecosystems in the world. They produce a large amount of biomass (plant growth) that is important to shellfish, birds, fish, and other wildlife. Salt marshes perform many functions, such as shoreline protection, wildlife habitat, and nutrient cycling. Birds breed in salt marsh habitat and many crustaceans and fish feed in these wetlands.

2.5 Fish Species

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 just south of the Swan Lake culvert outfall was one of ten beaches 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. Juvenile salmon were observed at the site from February through August with peak catches in both years occurring in April. 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. Hatchery Chinook numbers also peaked in July, but had left the beach by August.

Sampling within Swan Lake itself has to date not documented salmonids. However, fish sampling has found both freshwater and saltwater species in the lake. Three-spine sticklebacks inhabit fresh to brackish water, with some populations being anadromous (Froese and Pauly 2010). Adult Pacific staghorn sculpin inhabit brackish to marine environments (Froese and Pauly 2010). Seining by the Wild Fish Conservancy in 2005 reportedly found yellow perch (*Perca flavescens*), a freshwater to brackish fish, and three-spine sticklebacks (Wait et al. 2007).

Swantown Creek, which empties into the southeastern corner of the lake, is classified as a Type F (fishbearing) stream according to the Washington Department of Natural Resources Stream Type system (Figure 4). No records of the species inhabiting Swantown Creek were located in the State Water Type database. Much of Swantown Creek has been channelized, and the two detention ponds at the golf course cause the flow to be intermittent. Swantown Creek has been identified as a location of moderate

restoration potential for salmonids restoration (WRIA 6 STAG 2005). WDFW rated the restoration potential for chum and coho as high (Kearsley 1996). However, prior to restoring habitat in the middle or upper watershed, the tidal connectivity from the Strait into the lagoon must first be restored to enable fish to access the creek.

2.6 Birds

The wetlands in this associated with Swan Lake are important stopover feeding places for shorebirds and waterfowl. They contain nesting ducks of several species, rails, and snipe. In *A Birder's Guide to Washington*, Opperman (2003) writes: "Bos Lake and the surrounding salt marsh (aka Swantown Lagoon), east of the road, are notable for migrating shorebirds, gulls, and terns, and for wintering waterfowl, waders, and raptors. In fall migration (mid-July through September) Bos Lake is an important shorebird stopover, second on the island only to Crockett Lake for numbers and species diversity."

In 2000 the Whidbey Audubon Society nominated Swan lake and the surrounding area as Whidbey Audubon proposed this area as an Important Birding Area (IBA) in 2000, but it was not accepted due to insufficient data at that time. Efforts to collect data and get the site listed as an IBA continue. Three species of ducks that rarely nest in western Washington regularly breed at Swantown Lake: American Wigeon, Lesser Scaup and Ruddy Duck. Many waterfowl forage in the proposed IBA in winter; for example, 1000 pintails were observed on the lake on Jan. 21, 2008.

2.7 Upland habitats

The small upland area south of the lake currently supports grassland with scattered mature willows and occasional Douglas-fir trees. Grasslands provide important breeding habitat for ground nesting birds, foraging habitat for herons and raptors, and open prairie habitat that can provide critical habitat for several state priority bird, butterfly and potentially amphibian species. The area is used by hikers and dog walkers, and mowed and maintained by Island County Department of Public Works.

3 Stewardship Recommendations

Stewardship recommendations for Swan Lake were drawn from a variety of sources including technical papers, "*Protecting Nearshore Habitat and Functions in Puget Sound*" (Envirovision et al 2007), "*Management Measures for protecting and restoring the Puget Sound Nearshore*" (Clancy et al. 2009), State and County Regulations, and discussions with local residents. The recommendations are not exhaustive but represent SFEG and SLWPG's ideas about the most significant actions for the County to consider, given the existing site conditions and the capacity of the resources to provide the desired benefits.



Figure 4. Water Type designations in the San Lake basin (map downloaded from Washington Department of Natural Resources FPARS website October 11, 2010).

3.1 General Stewardship

General stewardship of the property should be conducted in accordance with applicable County, State and Federal Regulations. Specific recommendations include:

- Ensure that future development in the Swan Lake watershed incorporates LID principles to reduce or offset stormwater impacts.¹
- Protect lands surrounding the lake and Swantown Creek via acquisition, conservation easements or other mechanisms.
- Continue to work on restoration of habitats associated with Swan Lake and Swantown Creek by developing partnerships and seeking grant funding to plan and implement projects.

3.2 Shoreline Management

Long-term protection of habitat and habitat-forming processes is best accomplished through zoning, development regulations, incentive programs, and other means. Specific recommendations for future shoreline management include:

- Implement and enforce existing land use policies and regulations including the Growth Management Act (RCW 36.70A), Shoreline Management Act (RCW 90.58), State Hydraulic Code (RCW 77.55); zoning and building codes; state and local stormwater regulations; and other environmental controls on development activity.
- Revising existing policies and regulations to improve their effectiveness or remove impediments to restoration, and barriers to the use of voluntary conservation programs and incentive/disincentive programs that promote voluntary habitat protection.
- Discourage dredging of ditches and stream where water drains to and from Swan Lake. If dredging is permitted ensure that activities conform with all local, state and federal permit requirements, including biological site assessments and habitat management plan requirements specified in Island County's regulations governing Habitats of Local Importance and Critical Areas, fish protection provisions specified through WDFW's Hydraulic Permit Approval process, protection and mitigations requirements for dredge and fill in wetlands under the USACEs Clean Water Act Section 404(d) permitting process, and Take Prohibitions enacted under the Federal Endangered Species Act.
- Utilize bioengineering techniques when repairing or maintaining bulkheads that protect homes and infrastructure along the west side of the berm.

¹ On October 11, 2010 the Board of Island County Commissioners unanimously rejected any urban expansion into the Swan Lake Watershed.

3.3 Invasive species

Non-native invasive plant species thrive in disturbed areas. Exposed soils offer prime sites for invasive species to colonize and spread. Trails, fields, and road verges are often places where invasive plants first establish, either dispersed by animals and wind or carried unintentionally by people, pets, or vehicles. Invasive species are one of the major threats to the integrity of natural communities, second only to direct habitat loss. Control and



removal of invasive plant species is one of the most difficult management challenges and requires collaborating with others on technical and financial support. Mechanical, chemical, and biological techniques are effective depending on the specific invasive plant. The use of chemicals to control invasive plants requires a pesticide applicators license and requires careful consideration, especially in wetlands. Physical removal can be effective, but usually requires ongoing monitoring and repeated re-treatments.

Invasive exotic species do not currently appear to be a major problem at Swan Lake (WSCC 2000). There are some noxious weeds (reed canarygrass, blackberries and thistle) on the property; however, SLWPG regularly hosts volunteer parties to prevent species such as blackberry and thistle from establishing a foothold. The lake was surveyed for *Spartina* in September 2010, and found to be clean. Specific recommendations to ensure that invasive species do not become a problem at this site include:

- Conduct annual survey/inspection to identify invasive plant species. The Noxious Weed Control Board Weed Coordinator should lead these efforts on publically owned land, and be responsible for treatment of invasive species when and if they are identified there.
- SLWPG should continue organizing volunteer work parties to help control invasives, and coordinate with People for Puget Sound to conduct annual spartina surveys.
- Complete an evaluation of the upland habitat and develop a plan for restoring native grassland and plant communities in that area as needed to support Priority Species associated with maritime meadows..



Figure 5. Location of parking areas, trails and signage at Island County's Swan Lake property.

3.4 Public access

Use of the Swan Lake property by local residents and visitors should be encouraged in order to increase appreciation of this unique resource. Access to public lands surrounding Swan Lake is via West Beach Road. There is some public parking at the county-owned south pullout at West Beach with interpretive signage about Swan Lake (Figure 5).

3.4.1 Recreation

Swan Lake is a popular recreational resource for local residents. The Swan Lake site currently supports birdwatching, hiking and other low impact recreational activities. Management activities that maintain these activities should be continued. Specific recommendations include:

- Minimal mowing of the upland trail during the growing season to facilitate access.
- Do not mow native grasses on the remainder of the site in order to minimize impacts to ground nesting birds; if mowing is required mow once a year in late summer or early fall. This maximizes the benefit to all grassland-dependent species by allowing the nesting season to progress undisturbed and enable late season flowers and grasses to provide food and cover.
- Seek funding to develop handicapped accessible trail.
- Seek funding to develop wetland viewing stations with interpretive signage in upland area.
- Install a covered birding station with interpretive signage near the entrance to the upland trail to inform visitors about the trail network, sensitivity of habitats, rules about dogs, and other interpretive material.

3.4.2 Hunting

Unlike at several other Habitats of Local Importance, hunting is currently allowed at Swan Lake despite the proximity of residences and recreational areas. A series of public meetings should be convened to develop local hunting regulations that are enforceable and reasonably protective of nearby residences and other site users. If hunting is allowed to continue we recommend that at minimum the following restrictions should be enacted to make hunting activities consistent with other County and State rules:

- Prohibit discharge of firearms within 500 feet of residences (similar to WAC 232-12 which prohibits discharge of firearms within 500 feet of campgrounds)
- Prohibit discharge of firearms from the surface or right of way of West Beach Road (similar to WAC 232-12-828 which prohibits discharge of firearms from, across, or along the maintained portion of any public highway, except for hunters with disabilities)

If hunting continues as an allowable use at Swan Lake the County should consider

working with WDFW to develop a formal access point, trail system and blinds in order to minimize disturbance of both sensitive wetlands and local residents. Signs should be erected to inform hunters of local restrictions, and regular WDFW patrols should occur to enforce state hunting regulations.

3.5 Restoration

Restoration of Swan Lake and Swantown Creek has been recommended in several recent plans, including the Island County Comprehensive Plan, the Island County Estuarine Restoration Program (Sheldon 2001), the WRIA 6 Salmon Habitat Limiting Factors report (WCC 2000) and the WRIA 6 Multi-species Salmon Recovery Plan (2005). Projects completed to date include the acquisition of the Swan Lake parcel by the County in 1999 using CFF, and a recently completed preliminary feasibility assessment of the potential for improving hydrologic connectivity sponsored by SFEG and SLWPG using SRFB funds. In addition SLWPG has initiated an ongoing noxious weed removal and butterfly restoration project targeting the Taylor's checkerspot butterfly. Recommendations for future restoration efforts include:

- Complete a boundary survey of the County owned property and visibly stake the property corners for public awareness.
- Survey lake, wetlands and county-owned upland area for priority plant and animal species.
- Complete engineering analysis of options for restoring tidal connectivity and fish passage between Swan lake and the marine nearshore.
- Develop plans for restoring habitat and riparian zones associated with Swantown Creek and managing for potential salmonid use (coho, chum, cutthroat).
- Continue volunteer water quality monitoring program.
- Restore and protect a wildlife buffer with native plants including shrubs and shore pine along the south shore of Swan Lake and the banks of Swantown Creek.

3.6 Education and Outreach

The purpose of public education and outreach is to inform citizens, law and policy makers, and resource agency staff (among others) about the ecological consequences of actions and the need to preserve or restore nearshore processes (Clancy et al. 2009). If they understand the cause and effects of their actions, people may be more likely to choose ecologically sustainable options for developing and managing their property. People who become educated or involved in restoration efforts are also more likely to volunteer time, donate money, and support legislation/regulations aimed at nearshore protection and restoration compared to people who are unaware of the benefits of restoration. As a result, Public Education and Outreach is an essential tool for addressing existing impairments and achieving support for the protection and restoration of Swan Lake and its environs.

The SLWPG has initiated Education and Outreach efforts using funds from an Island County Conservations Futures Fund Grant. Using the CFF grant funds SLWPG printed

new brochures for educational purposes; erected an interpretive sign at the south West Beach parking pull-out; erected two otter crossing signs to help protect the river otters that go back and forth between Swan Lake and the Strait; organized work parties with the Oak Harbor High School Ecology Club to control noxious weeds and plant native plants; redesigned the SLWPG website; and supported the development of these recommendations for a final Stewardship Plan for the county-owned Swan Lake conservation property.



Recommendations for future education and outreach activities include:

- Present the results of work done to date to the via community meetings, and solicit input on proposed restoration strategies.
- Install an interpretive sign near the entrance to the upland trail to inform visitors about the trail network, sensitivity of habitats, rules about dogs, and other interpretive material.
- Construct an environmentally friendly board walk and covered birding station to facilitate viewing of wetland species.
- Provide information on Swan Lake at local environmental events (e.g., Sound Waters Conference, Fin Fest)
- Talk to local schools and service agencies (e.g. Rotary Club) about Swan Lake, proposed projects and opportunities to get involved.
- Host public events to promote the unique opportunities available at Swan Lake and allow the public to learn more about the local ecosystem.

SLWPG and SFEG will work to develop partnerships with other local organizations such as Beachwatchers and/or the Audubon Society to seek funding that could be used to continue education and outreach efforts.

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