DRAFT

SAUVIE ISLAND WILDLIFE AREA MANAGEMENT PLAN

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Oregon Department of Fish and Wildlife
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Salem, Oregon 97303

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Executive Summary

Sauvie Island Wildlife Area is one of several wetland-focused wildlife areas managed by the Oregon Department of Fish and Wildlife (department). The wildlife area is located in Columbia and Multnomah Counties, south of the confluence of the Columbia River and Multnomah Channel, approximately 12 miles from downtown Portland. The wildlife area presently encompasses 11,543 acres.

Purpose of the Plan
This 2009 Sauvie Island Wildlife Area (SIWA) Management Plan will:

1. Outline the purpose and describe the most important management challenges currently facing SIWA;

2. List, prioritize, and justify the main management goals and objectives at SIWA;

3. Summarize the current status of habitats on SIWA and major changes in habitat composition SIWA staff hope to achieve during the next 10 years;

4. Outline specific strategies SIWA staff will use to achieve the objectives outlined in the plan;

5. Ensure that management programs on SIWA are consistent with the original mandate and purpose of the area when it was first established and are consistent with Federal, State, and local natural resource plans;

6. Address conservation priorities and recommendations described in the 2006 Oregon Conservation Strategy;

7. Communicate the department's management priorities for SIWA to its neighbors, adjacent landowners, visitors, and to the public, and;

8. Provide a basis for budget requests to support SIWA needs for staffing, operations, maintenance, and capital improvements.

SIWA was established in 1947 with primary objectives of protecting and improving waterfowl habitat and providing a public hunting area. Managing habitat and providing public hunting programs continue to be the main management priorities of SIWA staff. There are several major challenges facing the wildlife area today including a dramatic increase in public use, an ever increasing wintering population of geese, and developing new wetland restoration projects. Public use on the wildlife area was over 800,000 visitor days in 2008. Due to its close proximity to the Portland Metropolitan Area SIWA staff expect public use to continue to climb. In particular, the beaches of SIWA receive 55% of the total public use throughout the year. When the wildlife area was created, approximately 6,000 geese were counted on SIWA during the winter; today survey counts have totaled over 100,000. During spring and fall migrations, peak numbers of geese can approach 300,000; consequently, SIWA staff are being asked to manage

habitats to support more geese to help reduce crop depredation on private lands and meet Oregon's obligations for continental management of Pacific Flyway geese.

In addition to managing the wildlife area for waterfowl and public use, SIWA staff are also striving to protect and manage important habitats for many different fish and wildlife species, including those of conservation concern. The Oregon Conservation Strategy (OCS) (ODFW 2006) recommends specific conservation actions to protect priority habitats and species. Nine distinct habitat types occur on SIWA, several of which are designated as Strategy Habitats as defined by the OCS. Habitat types present on the wildlife area include wetlands of various types, freshwater aquatic (open water), riparian / bottomland hardwood forest, beach, grassland/pasture, agriculture and oak woodland/savannah. Wetland restoration is one of many efforts being implemented on the wildlife area to achieve both waterfowl management and wildlife conservation goals. The wildlife area will continue to put a high priority on wetland restoration work while investigating ways to increase the carrying capacity of habitat used by wintering geese.

Another of the wildlife area's management priorities is Sturgeon Lake, a 3,000-acre open water/wetland area. Due to levee construction which has altered natural hydrology, the lake is silting in and subsequently the wetlands are becoming non-functional. The large levee (Sauvie Island Drainage District Levee) surrounding the south end of Sauvie Island has over the years reduced flushing action from the Gilbert River thus reducing lake depth. Sturgeon Lake and many of SIWA's shorelines are tidally influenced and these areas are important for foraging shore birds and salmonids. There is an ongoing effort by SIWA staff and the Sturgeon Lake Restoration Planning Group to restore the hydrology of the lake. These restoration efforts are described in further detail in this plan's Habitat Management Unit section.

Planning Approach

This plan revises the original long range management plan for SIWA, initially adopted by the Oregon Fish and Wildlife Commission (Commission) in 1993. The 1993 plan focused on public use, habitat goals and strategies directed towards meeting specific wildlife abundance objectives.

The goals, objectives and strategies (implementation actions) described in this 2009 revised plan were derived from an ecosystem-based management philosophy and from many of the conservation recommendations described in the OCS. This plan takes a strong habitat-based management approach recognizing that a landscape of well managed habitats is the best way to meet the needs of fish and wildlife species. Habitat goals, objectives and associated strategies were developed in an attempt to balance key habitat enhancement and maintenance with public use opportunities associated with those habitats.

This plan describes current issues and provides actions for addressing them. These actions will be implemented during the life of this plan, but are subject to availability of funding and personnel. The management plan will be reviewed in 2014 to gauge the progress of implementation and revised in 2019.

Management Vision

The vision for Sauvie Island Wildlife Area is as follows:

*Wetlands, and associated upland habitats, in the Columbia River bottomlands are being preserved and enhanced through sound management measures to support a diverse array of fish, wildlife and plant species, for use and enjoyment by present and future generation*s.

Plan Goals
The goals for SIWA are:

Goal 1: To protect, enhance and manage wetland habitats to benefit fish and wildlife species.

Goal 2: To protect, enhance and manage upland habitats to benefit a wide variety of wildlife species.

Goal 3: To maintain waterfowl hunting opportunities and provide a variety of other fish and wildlife oriented recreational and educational opportunities to the public that are compatible with Goals 1 and 2.

Goal 4: To control other public uses to minimize impacts on fish and wildlife, their habitats, and fish and wildlife related recreation and to maintain the security of the wildlife area and reduce disturbance to neighboring private lands.

Implementation Approach
Habitats on SIWA are both actively and passively managed. Active management within wetlands includes water level control (drawdowns and flooding) and vegetation manipulation (disking, mowing, farming and grazing). In areas without water control infrastructure, wetlands are passively managed through seasonal closures or restrictions on the type of public uses.

The primary action for benefiting wildlife is managing or preserving the range of habitat types that historically occurred on Sauvie Island. These habitats were created and maintained by a suite of ecological processes, most importantly hydrology. The natural ecosystems on Sauvie Island have been irreversibly altered since initiation of European settlement in the early 1800s. The most noticeable changes have been a disruption of hydrology, due to dams on the Columbia and Willamette river systems, and the proliferation of invasive plant and animal species. Recently, suspected climate changes seem to have added other disturbances to an already significantly altered system.

Due to the wide variety of habitat use among different fish and wildlife species, benefits will be varied. Not all species or guilds of species will see benefits at all times. In addition, recreational opportunities based on public demand and habitat capabilities, balanced with resource needs, and quite variable and specific uses will not be maximized in all cases. The department's current direction is to manage specific habitat types or features in an attempt to meet the life-history needs of specific wildlife species or guilds.

Introduction

SIWA is one of Oregon's outstanding natural treasures, supporting diverse species and providing the largest number of public use days for any Oregon Department of Fish and Wildlife (department) wildlife area. This plan outlines how SIWA staff will address these issues during the next 10 years. Specifically, this 2009 Sauvie Island Wildlife Area (SIWA) Management Plan will:

1. Outline the purpose and describe the most important management challenges currently facing SIWA;

2. List, prioritize, and justify the main management goals and objectives at SIWA;

3. Summarize the current status of habitats on SIWA and major changes in habitat composition SIWA staff hope to achieve during the next 10 years;

4. Outline specific strategies SIWA staff will use to achieve the objectives outlined in the plan;

5. Ensure that management programs on SIWA are consistent with the original mandate and purpose of the area when it was first established and are consistent with Federal, State, and local natural resource plans;

6. Address conservation priorities and recommendations described in the 2006 Oregon Conservation Strategy (OCS);

7. Communicate the department's management priorities for SIWA to its neighbors, adjacent landowners, visitors, and to the public and;

8. Provide a basis for budget requests to support the SIWA needs for staffing, operations, maintenance, and capital improvements.

Purpose and Need of Sauvie Island Wildlife Area

The wildlife area was established in 1947 with primary objectives of protecting and improving waterfowl habitat and providing a public hunting area.

The Oregon Game Commission (now the Oregon Fish and Wildlife Commission) initiated the purchase of SIWA because of the historically high levels of wintering waterfowl use on Sturgeon Lake and associated wetlands. SIWA was purchased to protect and restore these critical wetland habitats. While SIWA was not formally established until 1947, an initial purchase of five acres occurred in 1940. Additional purchases of land occurred mostly during the mid-1940s and 1950s, with the final purchase occurring in 1975. The Federal Aid to Wildlife Restoration Act of 1937 (Pittman-Robertson Act or PR) was the major funding source used to acquire Sauvie Island parcels from willing private landowners. This funding supported the initial development of SIWA's infrastructure and continues as the major funding source for habitat management activities today. The department acquired properties from

landowners because the parcels, consisting mostly of dairy operations, were located outside the protection of the Sauvie Island Drainage District levee. The dairies struggled since they were flooded almost every year. However, these properties were recognized as having excellent wildlife habitat value, especially for waterfowl (See Appendix A for detailed acquisition history).

The initial purchase of five acres in 1940 and subsequent purchases through 1975 has brought the wildlife area to its present size of 11,543 acres, of which 8,053 acres are under fee title to the department and 3,490 acres are managed through a cooperative agreement with the Oregon Department of State Lands (DSL). Sturgeon Lake (3,000-acres) is included In the DSL agreement. The wildlife area also incorporates all submersible lands adjacent to the department's deeded property of SIWA, as part of a cooperative management agreement with DSL.

Over time the management challenges of SIWA have become more complex as the department balances traditional waterfowl habitat needs and waterfowl hunting with an increase in wintering geese, increased demands for public use, habitat needs for federal and state listed species and the need to integrate SIWA with the OCS. SIWA staff have identified four primary management foci:

1. Providing habitat for ducks and other waterbirds,
2. Providing habitat for wintering Canada geese,
3. Helping achieve OCS objectives, and;
4. Providing recreational opportunities for hunters, anglers and wildlife viewers.

A brief explanation for each is provided below.

1. Providing habitat for ducks and other waterbirds

The Willamette Valley Ecoregion is an important habitat area for migrating, wintering and breeding waterfowl in the Pacific Flyway. Food is thought to be to the factor most limiting to waterfowl survival and condition during winter. As a result, wintering area Habitat Joint Ventures, organized under the North American Waterfowl Management Plan, have developed conservation programs that operate under the basic premise that, if food abundance is increased, demographic performance (e.g. survival) or the physiological condition (e.g. body fat) of wintering waterfowl will improve. The SIWA is an important area for wintering birds in the Lower Columbia River and Willamette Valley, both of which occur within the boundary of the Pacific Coast Joint Venture. Therefore, focusing on managing habitats that provide food in managed wetland impoundments at SIWA is consistent with regional and national waterfowl management objectives and objectives for the area established by the department. Managing for natural seasonal wetlands also provides habitat for other wetland dependent species.

2. Providing habitat for wintering Canada geese

SIWA plays an important role in meeting Pacific Flyway Council management objectives for wintering geese. Specifically, objectives and strategies in this plan were designed to be consistent with the Dusky Goose and Cackling Goose Management Plans and

Northwest Oregon / Southwest Washington Canada Goose Agricultural Depredation Control Plan (Pacific Flyway Council, http://pacificflyway.gov/Management.asp). One of the primary purposes of the wildlife area will be to manage pastures to provide habitat for geese and minimize their dispersal to, and grazing impacts on, neighboring private agricultural areas.

3. Helping achieve OCS objectives

Currently, SIWA supports a biologically diverse association of wildlife which includes at least 274 species of birds, 37 species of mammals, 12 species of reptiles and amphibians, and numerous species of fish and plants. The OCS (http://www.dfw.state.or.us/conservationstrategy), approved by the USFWS and adopted by the Oregon Fish and Wildlife Commission in 2006, is the State's overarching strategy for conserving fish and wildlife species and habitats of concern. SIWA is located in the Willamette Valley Ecoregion. Strategy habitats occurring on SIWA are oak woodland, grassland, wetland, riparian, and aquatic habitats. The entire wildlife area is designated as a Conservation Opportunity Area (COA WV-01 Columbia River Bottomlands). Many habitat management activities already occurring on SIWA to fulfill other state and/or federal management goals also address conservation needs that are identified in the OCS.

4. Providing recreational opportunities for hunters, anglers and wildlife viewers

Because of its proximity to Portland, SIWA experiences the largest number of public use days of any of the department's wildlife areas. Providing wildlife-related recreational opportunities is therefore an important purpose for SIWA. One key purpose of this plan will be to describe how public use will be managed to protect fish and wildlife and their habitats, protect SIWA infrastructure, and maintain the security and peaceful environment of the wildlife area and neighboring private lands.

Management Challenges at Sauvie Island Wildlife Area

1. Increased expectations of what SIWA provides to wildlife and the public:

As stated above, at its inception, SIWA was created to provide waterfowl habitat and waterfowl hunting opportunities. In some cases the role of SIWA for managing waterfowl has changed. For example, when the wildlife area was created, approximately 6,000 geese were counted on SIWA during the winter; today survey counts have totaled over 100,000. During spring and fall migrations, peak numbers of geese can approach 300,000; consequently, SIWA staff are being asked to manage habitats to support more geese to help reduce crop depredation on private lands and meet Oregon's obligations for continental management of Pacific Flyway geese. The Pacific Flyway population objective for Cackling geese is 250,000 birds, based on subsistent harvest needs of Native Alaskans. Presently the population is estimated at approximately 180,000. With the increased population objective, goose depredation on local agricultural crops in this area may increase as well. In addition, SIWA staff wish to increase the carrying capacity for wintering ducks, manage wetlands to support all wetland dependent organisms and increase the quantity or quality of OCS habitats on

the area. One significant challenge is how to increase capacity in all these areas with a fixed land base and staffing level.

2. Restoring Sturgeon Lake:

Sturgeon Lake is approximately 3,000 acres of open water and wetland habitat that is critical to the production and protection of waterfowl and other wildlife species. The off-channel features of Sturgeon Lake also likely make it an important habitat for migrating and rearing juvenile salmonids, many of which are listed under the state and federal ESA. Due to levee construction which has altered the natural hydrology, the lake is silting in. The large levee (Sauvie Island Drainage District Levee) surrounding the south end of Sauvie Island has decreased the flushing action from the Gilbert River, reducing the lake level over time. There has been an ongoing effort to restore this flushing action and SIWA staff have been active partners in the Sturgeon Lake Restoration effort. These restoration efforts are described in further detail in the Habitat Management Unit section.

3. Invasive species:

Invasive species on SIWA are an important management concern because of their ability to out-compete native and desired plants and animals. Invasive plants can significantly reduce plant diversity which impacts available forage for wildlife. The landscape may be altered as some invasive plants can form a monoculture. Examples of the primary invasive plant species that are controlled on SIWA include Himalayan blackberry, tansy ragwort, Canadian thistle and reed canarygrass. SIWA staff use many methods to control plants such as mowing, disking, water level management and herbicides. Invasive wildlife species (e.g. nutria, bullfrogs and carp) are controlled by various means such as trapping and angling.

4. Managing public use:

The wildlife area has also become a mecca for public recreation due its close proximity to the Portland Metropolitan Area. In 2008, over 800,000 visitor days were recorded, of this visitor use 55% occurred on the beach areas along the Columbia River. The challenge for the SIWA staff is to provide for the habitat needs of fish and wildlife while maintaining a balance with increasing public uses.

In addition, an increase in participation of and demand for wildlife- oriented recreational uses has occurred since the 1980s. This wildlife area plan acknowledges the shifts in demands and management emphasis over the past 62 years.

Sauvie Island Wildlife Area Vision Statement

The vision for Sauvie Island Wildlife Area is as follows:

Wetlands, and associated upland habitats, in the Columbia River bottomlands are being preserved and enhanced through sound management measures to support a diverse array of fish, wildlife and plant species, for use and enjoyment by present and future

*generation*s.

Wildlife Area Goals and Objectives

Wildlife area goals are broad, open-ended statements of desired future conditions that convey a purpose but do not define measurable units. In contrast, objectives are more concise statements of what the department wants to achieve, how much the department wants to achieve, when and where to achieve it, and who will be responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring wildlife area accomplishments, and evaluating the success of strategies. Strategies are actions that will be used to achieve objectives.

The goals and objectives for Sauvie Island Wildlife Area are:

Goal 1: To protect, enhance and manage wetland habitats to benefit fish and wildlife species.

Wetland habitats are critical to supporting wintering waterfowl populations that benefit birds and provide recreational hunting opportunities. There are 4,563 acres of wetlands on SIWA. Of that total, 286 acres are located inside two levees that provide protection against flooding from the nearby Columbia and Willamette river systems. The remainder, including the 3,000 acre Sturgeon Lake, is located outside those levees. Wetlands in areas protected behind levees provide staff a higher degree of water level control and therefore greater flexibility to create and manage for specific habitat types. Those wetlands located outside protective levees are greatly influenced by the adjacent Columbia and Willamette Rivers and by tidal influences on a daily basis; consequently, management on these lands is more difficult and this limits management options. Because of this important distinction, SIWA staff have drafted objectives separately for wetlands located inside versus outside the levees.

Sturgeon Lake

Objective 1.1: Conduct research on methods to improve the biological and hydrological function of the 3,000 acre Sturgeon Lake system and then implement these methods.

Inside the levees

Objective 1.2: Protect, enhance and manage approximately 286 acres of palustrine seasonally flooded wetlands and convert approximately 200 acres of existing agricultural land into this wetland type to benefit waterfowl and other wetland dependent species.

Outside the levees

Objective 1.3: Protect and enhance approximately 2,922 acres of lacustrine seasonally flooded wetlands to benefit a wide variety of native fish and wildlife and desired game species.

Objective 1.4: Protect and manage 285 acres of lacustrine permanently flooded wetlands.

Objective 1.5: Protect, enhance and manage approximately 795 acres of palustrine permanently flooded wetlands.

Objective 1.6: Enhance and manage 62 acres of palustrine semi-permanently flooded and 52 acres of palustrine seasonally flooded wetland habitats.

Objective 1.7: Protect approximately 161 acres of riverine wetlands to benefit a wide variety of fish and wildlife species.

Objective 1.8: Maintain and improve critical physical and functional infrastructure affecting wetland and water management activities within and outside the levees.

Goal 2: To protect, enhance and manage upland habitats to benefit a wide variety of wildlife species.

The department's upland management priority is to provide habitat, specifically pastures, to hold wintering geese and minimize depredation on private lands. In addition, SIWA upland habitats contain oak woodlands and riparian areas, both which are Strategy Habitats in the OCS. Most of the upland habitats are located outside of the two levees and therefore subject to the hydrologic processes of the two river systems. As with the wetland habitats, SIWA staff has limited water control capabilities outside the levees especially after spring freshets. Depending on the duration and extent of inundation, upland habitats can experience changes in plant composition. Staff must address these potential vegetative changes, particularly in pastures and agricultural areas, to promote goose use.

Objective 2.1: Enhance habitat carrying capacity for wintering Canada geese by reviewing current habitat management practices on 1,800 acres of pasture and 1,316 acres of agricultural crops.

Objective 2.2: Maintain and improve the quality of 193 acres of existing Willamette Valley oak woodlands and oak savannah.

Objective 2.3: Maintain 3,287 acres of riparian/bottomland hardwood forest and improve the quality of these habitats.

Objective 2.4: Restore approximately 50 acres of native grasslands, an OCS priority habitat.

Objective 2.5: Maintain and enhance SIWA facilities, structures, and equipment used to conduct habitat management, public use projects and other administrative functions.

Goal 3: To maintain waterfowl hunting programs and to provide a variety of other fish and wildlife oriented recreational and educational opportunities to the public that are compatible with Goals 1 and 2.

Public hunting is one of the primary reasons for the purchase and creation of SIWA and waterfowl hunting will remain a high priority public use on SIWA. Additional wildlife-oriented recreational opportunities (e.g., birding, wildlife photography, hiking and dog training) will be allowed when such activities do not conflict with the main mission of managing waterfowl habitat. Sport fishing is also an important recreational pursuit on SIWA, and staff will continue to provide oversight of three boat ramps, two ADA fishing piers, and several popular access points to the adjacent river.

For reference the word "compatible" in this document is used as defined in the 2007-08 Oregon Wildlife and Commercial Fishing Codes Title 41 ORS Chapter 496 General Provision 496.004 which states in "Article (3): "Compatible" means capable of existing in harmony so as to minimize conflict."

Objective 3.1: Provide approximately 165,000 hunting, trapping, and angling use days annually.

Objective 3.2: Maintain the existing level of 300 individual dog training permits and 50 days of permitted field dog trials, annually, and assure that these activities do not conflict with current and future habitat management objectives.

Objective 3.3: Provide 100,000 wildlife viewing, wildlife oriented education and interpretation use days annually, compatible with Objective 3.1 and habitat management objectives.

Goal 4: To control other public uses to minimize impacts on fish and wildlife, their habitats, and fish and wildlife related recreation and to maintain the security of the wildlife area and reduce disturbance to neighboring private lands.

Non-wildlife oriented public uses are increasing each year as the population of the Portland Metropolitan Area grows. These other uses include beach use, windsurfing, horseback riding and bicycling among others. Along with rising numbers of visitors, SIWA staff has observed significant increases in littering and vandalism. Innovative approaches to control visitor numbers will need to be implemented when public use jeopardizes the primary mission of SIWA.

Objective 4.1: Manage public use to minimize disturbance to wildlife species on SIWA.

Objective 4.2: Initiate a review of the SIWA parking permit program to determine its effectiveness.

Objective 4.3: Continue implementation of the 1993 SIWA Beach Use Plan.

The objectives and strategies to implement each goal, as well detailed rationale are provided in this plan on pages 40 to 60.

Current Status of Habitats, Environment, and Infrastructure on SIWA

Physical Resources

Location

Sauvie Island Wildlife Area is located on the north end of the 24,000 acre Sauvie Island (see Figures 1.1, 1.2 and 1.3). The island is located at the confluence of the Willamette and Columbia Rivers. The island is bordered by the Willamette River on the south, Columbia River on the east and Multnomah Channel on the west. The wildlife area is 12 miles from downtown Portland.

The wildlife area's headquarters is located at 18330 NW Sauvie Island Road, Portland, Oregon, 97231. Figures 1.1, 1.2 and 1.3 show the location and key features of Sauvie Island Wildlife Area.

Climate

SIWA is located at the northern end of the Willamette Valley, in a temperate climate in which summers are warm and dry, while winters are mild and wet. Temperatures range from average summer highs in the 90ºs (F) to average winter lows in the 20ºs (F). During the summer months, the daytime temperatures are moderated by cooler evening temperatures. Annual precipitation for Sauvie Island is about 40 inches, with about 70 percent falling between October and February. Less than three percent falls during July and August. Runoff follows a similar pattern, with high winter flows and low summer flows. Snow and freezing temperatures are generally absent in the winter are or present for only short durations.

Topography and Soils

Sauvie Island was formed by the Missoula Floods approximately 14,000 year ago. Sauvie Island is 14 miles long, oriented from north to south and 4.5 miles at its widest point east to west. The average elevation throughout the wildlife area is 20 feet above mean sea level.

The soils on SIWA are comprised primarily of alluvial deposits from the Lower Columbia and Willamette Rivers. Sauvie-Rafton silt loams are the predominant soil types on SIWA. The soil types are generally very good for agricultural crop production, but have limited water holding capacity. The water table is highly dependent on the river levels adjacent to the wildlife area which vary significantly on a seasonal basis and from daily tidal changes, as well. Specific information about soils and topography is also contained in the individual habitat management unit descriptions in Appendix G.

SIWA contains two levees (Figure 2) which are important topographical features affecting habitat management. One large levee, surrounding the south end of Sauvie Island, is 22 miles long and 32 feet high. This levee is maintained by the Sauvie Island Drainage Improvement District. The second smaller levee is 12 miles long and 27 feet

Figure 1.1 - Sauvie Island Wildlife Area Features and Ownership - Headquarters Unit

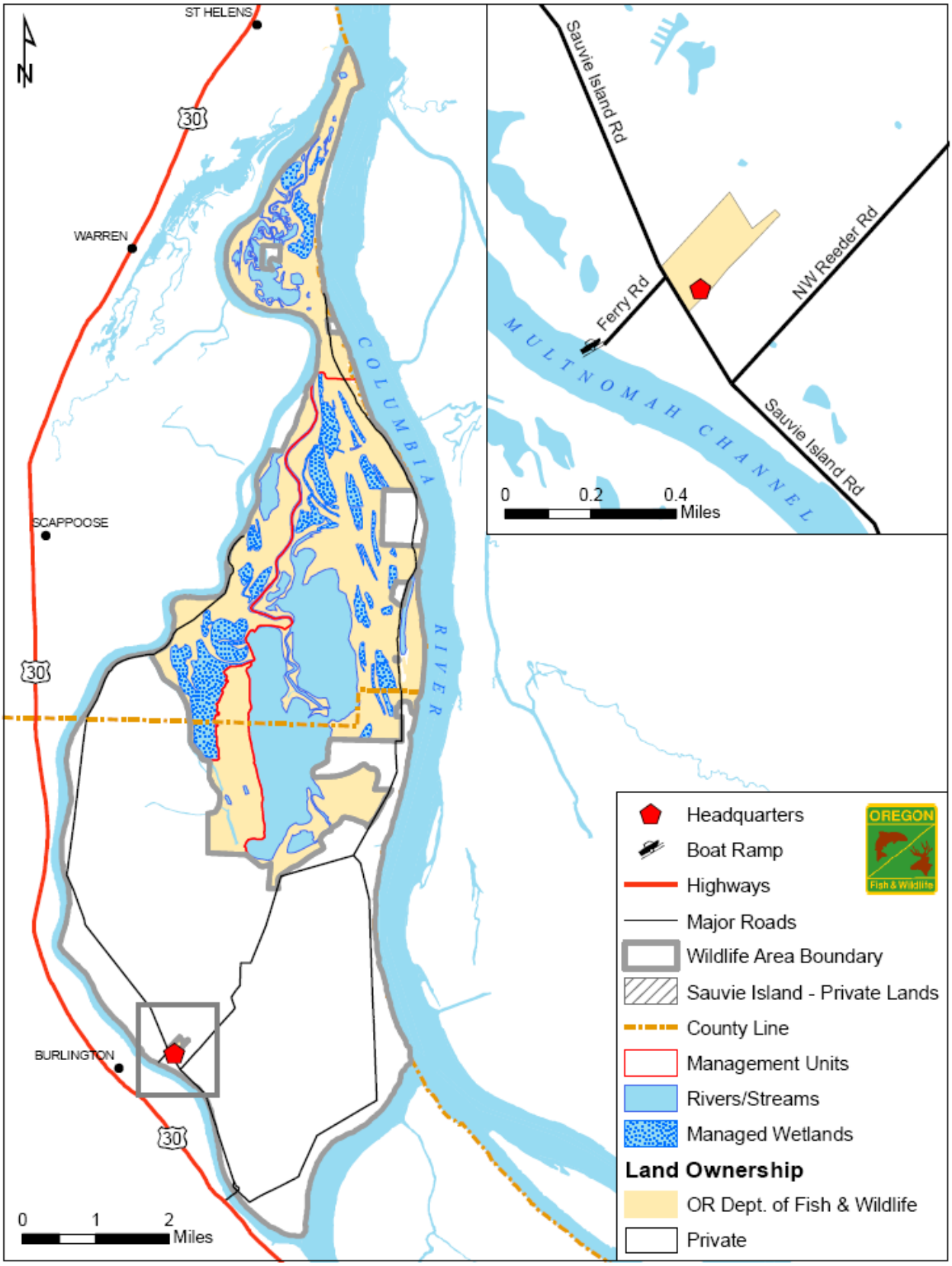


Figure 1.2 - Sauvie Island Wildlife Area Features and Ownership - North Unit

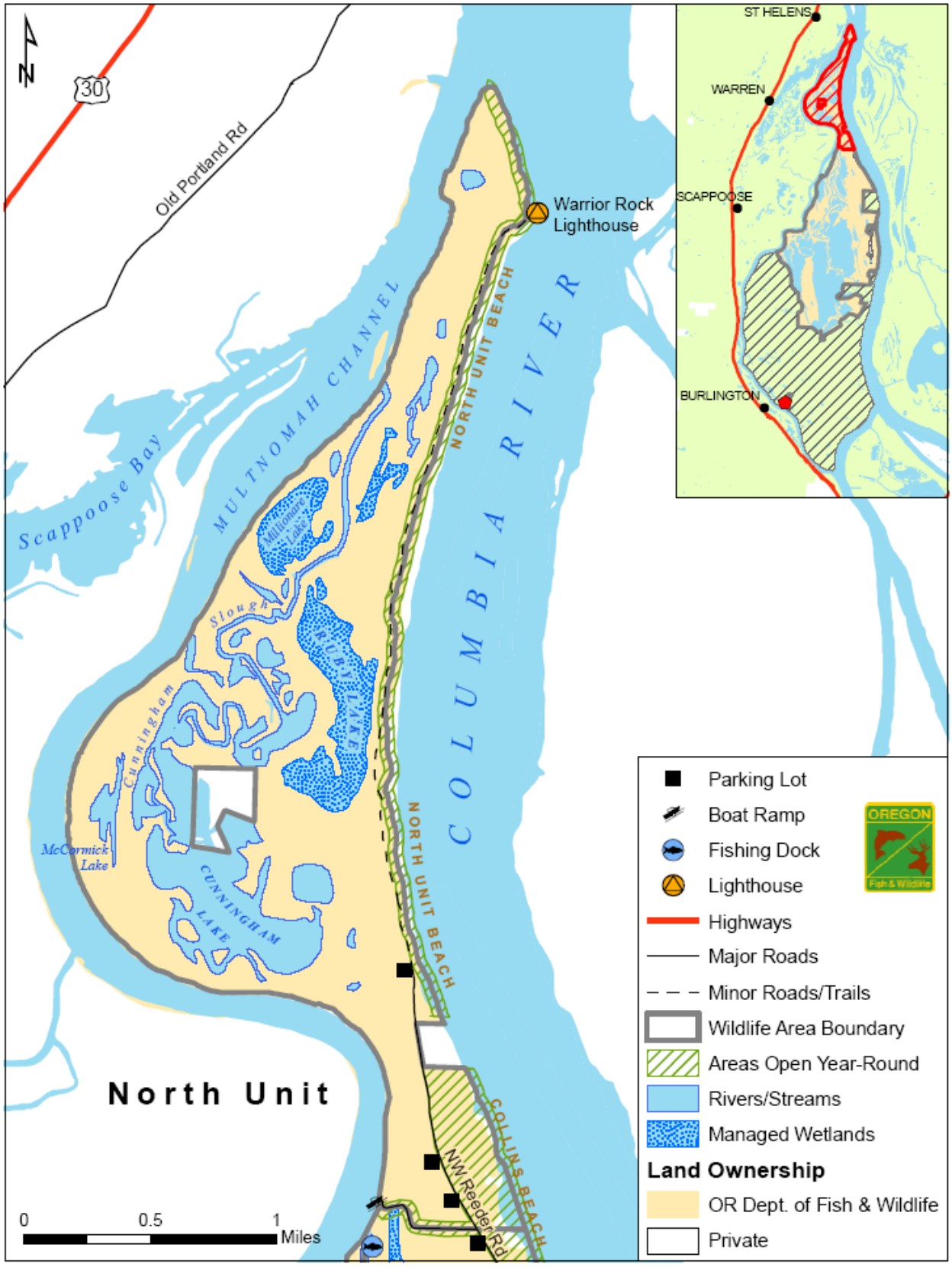
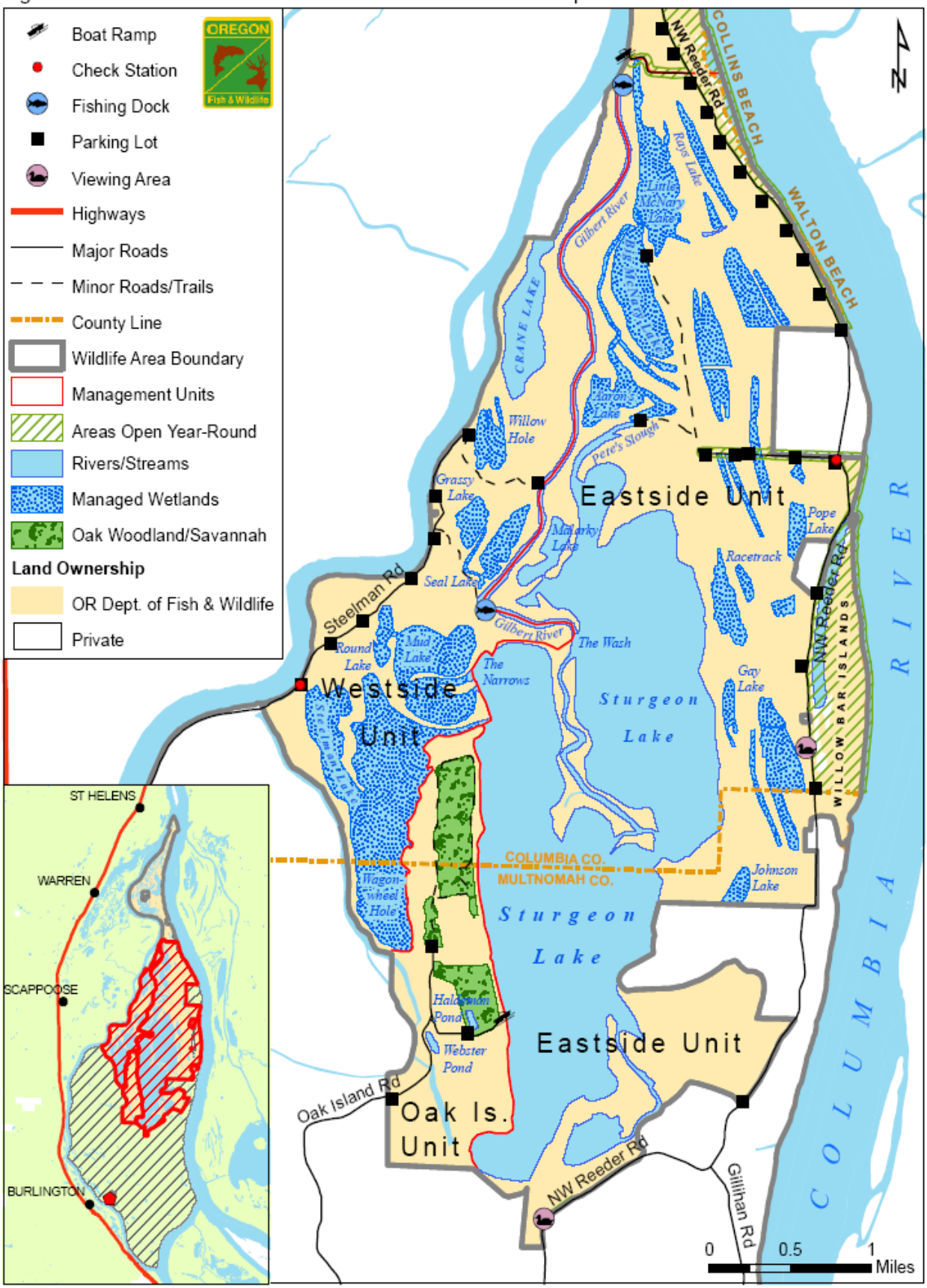


Figure 1.3 - Sauvie Island Wildlife Area Features and Ownership - Southern Units



high and is located in SIWA's Eastside Unit. This second levee is mostly owned and completely maintained by the department, in cooperation with the Columbia County Drainage District #1.

Habitat Types

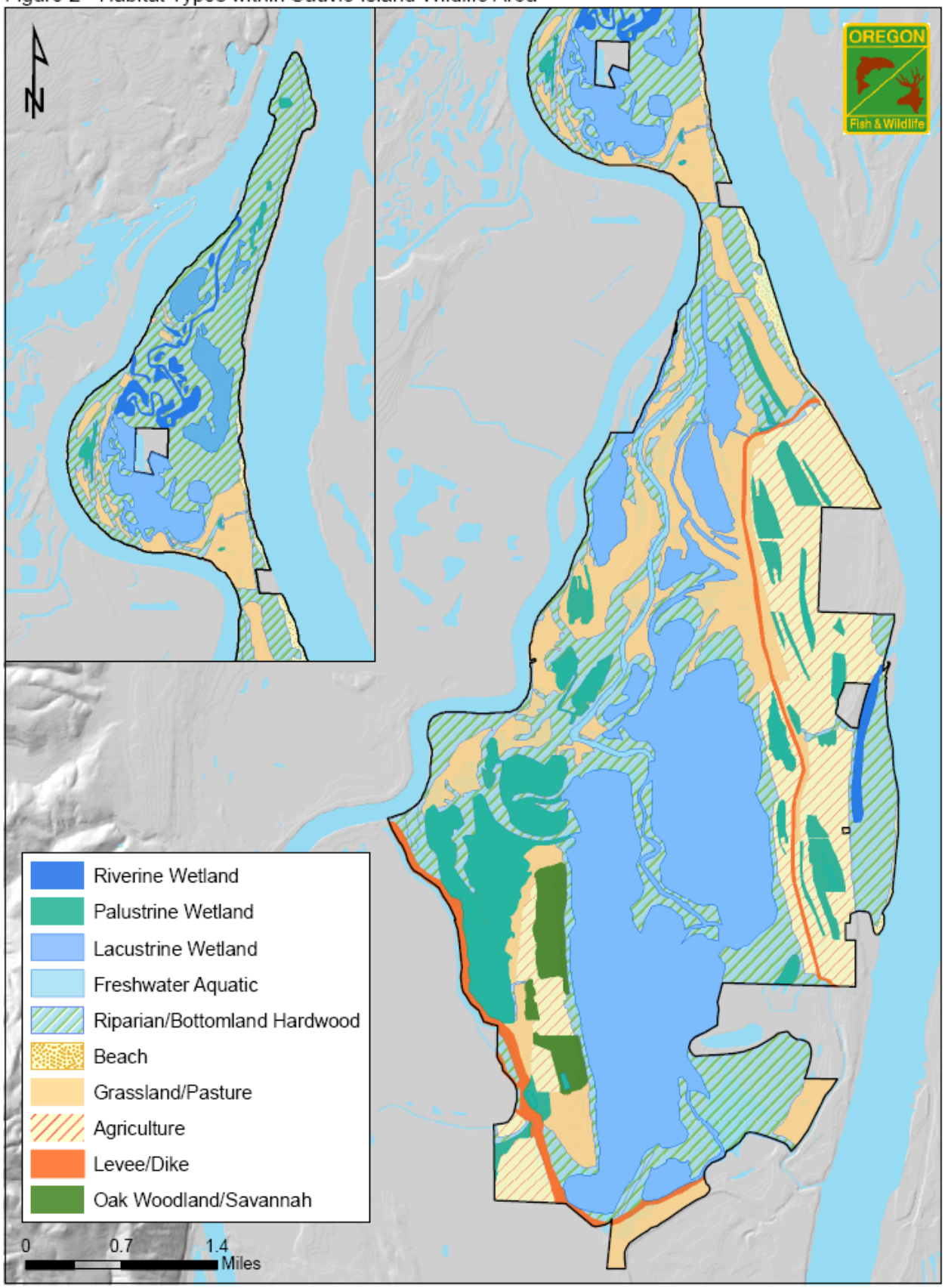
Habitats historically found on the island were the result of the natural meandering of the lower Columbia and Willamette River drainages and the low elevation topography typically found in the floodplains of large river systems. Due to management actions and other primarily human-induced influences, SIWA habitats are in a continual state of change, causing acreage of specific habitat types to vary over time.

There are nine habitat types found within the borders of the SIWA (Figure 2): palustrine, lacustrine, and riverine wetlands, riparian/bottomland hardwood forest, grasslands/pastures, oak woodland/savannah, agricultural uplands, freshwater aquatic and beach. The department has developed objectives and strategies to actively managed most of these habitat types. An adjudicated Beach Use plan guides the department's management of the beaches while the freshwater aquatic habitat is passively managed. These habitat types and the amount of acres of each type are listed in detail in Table 1.

Table 1. Habitat composition on the Sauvie Island Wildlife Area.

Habitat Type	Approximate Acres
Palustrine Wetland	
Permanently flooded	795
Semi-permanently flooded	62
Seasonally flooded	338
Lacustrine Wetland	
Permanently flooded wetlands	285
Seasonally flooded wetlands	2,922
Riverine Wetland	161
Riparian/Bottomland Hardwood Forest	3,287
Grasslands/Pastures	1,779
Oak Woodland/Savannah	193
Agricultural Upland	1,316
Freshwater Aquatic	293
Beach	112
Total	**11,543**

Figure 2 - Habitat Types within Sauvie Island Wildlife Area



Of these habitats, oak woodland, riparian forest, wetland and grasslands are priority habitats in the Willamette Valley Ecoregion. The OCS recommends specific conservation actions on SIWA to protect and enhance these strategy habitats such as improving water delivery systems to enhance effectiveness of wetlands management; maintaining or restoring riparian habitat and ecological function; ensuring sufficient habitat complexity for wildlife; removal of vegetation encroaching on oak woodlands; and restoring or enhancing seasonal wetlands. Appendix B contains a list of trees, shrubs, forbs and grasses found on SIWA.

Wetlands

The SIWA contains a large percentage of the total inland wetlands of Columbia and Multnomah Counties and, as such, is extremely important for wildlife. The gradual slopes of the wetlands provide extensive areas of shallow fresh water wetlands that are well suited to support a wide variety of wetland dependent wildlife and fish species.

The description of wetland habitat types follows the classification scheme of Cowardin et al. (1979), described in further detail below. The majority of SIWA wetlands are freshwater lacustrine (seasonally flooded) and palustrine seasonal wetlands (permanently flooded). Frequently, emergent and aquatic bed plant communities create a mosaic of wetland plant types within each management unit. Within each major wetland type, variation in hydrology and topography creates important differences in plant communities and seasonal differences in wetland availability that in turn influences bird use. While these habitat associations are described below as discrete, they represent a continuum from dry to wet and when considering the topographical variation of the area, each may occur in close juxtaposition to the other in a single habitat management unit.

As previously mentioned, the majority of the wetlands on SIWA are dependent on existing Columbia and Willamette River levels and, as a result, staff have limited water level management capability. These wetlands are located outside of the two levees which protect portions of Sauvie Island from flooding and are affected tidally on a daily basis as well. The intensively managed wetlands where water levels can be controlled by SIWA staff are located primarily in the Eastside, Westside and North habitat management units (HMUs). These HMUs are divided into physically discrete sub-units which have independent water level management capabilities. Eastside Unit consists of twenty sub-units; Westside has seven, and the North Unit has three sub-units.

Sturgeon Lake consists of approximately 3,000 acres of open water and wetland habitats. The lake is situated between the Eastside and Westside Units and is administratively managed as a separate entity, under agreement with DSL. The lake comprises the largest wetland on SIWA and is usually inundated October through July. It is important to note that the lake is openly connected to the Multnomah Channel by the Gilbert River which is tidally influenced and allows fish ingress and egress. Over the years, the lake level has been dramatically reduced due to the lack of tidal flushing action outside the large levee, which was constructed surrounding the south end of Sauvie Island. The natural water flow processes of Sturgeon Lake were eliminated. There has been an ongoing effort to restore the tidal and riverine influenced flushing action and SIWA staff will continue to be active partners with the Sturgeon Lake

Restoration Planning Group. These restoration efforts are described in further detail in the Habitat Management Unit section.

Palustrine wetlands

1. Permanently flooded: Permanently flooded wetlands hold water all year and are dominated by vascular plants such as water plantain (*Planfago ssp*), smartweed (*Polygonum hydropiperoides*) and wapato (*Sagittaria latifolia*). This habitat is typically interspersed with robust tall emergents such as soft-stem bulrush (*Scirpus tabernaemontani*). Water depths range from 2 to 6 feet deep. Examples of this wetland type include Steelman and Pope Lakes. Fish (primarily non-native carp (*Cyprinus carpio)*) are usually abundant in this habitat. The stable water levels and inundation support submergent aquatic plants, and some species of aquatic invertebrates and fish. Many species of wildlife also capitalize on stable water levels and develop traditional use areas.

2. Semi-permanently flooded: Surface water is controlled so it persists throughout the growing season. These wetlands are dominated by emergent plants such as wapato, smartweed, plantain, and various sedges (*Carex* spp). All the semi-permanently flooded wetlands on the wildlife area have varying rates of non-native reed canarygrass (*Phalaris arundinacea*) invasion. Water depths range from 2-3 inches up to 2-3 feet. Fish are sometimes abundant, particularly non-native invasive carp, if the wetland does not dry out completely in a given year. These sites vary in productivity, capability and wildlife use depending on depth and permanency of water levels. Many of the wetlands outside the levees are subject to tidal influences on a daily basis and this is important habitat for salmonids.

This habitat type provides foraging sites for an array of wetland dependent and wetland obligate fish and wildlife species, both migrants and residents. A large number of species will use these wetlands during breeding, brood rearing and molting life stages.

Tall emergent vegetation within this community has expanded in recent years, taking advantage of low and receding water levels that allow for seedling development on exposed mudflats or rhizome growth of individual clonal-type plants. Associated open water areas and use by some species of wildlife have been reduced as a consequence of this expansion. This is especially true with Racetrack Lake.

3. Seasonally flooded: Surface water is present for extended periods, fall through winter, and especially early in the growing season. As summer progresses these wetlands will dry out as a result of increases in evapotranspiration and reduced water deliveries due to reduced river flows. Plaintain, smartweed and barnyard grass (*Echinochloa crus-galli*), as well as a wide variety of other grasses, sedges, rushes and forbs are common. Reed canarygrass is a major concern in the wetland areas throughout the wildlife area. This grass forms large monotypic stands, provides little food value for wildlife, and out-competes native plant species. Where native species do occur, these sites vary in productivity, capability and wildlife use depending on depth, timing and rate of receding water levels as

well as amounts of vegetation present. This habitat supports abundant invertebrate populations, providing food to a wide variety of wildlife species.

Lacustrine wetlands (open water)

1. Permanently flooded: These wetlands are scattered throughout SIWA. The largest of these wetlands are the McNary and Aaron Lake systems. The unconsolidated mud bottoms support emergent and submergent aquatic plants but are subject to intense pressure from grazing carp. Open water is shallow, usually less than five feet. Turbidity caused by both carp and wind reduces algae and phytoplankton productivity by blocking sunlight and disrupting photosynthesis. This in turn affects the productivity of macroinvertebrates. Submergent aquatic and some emergent plants, some species of aquatic invertebrates and fish rely on stable water levels and inundation in order to remain productive. Many species of wildlife also capitalize on stable levels and develop traditional use areas.

2. Seasonally flooded: Typically these wetlands are dry from late spring into early fall. They are flooded when water deliveries to other managed wetlands begin in early fall, as evaporation rates decrease, and late growing season/winter precipitation increases. The largest wetland on the wildlife area, Sturgeon Lake, is classified as this wetland type. SIWA staff has no ability to control water levels on Sturgeon Lake. Depending on the size and duration of local flood events (primarily spring freshets), Sturgeon Lake can cover an extensive part of the wildlife area. Sturgeon Lake is subject to daily tidal influences from the Gilbert River as long as the river level is above two feet. Waterfowl make extensive use of this wetland type in the winter, while fall use is variable depending on river levels and wet weather patterns.

Riverine wetlands

These wetlands are extensive throughout the unmanaged water level portion of SIWA. The riverine wetlands occur along the Columbia and Gilbert Rivers, Multnomah Channel, Cunningham Slough and Dairy Creek. The habitat consists predominately of an overstory of black cottonwood (*Populus trichocarpa*), Oregon ash (*Fraxinus latifolia*), and Pacific willow (*Salix speciosa*), with a variety of native and non-native plants in the understory. During the 1996 flood, virtually all of the wildlife area was a riverine wetland. The Columbia River reached a level of 27 feet in 1996 and 23 feet in 1997. These tidal and flood prone areas remain important for a variety of foraging shore birds and multiple fish species.

Uplands

Riparian/Bottomland Hardwood Forest

As defined by the OCS, riparian habitats are those adjacent to rivers and streams or occurring on nearby floodplains and terraces, shaped by seasonal flooding, scour and soil deposition. This habitat type is the most extensive habitat found on SIWA, consisting of 3,287 acres. The associated bottomland hardwood forest type is found throughout the wildlife area, particularly in the unmanaged water level portions of SIWA. Riparian forests occur along the Columbia and Gilbert Rivers, Multnomah Channel, Cunningham Slough and Dairy Creek. The habitat consists of

mainly black cottonwood, Oregon ash and Pacific willow, with a variety of native and non-native plants in the understory. Invasive plant species dominate the understory, mostly Himalayan blackberry (*Rubus armeniacus*) and reed canarygrass.

Oak Woodland/Savannah

Most of the remaining oak woodland habitat occurs on Oak Island while the remaining oak savannah occurs in isolated areas south of Sturgeon Lake and in the Eastside Unit. These habitat types woodlands are considered a Strategy Habitat as defined in the 2006 Oregon Conservation Strategy. There are few conifers on the wildlife area and these are mostly found within the oak woodlands. Primary hardwood tree species include Oregon white oak (*Quercus garryana*), Oregon ash, big-leaf maple (*Acer macrophyllum*), black cottonwood and eight different willow (*Salix*) species. The predominant conifer species present is Douglas fir (*Pseudotsuga menziesii*). The oak woodland understory is thick with snowberry (*Symphorocarpus albus*), native blackberry, forbs and grasses. Himalayan blackberry and reed canarygrass create thickets that occupy many open areas as the woodlands transition into oak savannah. SIWA staff are developing integrated weed management plans to control these non-native invasive plant species.

Grasslands/Pastures

Pastures comprise approximately 1,779 acres of SIWA, with remnant grasslands interspersed within this acreage. Most of this habitat is situated within the floodplain and receive periodic flooding which may alter the plant composition for a given season. Many grasslands/pastures are maintained to provide quality forage for large numbers of wintering geese. Most of the pastures are grazed by livestock, from March through September, under grazing agreements with permittees. These areas are then grazed by geese from October through April. After bird nesting season, the pastures are mowed by SIWA staff or permittees to provide high nutritional value and suitable plant height for geese. A small number of acres of pasture is not grazed by livestock but are mowed to provide adequate grazing for geese.

Native grasslands are considered a Strategy Habitat as defined in the OCS. The opportunity to restore native grasslands exists in some limited areas on SIWA which are not utilized by geese. SIWA staff are developing a native grassland management plan that will identify the number of acres that can potentially be restored. The intent is to provide grassland habitat to benefit native birds such as the western meadowlark (*Sturnella neglecta*) and streaked horned lark (*Eremophila alpestris strigata*).

Agriculture

Agricultural crops (1,316 acres) are a major component of the habitat program at SIWA, both from the standpoint of providing a wintering waterfowl food source, but also to improve waterfowl hunting quality through discrete spacing of hunters.

Approximately 1,200 acres a year are planted with corn, millet and buckwheat. Other food crops may be planted to test crop success and utilization by wildlife. Corn is the most expensive crop to plant and is the most familiar to the public. The wildlife area staff annually plant between 150-250 acres of corn. The other food crops vary from year to year, in both composition and amount of acreage planted. While all food crops are planted to meet the needs of wintering waterfowl, numerous other species of wildlife (e.g. song birds, sandhill cranes, black-tailed deer) also benefit from these food crops. Crop irrigation is presently not used but will be considered in the future.

Alfalfa and hay fields are maintained by sharecroppers for the primary purpose of green forage for geese. Sharecropper agreements vary in terms of the amount of crops retained by the farmers versus the amount retained for wildlife use.

Freshwater Aquatic

The Columbia and Gilbert Rivers, Multnomah Channel, Cunningham Slough and Dairy Creek water bodies constitute 293 acres of freshwater aquatic habitat. Several federally listed salmonid species, white sturgeon and lamprey are found in these important aquatic tidal habitats.

Beach

Four beach areas managed by SIWA are located along the Columbia River and total 112 acres. The beaches were primarily the result of the placement of dredge materials when the Columbia River was dredged numerous times since the 1960s. The SIWA Beach Use Plan, adopted by the Oregon Fish and Wildlife Commission in 1993, and adjudicated by Columbia County Circuit Court in 2001, guides the department's management of public recreation on these beaches.

Description of Habitat Management Units

SIWA is divided into four separate HMUs (refer to Figures 1.1, 1.2 and 1.3). These include: Eastside, Westside, Oak Island and North Unit. Although Sturgeon Lake is not as intensively managed by the department as the four HMUs, because of its large size and its importance to fish and wildlife, it is included in this discussion of management units.

The boundaries of the management units are based on physical, administrative, and operational characteristics. Appendix G describes the department's management strategies for each unit in greater detail.

The HMUs receive water from a variety of sources including: pumping from the Gilbert River, ground water, winter rainfall, and flows from incoming waterways, primarily the Columbia River and Multnomah Channel. The important limiting factor that affects water management is the seasonally fluctuating in-flows of these two rivers.

In some areas, wetland cells within a HMU are located in a series so that one cell must be filled before water will move into another. In these cases, management actions in the upper cells affect adjacent or "downstream" cells. This "downstream" system is especially important for water level control within the Eastside Unit. In other cases, cells

have independent in- and out-flow capability and may be managed with complete independence from adjacent cells within the same HMU.

Proper functioning of Sturgeon Lake as habitat for fish and wildlife is a major concern of the department as well as its wildlife refuge value. Sturgeon Lake and associated lakes and wetlands were designated as a legislative refuge by the Oregon Legislature in 1937.

Sturgeon Lake has been silting in since the early 1940s when the main Sauvie Island levee was constructed. During the 1980s and early 1990s a project was initiated to clear Dairy Creek and to dig a shortened channel to restore water flow to Sturgeon Lake. This project involved numerous federal and state entities such as: West Multnomah Soil and Water Conservation District (WMSWCD), Oregon Department of Environmental Quality (DEQ), USDA Soil Conservation Service and The Coalition for Sturgeon Lake Restoration. Unfortunately the flood in February of 1996 created blockages in Dairy Creek, greatly limiting its effectiveness in providing water flow to Sturgeon Lake. The department and WMSWCD are currently considering options to restore the water flow to Sturgeon Lake. A Sturgeon Lake Restoration Planning Group (SLRPG) will supervise the continuing progress of all the activities pertaining to the Sturgeon Lake restoration. The membership of the SLRPG includes: WMSWCD, the department, Oregon DEQ, Ducks Unlimited, Multnomah County, with the following agencies participating as non-voting members: U.S. Army Corp of Engineers (USACE), National Resource Conservation Service (NRCS), Northwest Oregon Resource Conservation and Development Council, NOAA Fisheries, USFWS and adjacent private landowners.

Managed impoundments, croplands, moist soil units

In total, thirty sub-units or impoundments have been developed in the Eastside, Westside and North Units. Typically the impoundments consist of natural swales with levees and water control structures and have an average depth no greater than four feet.

The impoundments are managed to provide habitat and sanctuary for wildlife, with an emphasis on attracting and holding wintering waterfowl. This has been accomplished by using a combination of moist soil management techniques, maintenance of semi-permanent wetlands, control of invasive plant species, and draining selected impoundments in the spring and summer. Drained impoundments are either left fallow or planted with cereal grains for wildlife benefit.

Moist soil management techniques utilized on the wildlife area employ a combination of water level control, periodic soil disturbance, and timed drawdown and inundation to foster growth of native wetland plant species or to return habitats to an early successional vegetative state.

The target management prescription for SIWA is to maintain a balance of planted foodcrops and moist soil management within the managed impoundments on the Eastside Unit. Moist soil management is used to a limited degree on the Westside and North Units due to river level fluctuations. This scenario provides forage over a longer period of time than either practice used alone and as a result provides benefits to a

wider array of wildlife species. Wetlands utilizing moist soil management produce a diversity of native wetland plant species as recommended in the OCS.

Biological Resources

Wetland dependent or wetland obligate wildlife, primarily birds, is the major wildlife resource found on SIWA. Over 274 bird species have been recorded on SIWA, and over 70 of these species are confirmed breeders. Comprehensive inventory data for mammal, amphibian and reptile (herptile) species on SIWA is lacking, but it is estimated that at least 37 mammals and 13 herptiles are likely present. Many species of resident and migratory fish are found seasonally and annually in SIWA habitats. Invertebrate occurrence and abundance has not been inventoried and is unknown. The plant species included in this plan is partial, as a comprehensive survey has not been conducted. See Appendix B for a list of wildlife species known to occur or potentially present on SIWA.

Birds

Birds are the most important and dominant component at SIWA in terms of abundance and species diversity. Waterfowl is the major species complex utilizing SIWA especially for overwintering. Use of the wildlife area during the breeding season has expanded over the past 12 years, in response to wetland habitat management activities. SIWA plays an important role in meeting the life-cycle needs of a wide variety of species that are lacking on the surrounding developed lands in the Portland Metropolitan Area. A number of bird species identified in the OCS occur on the wildlife area (see Table 3) and these particular bird species are considered when habitat modifications are planned. SIWA's designation as an Important Bird Area (IBA) by the National Audubon Society demonstrates its value as significant bird habitat. Many of the management activities and habitat improvement projects designed for waterfowl have provided auxiliary benefits for shorebirds, cranes, rails, gulls, herons, pelicans, eagles, osprey, song birds and purple martins.

Wildlife use of Sturgeon Lake is very dynamic during the fall, winter and spring seasons. Over 120,000 waterfowl have been recorded on the lake during a single winter bird count. During their migration, thousands of shorebirds use the lake as well as the wildlife area's other wetlands to forage.

Forested tracts provide habitat for many species and contribute substantially to the overall wildlife value of the area. Raptors are quite common. Their abundance is a direct response to the diversity of habitats, concentrations of prey species, and lower disturbance on wildlife area lands relative to the surrounding developed areas. Upland gamebirds are present in limited numbers. SIWA plays an important role in meeting life-cycle needs for a wide variety of species that cannot be met on surrounding developed lands in the Portland Metropolitan Area.

Waterfowl

The SIWA wetlands provide extensive wintering habitat for ducks, geese, and swans. Duck species wintering on the area include large numbers of mallard (*Anas platyrhynchos*), green-winged teal (*Anas crecca*), northern shoveler (*Anas clypeata*), American wigeon (*Anas americana*), northern pintail (*Anas acuta*), and lesser numbers

of gadwall (*Anas strepera*), greater scaup (*Aythya marila*), ring-necked duck (*Aythya collaris*), bufflehead (*Bucephala albeola*), wood duck (*Aix sponsa*), canvasback (*Aythya valisineria*) and redhead (*Aythya americana*). Eight species of waterfowl breed on the wildlife area.

Seven subspecies of Canada geese utilize SIWA including resident western Canada geese (*Branta canadensis moffitti*) which nest on the wildlife area. Winter migratory residents include the increasingly abundant cackling Canada goose (*Branta canadensis minima*), Taverner's Canada goose (*Branta canadensis taverneri*), lesser Canada goose (*Branta canadensis parvipes*), and dusky Canada goose (*Branta canadensis occidentalis*). Two other subspecies that have been documented on the wildlife area include the Aleutian Canada goose (*Branta canadensis leucopareia*) and Vancouver Canada goose (*Branta canadensis fulva*). Snow goose (*Chen caerilescens*) use has increased over the last decade and greater white-fronted goose (*Anser albifrons*) use has been sporadic.

An overall increase in wintering geese in the Willamette Valley has resulted in a corresponding increase of geese wintering on and in the vicinity of SIWA. During the past few years, between November and April, a night roost population has established on Sturgeon Lake, frequently exceeding 50,000 geese. At daybreak the majority of the birds depart to forage on the wildlife area, on surrounding private fields or move between federal wildlife refuges and/or state wildlife areas in Washington.

A large management concern is how to maintain the quality and quantity of goose green forage habitat on the SIWA, to assist in reducing private land agricultural goose depredation. Goose monitoring will become even more important as goose populations increase.

In addition to Canada geese, several thousand tundra swans (*Cygnus columbianus*) spend part of the winter roosting on wildlife area lakes and forage in surrounding agricultural fields and wetlands.

Shorebirds

SIWA provides essential habitat for many species of shorebirds throughout the year. The freshwater habitat is important for several species that typically do not occur in large flocks, such as solitary sandpiper (*Tringa solitaria*) and spotted sandpiper (*Actitis macularia*), and for smaller numbers of species such as western sandpiper (*Calidris mauri*). During certain times of year, thousands of shorebirds can be found at SIWA, including wintering dunlin (*Calidris alpine*) flocks numbering up to 12,000 birds. SIWA was designated an IBA by the National Audubon Society partly because of the essential shorebird habitat provided on the wildlife area. Shorebird habitat is also a concern referenced in the OCS.

Ten species of shorebirds are found in abundant numbers at SIWA at various times of the year. These include semipalmated plover (*Charadrius semipalmatus*), black-bellied plover (*Pluvialis squatarola*), killdeer (*Charadrius vociferous*), greater yellowlegs (*Tringa melanoleuca*), spotted sandpiper *(Actitis macularia),* Western sandpiper (*Calidris*

mauri), least sandpiper (*Calidris minutilla*), dunlin (*Calidris alpine*), long-billed dowitcher (*Limnodromus scolopaceus*) and Wilson's snipe (*Gallinago gallinago*).

A number of shorebird species considered rare or accidental have been documented on SIWA. These include American golden-plover (*Pluvialis dominica*), willet (*Catoptrophorus semipalmatus*), whimbrel (*Numenius phaeopus*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), sanderling (*Calidris alba*), semipalmated sandpiper (*Calidris pusilla*), sharp-tailed sandpiper (*Calidris acuminate*), stilt sandpiper (*Calidris himantopus*), ruff (*Philomachus pugnax*), short-billed dowitcher (*Limnodromus griseus*), and red phalarope (*Phalaropus fulicarius*).

Daily tidal influences and receding water levels in late July, August, September, and October provide constant new habitat as fresh mudflats are exposed mostly in Sturgeon and Cunningham Lakes. During the fall, Sturgeon Lake's mudflats provide habitat for several species including killdeer, long-billed dowitcher, least sandpiper, and tens of thousands of dunlin. Smaller numbers of greater yellowlegs, black-bellied plover, least sandpiper, dunlin and western sandpiper are present through the winter months. As fall migration tapers off in October, shorebird diversity diminishes and the wintering species return. Peregrine falcons (*Falco peregrinus*) and merlin (*Falco columbarius*) take advantage of the shorebird migration and are frequently seen hunting the mudflats in September and October.

Upland Birds

Upland birds at SIWA primarily include ring-necked pheasant (*Phasianus colchicus*) and California quail (*Callipepla californica*). Approximately 700 rooster pheasants are released annually on the wildlife area as part of the Western Oregon Fee Pheasant Hunt Program. Prior to this program, occasional releases of hens and roosters, to bolster resident populations, were largely unsuccessful due to low over-winter survival rates. It is believed that high winter rainfall and frequent flooding limit the amount of area suitable for pheasant populations to thrive. California quail nest and reside year-round on the wildlife area in the upland habitats.

Mammals

A variety of mammals inhabit the riparian/bottomland hardwood forests, woodlands, grasslands, and wetland habitats of the wildlife area (Appendix B).

Furbearers present include red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), American beaver (*Castor canadensis*), river otter (*Lutra canadensis)* and raccoon (*Procyon lotor*). Other mammals include brush rabbits (*Sylvilagus bachmani*), western gray squirrel (*Sciurus griseus*), coyote (*Canis latrans*), striped skunk (*Memphitis memphitis*), western spotted skunk (*Spilogale gracilis*), and various shrews, voles, moles, gophers, chipmunks, and ground squirrels. SIWA also provides foraging and roosting habitat for several bat species.

Black-tailed deer (*Odocoileus hemionus*) are the principal resident big game species, with occasional sightings of elk (*Cervus elaphus*). Bear (*Ursus americanus*) and cougar (*Felis concolor*) are rarely observed.

Non-native nutria (*Myocastor coypus*) are present on the wildlife area and are considered to be a nuisance species because their burrowing activity damages dikes and levees. Trapping, by permit only, is used to control nutria. A number of other non-native mammal species also occur on SIWA including Virginia opossum and eastern gray and eastern fox squirrels.

Amphibians and Reptiles

Amphibian and reptile species present include northwestern salamander (*Ambystoma macrodactylum*), long-toed salamander (*Ambystoma macrodactylum*), Pacific treefrog (*Hyla regilla*), non-native bullfrog (*Rana catesbeiana*), roughskin newt (*Taricha granulosa*), western fence lizard (*Sceloporus occidentalis*), western skink (*Eumeces skiltonianus*), rubber boa (*Charina bottae*), racer (*Coluber constrictor*), gopher snake (*Pituophis melanoleucus*) and garter snakes (*Thamnophis* spp.).

The wildlife area supports significant populations of three federal Species of Concern: northwestern pond turtle (*Clemmys marmorata marmorata*), western painted turtle (*Chrysemys picta bellii*) and northern red-legged frog (*Rana aurora aurora*) (Appendix B).

Fish

Located at the confluence of the Willamette and Columbia rivers, Sauvie Island is situated among some of the most dynamic and economically important fish runs in the Pacific Northwest. Both wild and hatchery origin salmon and steelhead runs move past the island daily, all year, either on their way to the ocean as smolts, or as adults moving upstream to hatcheries or natal streams to spawn.

There are thirteen Federal and State listed threatened and endangered Evolutionarily Significant Units (ESU) of salmonids in the river and tidal lake systems adjacent to and on SIWA (Table 3). Given the importance of the diverse and significant aquatic habitats on SIWA for native ESA listed salmonids, planning objectives and actions described in the 2009 Draft Recovery Plan for Federally Listed Salmon in the Lower Columbia River, and The Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead may guide management action in some areas where appropriate to help restore these runs. Listed salmonids are an important management concern that the department takes into account when conducting projects on the wildlife area.

The shallow, warm waters of the interior of SIWA provide an environment suitable to warm water tolerant fish. However, elevated water temperatures in the summer cause low dissolved oxygen and high turbidity, and along with large water level fluctuations, combine to reduce water quality, limiting cold-water salmonid smolt productivity.

The waters of SIWA support naturally reproducing populations of introduced warm water species such as bluegill (*Lepomis macrochirus*), black crappie (*Pomoxis nigro-annularis*), white crappie (*Pomoxis annularis*), brown bullhead (*Ictalurus nebulosus*), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui),* and pumpkinseed (*Lepomis gibbosus*). Though these species are classified as invasive non-native fish in

the OCS, they are considered gamefish by the department and provide a popular and economically important angling benefit.

Species of Conservation Concern
A variety of federally listed and proposed endangered, threatened species, candidate species and species of concern and/or state listed endangered, threatened and sensitive species are known or suspected to occur on SIWA.

Howellia (*Howellia aquatilis*) is listed as Threatened under the Federal Endangered Species Act (ESA). In the past, Howellia has been collected on SIWA, but none of the management practices have changed in the locations where this species has occurred. All project activities have been occurring on historic farmed or grazed lands except the current wetland restoration work.

Although there is suitable habitat on SIWA, the Federally-listed Endangered Columbian white-tailed deer (*Odocoileus virginanus leucurus*) has not occurred on the SIWA since the early 1900s. There have been recent discussions between the USFWS and the department concerning the possibility of re-introducing this subspecies to the wildlife area.

Thirteen listed salmonid runs or Evolutionary Significant Units (ESUs) are known to or may possibly occur on the wildlife area including chum salmon, coho salmon, Chinook salmon, sockeye salmon and steelhead trout. White sturgeon and Pacific lamprey also use aquatic habitats on SIWA. Salmon, steelhead and trout occur in waters outside the levees on the wildlife area. Two pumps on the Gilbert River (Multnomah Channel tributary) are screened and all other pumps are secondary to these. In locations where salmonids may occur, water is pumped in the systems to allow escapement of juvenile fish after spring high waters.

Federal candidate species known to or that may occur on the wildlife area include yellow-billed cuckoo and streaked horned lark. There were historical records of yellow billed cuckoo on SIWA but the breeding population has likely been extirpated from Oregon. Streaked horn lark overwinter on SIWA.

Federal Species of Concern include purple martin (*Progne subis*), yellow-breasted chat (*Icteria virens*), acorn woodpecker (*Melanerpes formicivorus*), Lewis woodpecker (*Melanepres lewis*), Oregon vesper sparrow (*Pooecetes gyramineus*), band-tailed pigeon (*Columba fasciata*), olive-sided flycatcher (*Contopus borealis*), yellow-breasted chat (*Icteria virens*), long-legged myotis (*Myotis volans*), Yuma myotis (*Myotis yumanensis*), fringed myotis (*M. thysanodes*), northwestern pond turtle, western painted turtle and northern red-legged frog.

Species of special concern as outlined in the OCS which occur on SIWA are: bald eagle, peregrine falcon, shorebirds, waterfowl, Coho salmon, fall Chinook salmon, winter steelhead, Northwestern pond turtle and western painted turtle (Table 3) (ODFW, 2006).

Table 3. Federal or State-listed Endangered, Threatened, Candidate and Species of Concern plants and animals potentially present on the Sauvie Island Wildlife Area.
(Federal Status: C–Candidate; LT–Threatened; LE–Endangered; SOC–Species of Concern
State Status: LT – Threatened; LE – Endangered; SC – Sensitive Critical SV – Sensitive Vulnerable
OCS Strategy Species: X)

Common Name	Scientific Name	Federal Status	State Status	OCS Status
Howellia	*Howellia aquatilisi*	LT	S	
Salmonid ESU				
1. Chinook salmon	*Oncorhynchus tshawytscha*			X
a. Lower Columbia River		LT	SC	
b. Upper Columbia River		LE		
c. Snake River fall run		LT	LT	
d. Snake River spring / summer run		LT	LT	
e. Upper Willamette River		LT	SC	
2. Chum salmon	*Oncorhynchus keta*			
a. Columbia River		LT	SC	
3. Coho salmon	*Oncorhynchus kisutch*			
a. Lower Columbia River				X
	Oncorhynchus nerka	LT		
4. Sockeye salmon				
a. Snake River	*Oncorhynchus mykiss*	LE		
5. Steelhead trout				
a. Snake River Basin		LT		X
b. Upper Columbia River		LE	SC	
c. Middle Columbia River		LT	SC	
d. Lower Columbia River		LT	SC	
e. Upper Willamette River		LT	SC	
Pacific lamprey	*Lampetra tridentate*		SV	
Green sturgeon	*Acipenser medirostris*	LT		X
American peregrine falcon	*Falco pereginus anatum*		SC	
Western meadowlark	*Sturnella neglecta*		SC	X
Streaked horned lark	*Eremophila alpestris strigata*	C	SC	
Band-tailed pigeon	*Columba fasciata*	SOC	-	
Common nighthawk	*Chordeiles minor*		SC	
Little willow flycatcher	*Empidonax trailii brewsteri*		SV	
Olive-sided flycatcher	*Contopus borealis*	SOC	SV	
Yellow-breasted chat	*Icteria virens*	SOC	SC	
Acorn woodpecker	*Melanerpes formicivorus*	SOC	SV	
Lewis's woodpecker	*Melanerpes lewis*	SOC	SC	
Slender-billed nuthatch	*Sitta carolinensis aculeate*		SV	
Western bluebird	*Sialia Mexicana*		SV	
Oregon vesper sparrow	*Pooecetes gyramineus*	SOC	SC	
Purple martin	*Progne subis*	SOC	SC	
Hoary bat	*Lasiurus cinereus*		SV	
Silver-haired bat	*Lasionycteris noctivagans*		SV	
Long-eared myotis	*Myotis evotis*	SOC	-	
Fringed myotis	*Myotis thysanodes*	SOC	SV	
Long-legged myotis	*Myotis volans*	SOC	SV	

Yuma myotis	*Myotis yumanensis*	SOC	SV	
Western painted turtle	*Chrysemys picta belli*		SC	
Western pond turtle	*Actinemys marmorata*	SOC	SC	X
Northern red-legged frog	*Rana aurora aurora*	SOC	SV	X

Although bald eagles were removed from the Federal ESA in August 2007, they are still classified as Threatened under the State ESA and provided protection under federal and state law. Regular monitoring of nest occupancy and nest productivity occurs to ensure that bald eagle recovery continues through time. On SIWA, bald eagles are also monitored during aerial waterfowl counts and counted as part of SIWA's education and wildlife viewing activities. They are present year round and all activities occur with minimal disturbance on historically managed lands. Bald eagles use SIWA year-round, foraging primarily on fish and waterfowl. Breeding eagle pairs have historically nested on Sauvie Island and there are four active nests at present. Eagles roost and forage on the wildlife area, generally in proportion to food availability. In 2007, a record 38 bald eagles were documented on Sauvie Island.

The Oregon's Sensitive Species Rule (OAR 635-100-040) which was revised in December 2008 includes the following species which presently occur or have occurred on SIWA: chum and Chinook salmon, steelhead, Pacific lamprey, Northern red-legged frog, Western painted turtle, Western pond turtle, yellow-billed cuckoo, common nighthawk, streaked horned lark, purple martin, Oregon vesper sparrow, Western meadowlark, American peregrine falcon, pileated woodpecker, olive-sided flycatcher, little willow flycatcher, white-breasted nuthatch, Western bluebird, several bat species, western gray squirrel, and Columbian white-tailed deer.

The plant and animal species described in this section have also been defined as Strategy Species in the OCS. This strategy describes many conservation activities which can be implemented to contribute to the overall conservation of these species. SIWA's diverse habitat management actions and protective measures contribute to conservation of OCS species in the Willamette Valley Ecoregion.

Non-Native Species

Non-native wildlife on the SIWA includes nutria, Virginia opossum, European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*) and bullfrog (*Rana catesbeiana*). Occasional sightings of both eastern fox and eastern gray squirrels are documented. Ring necked pheasant and California quail, technically classified as non-native species are also resident on the wildlife area in relatively low numbers. Feral cats (*Felis domesticus*) and the common house mice (*Mus musculus*) are also present. Red-eared slider turtles (*Trachemys [Chrysemys] scripta elegans*) and several introduced fish species are present in wildlife area wetlands and waterways.

The most prolific non-native and invasive plant present in abundance at SIWA is reed canarygrass. The thick sod mat created by the grass chokes out native vegetation and the build up of roots and stem mass eventually fills in open water areas of the wetlands. Research and control measures have been ongoing at SIWA during the past several years to develop effective control techniques using heavy equipment, flooding, controlled burns, herbicides, shading, and other techniques based on timing and

frequency of application. Recent success has been demonstrated on tracts of old growth reed canarygrass using mowing, repeated heavy disking, followed by water flooding. Late summer mowing followed by fall herbicide (glyphosate) application has also proven to be an effective control technique.

Several non-native plant species have been documented on SIWA. Purple loosestrife (*Lythrum salicaria*) has been found on the wildlife area and control measures were immediately undertaken to eliminate plants and to monitor for further establishment. Scotch broom (*Cytisus scoparius*) is found on a more frequent basis on upland areas around the wildlife area boundary as colonization of surrounding private lands is increasing. Himalayan blackberry and evergreen blackberry (*Rubus laciniatus*) are present as invasives in many areas around the wildlife area. Tansy ragwort (*Senecio jacobaea*) and Canada thistle (*Cirsium arvense*) is also present as a persistent invasive that is interspersed in grasslands and along earthen levees.

Many non-native (introduced) plant species appear to be beneficial as forage or cover as evidenced by wildlife use and do not appear to have serious deleterious effects on overall landscape scale habitat quality. While many of these plant species serve as functional wildlife habitat, their presence is often at the expense of displacing native plant species. Generally, invasive plant species are opportunistic and present a challenge to effectively eradicate. The science of understanding the composition and dynamics of Sauvie Island grasslands and wetland habitats is complex relating to control efforts, population trends, reproductive biology, and interactions with other species. An adaptive management approach in line with recommendations of the OCS will continue to be used to balance acceptable levels of invasive species in limited areas, but to aggressively control, prevent establishment and limit expansion of the invasive species where feasible.

Cultural Resources

Sauvie Island has a long history of human use. Historically, the Native Americans who ceded this area are documented under the treaty by the Confederated Bands of the Willamette Valley signed on January 22, 1855. The peoples who inhabited the Lower Columbia and Willamette Rivers at the time of Euro-American settlement are collectively known as the Grande Ronde. Their descendants are included in the modern Confederated Tribes of the Grand Ronde. Many other tribes utilized SIWA's favorable climate and abundant natural resources for food procurement during the winter months. Many species of vegetation provided food and shelter, with wapato being the staple food for many of these tribes. Waterbirds, fish and mammals were very abundant on SIWA during the entire year but especially during the months of winter. Campsites, as evidenced by housepits and tool manufacturing sites, are located throughout SIWA and in uplands surrounding Sturgeon Lake, confirming significant use of SIWA's wetlands. The Multnomah Band occupied all of Sauvie Island, however, none of this band exists today.

Log entries from Lewis and Clark's journals also suggest that historically, large populations of waterfowl existed on the island; the noise of the birds even prevented the expedition from staying overnight on the island. The travel route used by early explorers for the fur trade in the Northwest and Pacific Ocean used Sauvie Island as a way stop

as did many settlers. Settlers homesteaded along the travel route, and eventually the area was converted to agriculture.

In the late 1800s, European settlement began with the homesteading of the area and development of the dairy industry. Livestock grazed in the drier upland areas while native marsh and meadow vegetation was cut for hay. In the early 1940s, major developments were undertaken to construct levees to protect areas from flooding and reduce livestock loss. This caused major changes to the natural hydrology and lakes ecosystem.

A number of cultural resource surveys and archeological excavations have been conducted on Sauvie Island. SIWA lands are afforded protection according to federal regulations. All of the sites within wildlife area lands could be considered potentially eligible for the National Register of Historic Places.

In the mid-1990s, habitat management on SIWA shifted away from low topographical area food crop production to moist soil management and waterfowl production. These same techniques are currently utilized, but emphasis is now directed towards all wetland dependent wildlife.

Social Environment

Demographics

SIWA is located near the largest metropolitan area in the state which includes Portland, Beaverton, Hillsboro, Gresham, and Oregon City. The base metro population is approximately three million people. The population of Sauvie Island is approximately 1,000. The Island is unincorporated and considered part of Portland.

Land Use

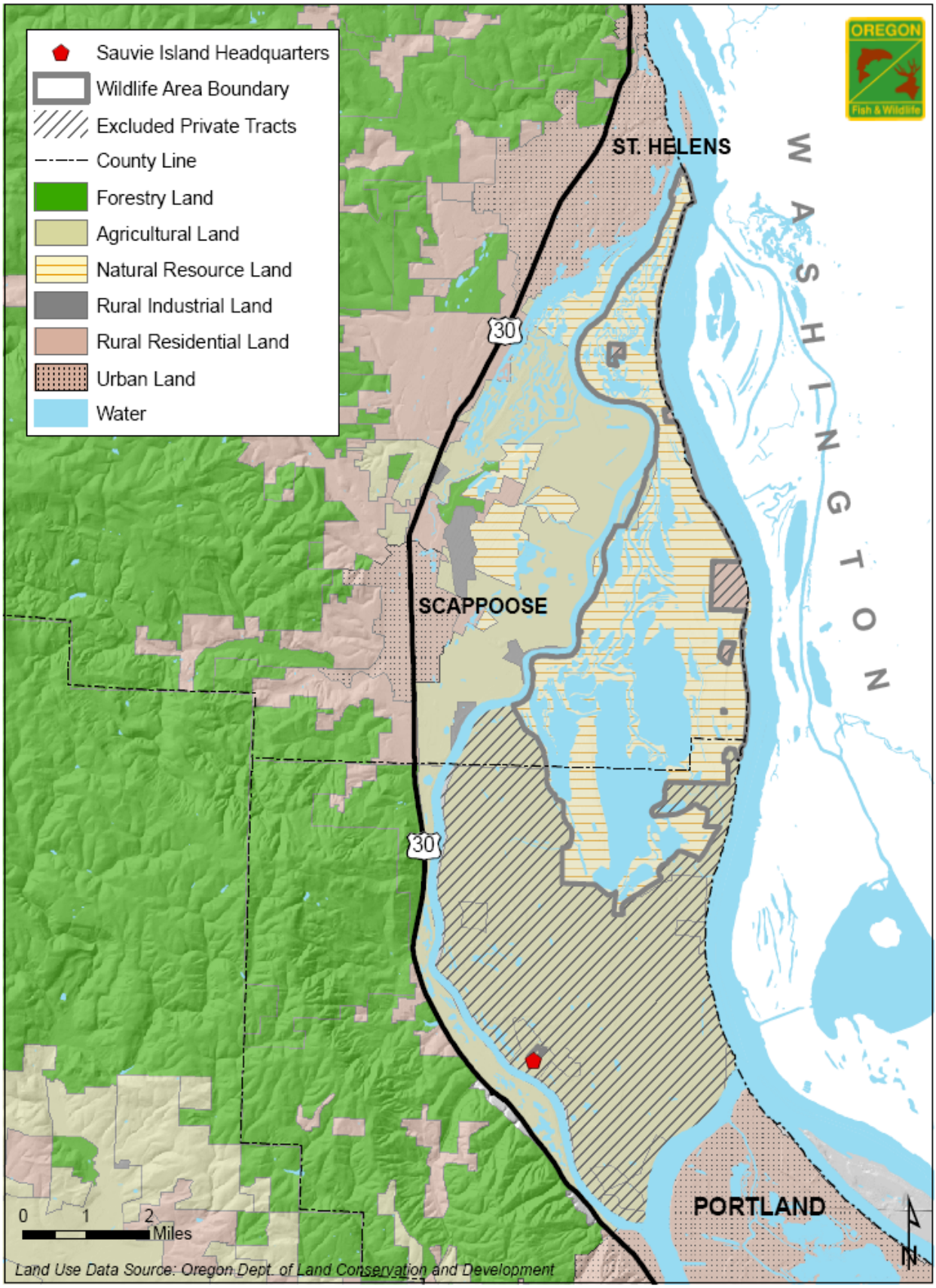
The Sauvie Island Wildlife Area is surrounded by predominantly agricultural and rural residential land uses. Figure 3 shows the land uses which border the wildlife area.

SIWA is adjacent to many private enterprises which include: kennels, private hunting clubs, nurseries and commercial and hobby farms.

Monitoring

Monitoring of all management activities will be conducted by wildlife area staff in coordination with department regional and headquarters staff. USFWS staff periodically monitors winter goose use on SIWA to document the component of wintering goose populations in the Lower Columbia River and Northern Willamette Valley. Other monitoring occurs periodically on the area such as bird banding and swab testing for Avian Influenza and aquatic organism sampling by United States Geological Survey (USGS) and NOAA Fisheries.

Figure 3 - Sauvie Island Wildlife Area Land Use



Wildlife
Wildlife population monitoring of various species consists of routine aerial census for waterfowl, inter-agency mid-winter waterfowl surveys, bald eagle surveys, deer surveys and cooperative marsh bird and neo-tropical species surveys. Currently Oak Island has a point count monitoring program in place, conducted by volunteers for the Important Bird Area (IBA) project. Monitoring of vegetation is also conducted to determine response to management techniques.

Amphibian egg mass surveys and turtle monitoring projects have been conducted on various wetlands on SIWA.

Waterfowl banding at SIWA is conducted on an intermittent annual basis as part of a coordinated Pacific Flyway banding project. In recent years, waterfowl captured at SIWA for leg banding are also included in the monthly avian influenza sampling protocol and population estimations. Banding data is used by the USFWS for flyway duck harvest, survival analysis and for hunting season regulation recommendations.

A new monitoring project was initiated to monitor goose use on SIWA. This project will assist department staff in determining the high priority goose grazing areas and potential for increasing the quality of forage in these areas. The project will also be used to provide justification for extended closures into the month of May, in high goose use areas.

Fish
Fish populations are monitored on occasion through angler creel checks and stream surveys by Oregon State Police (OSP) and the department's North Willamette Watershed District (NWWD) Fisheries staff. Monitoring will be conducted opportunistically and/or as scheduled by District fisheries personnel.

Wildlife Diseases
West Nile Virus
West Nile virus is a disease found in birds and is transmitted to other birds and mammals, including humans, via certain species of mosquito. The department coordinates with both the Multnomah and Columbia County Vector Control Districts who are responsible for mosquito control within their respective counties which include SIWA. Both Vector Control Districts provide an annual action plan to SIWA and NWWD Wildlife staff for review and revision, if needed.

The mosquito-borne virus first reached the United States in 1999 and began moving westward, reaching Oregon in 2004. Multnomah and Columbia Counties began testing mosquitoes for the virus in 2004. The Oregon Department of Human Services reported 16 human cases of West Nile virus in Oregon in 2008, down from 27 cases in 2007. Multnomah County has had confirmed West Nile in both mosquitos and horses. Now that an ongoing presence of the virus has been confirmed, County Vector Control District officials have indicated continuing some level of surveillance effort and taking steps toward prevention.

Avian Influenza

Beginning in 2007, the department began swab-testing waterfowl on SIWA for the Avian Influenza virus in association with the waterfowl banding program. Samples are acquired from live birds during the months of July, August and September while U.S. Department of Agriculture (USDA) personnel sample hunter harvested birds during the fall and winter. This testing follows recently developed statewide and national virus testing protocols.

Ongoing morbidity and mortality surveys are conducted on the wildlife area to monitor potential die-off events. Protocol is in place to coordinate with the department's wildlife veterinary staff for status determination and subsequent disease testing of sick or deceased wildlife as necessary. There have been no positive tests for avian influenza to date.

Water Use
Water use for moist soil management and flooding hunt areas is monitored and documented according to water use reports submitted annually to the department's Engineering Section and to Oregon Water Resources Department (OWRD).

Water Quality
Water quality and quantity at SIWA are monitored through various means. The main concern to water quality is the water discharge from the Eastside levee units into the Columbia River. Other water quality tests have been conducted on SIWA water bodies, primarily Sturgeon Lake. In 1994 there was major concern with the water quality of Sturgeon Lake. Water sampling results yielded high fecal *Coliform* counts, but surprisingly the source of the *Coliform* was from the large number of waterfowl which use Sturgeon Lake. The high population of common carp, an introduced bottom-feeding fish, also contributes to high lake turbidity.

Public Use
Public use is conducted using car counters at four strategic locations to determine the number of visitors. Car counter data is taken monthly throughout the year.

Infrastructure

Developments/Facilities
Major facilities development occurs primarily at SIWA's Headquarters and Eastside Shop complexes (Table 4). The Headquarters Complex consist of the Safety Action Team, SIWA and NWWD Wildlife District Staff offices, wood shop, two vehicle/storage garages, three Fish and Wildlife Volunteer Host sites and three storage sheds. The Eastside Shop Complex consists of one large shop building, one vehicles garage, Wildlife Viewing Platform, three Fish and Wildlife Volunteer Host sites and one seasonal residence. The area maintains seven staff residences, 11 barns and numerous outbuildings. All of the residences have wells for domestic water and septic systems. Other notable facilities include the Eastside Check Station, three boat ramps, fish screens, fencing, water delivery systems and a large number of water level management structures.

Table 4. Facilities and Developments on the Sauvie Island Wildlife Area.

Development Type	Location / Hunt Unit Name(s)
Viewing Area (3)	Coon Point, Eastside Viewing Platform, Rentenaar Road
Public Restroom (~45)	Eastside ADA, Gilbert River Boat Ramp permanent, up to 40 portable toilets (contract)
Access Area (7)	Westside, Oak Island, Rentenaar Road, Walton Beach, Collins Beach, Gilbert River Boat Ramp, North Unit
Parking Lot (29)	In Columbia County (22), In Multnomah County (7)
Maintenance Shop (2)	Headquarters, Eastside
Headquarters Office (1)	SIWA Headquarters
Equipment Shed (3)	Hunt, Browning, Headquarters
Storage Building (6)	Graf, Richardson, Pole Building, Hunt, Lyons, Headquarters
Barn (10)	Richardson, Hunt, Graf, Farrell, Horse Barn, Oak Island
Residence (7)	Headquarters (2), Eastside (5)
Host Site (3)	Headquarters (1), Eastside (2)
Fences (10)	Westside, Headquarters, Eastside, Coon Point, North Unit
Bridges (1)	McNary
Dike (3)	Sauvie Island, Columbia County, Collins
Boat Ramp (3)	Farrell, Gilbert River, Steelman
Pumphouse (6)	Richardson, Lyons, McNary, Gilbert Westside, Headquarters, Johnson
Pump Structure (3)	McNary, Aaron, Westside
Fishing Dock (2)	Gilbert River, Big Eddy
Check Station (2)	Eastside, Westside
Cattle Guard (2)	Eastside, Westside

Water Rights

The department holds numerous Oregon Water Resources Department water right certificates and permits for a majority of SIWA's wetlands. These are critical to meeting SIWA goals and objectives, as well as complying with the agency mission. The two major pumping stations (Aaron and Westside) provide the bulk of the water to meet the water rights. Both of these pumps are located in the Gilbert River which is a tributary of the Multnomah Channel. Annual spring freshet waters for both the Columbia River and Multnomah Channel are also held as part of the water rights.
Appendix D shows State water rights which are currently held on the Sauvie Island Wildlife Area.

Easements/Access Agreements

Rights-of-way on SIWA include four powerlines (all for Portland General Electric) and one sewer line (buried pipe from City of St. Helens). Generally, the rights-of-way are providing service to the Sauvie Island Wildlife Area facilities (Headquarters and Eastside Shop Complexes and pumps) or are situated along the exterior boundary of the wildlife area. The other easements include a road into the Elledge property in the North Unit and a bridge and a walk-in easement on Oak Island.

Approximately 3,400 acres of DSL lands are in a 99-year cooperative agreement with the department. This allows SIWA staff to manage these lands for the benefit of wildlife and their habitats.

Grazing and sharecropper permit agreements, for eight permittees, are in effect on an annual basis. The grazing permittees have approximately 3,400 Animal Unit Months (AUMs) and the sharecrop permittees plant and harvest approximately 400 acres.

Appendix E lists the easements and access agreements occurring on SIWA.

Land Acquisition and Adjustment

It is the policy of the department to only acquire land or interests in lands, including easements and leases, from willing sellers, consistent with statutory authority and the department's mission. Acquisitions and adjustments must be for the conservation of fish and wildlife and their habitats and to provide fish- and wildlife-oriented public use for educational and recreational purposes. Land adjustments would allow for the sale, trade or exchange of land with willing landowners to enable the department to consolidate wildlife area boundaries.

There are three categories of lands that may be considered for acquisition. These include: 1) significant or unique habitats, especially those beneficial to threatened, endangered, or sensitive species; 2) sites, or access to sites that provide wildlife-related recreational opportunities; and, 3) properties to facilitate the performance of the Department's mandated duties (e.g., storage and warehouse, feeding barns, etc.).

At present, neighboring private lands provide significant wintering habitat for a variety of waterbirds. However the quality of this habitat is seasonally variable due to the timing and intensity of activities such as crop rotation, haying, livestock grazing, and private duck club hunting.

Public Use

Public Access

Because of its proximity to Portland, SIWA experiences the largest number of public use days of any of the department's wildlife areas. This large number of use days has increased challenges to the management of SIWA. Public use will be managed to protect fish and wildlife and their habitats, protect SIWA infrastructure, and maintain the security and peaceful environment of the wildlife area and neighboring private lands.

The number of visits by the public varies widely due to weather patterns, with the heaviest use occurring in the summer. For example, in 2008, 877,339 visitor use days were recorded at SIWA. With the primary public use (55%) occurring on the beaches. During the summer of 2008, records show that 85% of all visitors recreated on the beaches.

Currently, seasonal entry restrictions are in place from October 1 through May 1. In recent years, biologists have recorded delayed spring migration of cackling Canada geese, therefore this closure period has been temporarily adjusted to a later date (May 1) and will be re-assessed with the intent of maintaining this date in the future.

A number of areas are open year around, such as Rentenaar Road, Columbia River beaches, Coon Point Viewing Area and the Eastside Wildlife Viewing Platform. A time restriction of 10:00 PM to 4:00 AM has been set throughout the wildlife area to improve security and protect the livability of adjacent private properties.

Hunting access occurs on approximately 72% of the wildlife area during the fall and winter hunting seasons. Hunting use is quantified through the requirement of daily hunting permits obtained at a staffed hunter check station or self-serve hunter check station. Non-hunting visitor use is monitored by car counters placed at specific locations such as the beach areas. However, it is difficult to determine the specific uses (birding, beach use, hiking, etc.) the car counters are reflecting. General visitor use is also monitored by the sale of daily or annual SIWA parking permits.

Hunting, Trapping, and Angling

Hunting and angling are very popular recreational activities enjoyed on the SIWA (Table 5). Providing public hunting opportunity was a major objective for the acquisition of SIWA, and revenues derived from hunting-related expenditures were the sole funding source for SIWA operations until 1990 when the SIWA parking permit system was initiated. Hunter use has remained rather steady with an average of 8,500 hunter visits over the past 40 years.

Table 5. Estimated Annual Hunting, Angling and Trapping Use Days on Sauvie Island Wildlife Area.

Activity	Estimated Annual Use Days
Hunting	15,000
Angling	150,000
Trapping	70
Total	**165,070**

SIWA provides a hunting experience which, once one is familiar with the system, can be extremely satisfactory. The SIWA has a wide variety of hunting opportunities. Waterfowl (especially ducks), upland game birds and deer are the primary species hunted. Waterfowl hunting options include a controlled hunt draw, first come-first serve opportunity, random numbered chip draw or an area which is open everyday during game bird seasons. Black-tailed deer hunting is archery only, during the Western Oregon general buck deer bow season. The wildlife area is closed to the hunting of furbearers, predators, unprotected and protected wildlife (except black-tailed deer and game birds). Access for disabled waterfowl hunters is provided with three disabled hunter blinds and areas which are relatively easy to access from the numerous parking areas.

- About 72% of SIWA (12,000 acres) is open to hunting. Other key areas are maintained, as refuge where access is generally not allowed during the hunting season. Refuges are necessary to meet wintering needs for many species. Should refuge areas be eliminated, birds would probably migrate out of the region to wintering areas or locations with reduced disturbance.

- Management of the hunt program is a major activity during hunting season. On average, about 8,500 hunter days are recorded annually with 15,700 waterfowl, coots, snipe, and upland game harvested. Collection of data on hunting activity, success, and species composition of game harvested is conducted by SIWA staff. The bulk of the data collected is obtained at the department's Eastside and Westside Check Stations.

- Hunters have access to 22 parking areas, two boat launches, up to 15 portable toilets, roads, trails, and one footbridge.

- Signing of boundaries and displays at SIWA Headquarters Complex, Eastside and Westside Check Stations and major access areas provide information to hunters.

- Considerable information is disseminated to the hunting public via telephone and personal contact, especially at the two waterfowl check stations.

- Fishing is a popular activity throughout SIWA's waterbodies and the adjacent Columbia River and Multnomah Channel. A warmwater fishery has developed because of the large areas of warm water habitat. Two disabled angler piers were installed to accommodate warmwater fishing and salmon, steelhead and sturgeon fishing. Salmon, steelhead and sturgeon fishing occurs on the wildlife area's shorelines along the Columbia River and Multnomah Channel. Haldeman Pond is stocked with legal trout during the spring to support a popular trout fishery in spring and early summer. Fishing use days on the wildlife area is estimated at 150,000 annually

- Fisheries related work on SIWA is conducted by both SIWA staff and NWWD Fisheries staff. Consistent with USFWS Pittman-Robertson (PR) Federal Assistance requirements, if SIWA staff time is utilized the costs associated must be derived from a non-Federal Assistance PR funding source. Opportunities to increase angler use will be explored if the impacts are consistent with wildlife management objectives.

- Trapping is allowed, on a closely controlled permit basis, to achieve population controls for selected species, particularly nutria. Currently only one permitted trapper is allowed after waterfowl season to the close of trapping season which is typically March 31. Restrictions on trapping seasons at SIWA have been enacted to reduce potential conflicts between user groups, prevent undue harassment to wintering wildlife and to prevent impacts to nesting waterbirds.

Other Compatible Uses

For the purposes of this plan 'other compatible uses' include those predominantly wildlife-oriented activities such as bird watching, photography, and hiking.

Beach use is the largest use on the wildlife area and is described in greater detail below. Dog training, an important component of hunting, is necessary to teach dogs to effectively retrieve game. The Fish and Wildlife Commission has approved two dog

training plans to address both field trials and individual training activities. A trap shooting area was established on the Westside Unit and is largely used just prior to fall hunting season. The trap area is closed from October 1 – April 15.

The SIWA is open to public access based on a season closure schedule with a number of areas open year around, such as the beaches. For this planning process, Table 6 uses an average visitor use estimate over the past 10 years.

Table 6. Estimated Annual Other Compatible Public Use Days on the Sauvie Island Wildlife Area.

Activity	Estimated Annual Use Days
Beach Use	600,000
Wildlife Viewing (i.e. bird watching)	80,000
Dog Training and Field Trials	10,000
Trap Shooting	10,000
Hiking	5,000
Other Uses (e.g. picnicking, biking)	3,000
Photography	2,000
Total	**700,000**

Wildlife Viewing

Wildlife viewing use has increased dramatically during the past ten years and is estimated to be 80,000 visitor use days annually. Viewers and other public uses utilize the same infrastructure that serves the hunting public. During the non-hunting season a much larger portion of SIWA is open or available for use.

- Wildlife viewing is largely unregulated except by season closures with a wide array of opportunities available. A viewing blind has been constructed to provide viewing opportunities during hunting seasons.

- The office facility and staffed hunter check stations serve as informational outlets when personnel are present, and informational contacts in the field are frequent. Fish and Wildlife Volunteer Hosts and other Northwest Region volunteers have been utilized to provide additional assistance to visitors.

- The Audubon Christmas Bird Count, waterfowl banding, and numerous special tours and slide programs are conducted annually.

- Refuge areas are open to public access during the summer months.

- Off road vehicle use is prohibited on SIWA.

- Horseback riding and bicycle use is limited to roads open to public vehicle traffic.

Beach Use

The majority of the wildlife area's recorded visitor use is from beach users. The current estimate of beach visitors is over 600,000 use days annually. During the summer

months, as much as 85% of all use is beach use. Throughout the year, 55% of all visitor use is from beach users.

The beach users park on SIWA lands but recreate on the beaches owned by DSL. By cooperative land use agreement, the beaches are managed by SIWA staff. The SIWA parking permit program provides the funding for law enforcement, portable toilets, litter patrols, and facilities maintenance on the adjacent SIWA property. A Beach Use Plan, developed in 1993, and was adjudicated in 2001 by the Columbia County Circuit Court. For the purposes of this 2009 SIWA management plan, the department's beach-related management activities will remain unchanged.

Educational/Interpretive

The SIWA is used by a variety of educational groups including local and distant school districts, colleges, universities, various Scouting and other groups. Educational groups can use the area on their own or arrange for guided tours by department staff. Informational talks and slide shows are presented to many groups upon request and in conjunction with special projects.

Objectives and Strategies

Objectives and Strategies

As stated previously, objectives are concise statements of what the department wants to achieve, how much the department wants to achieve, when and where to achieve it and who will be responsible for the work. Objectives derive from goals and provide the basis for determining strategies. Strategies describe the specific actions, tools, techniques or a combination of these elements used to achieve an objective.

The goals, objectives and strategies in the plan were derived from following an ecosystem based management philosophy. The primary action for benefiting wildlife is managing or preserving the range of habitat types that naturally occurred on Sauvie Island. These habitats were created and maintained by a suite of ecological processes, most importantly hydrology. Management activities such as water level management (drawdowns and flooding) and vegetation manipulations (disking, farming, grazing, mowing, controlled burning) are tools that SIWA staff use to mimic ecological processes to create and maintain desired habitat composition. Due to the wide variety of habitat use among the different species utilizing SIWA, benefits will be varied. In addition, recreational opportunities based on public demand and habitat capabilities, balanced with resource needs, will be quite variable and specific uses will not be maximized in all cases.

Wetland habitats on SIWA occur in both unmanaged and managed units. The unmanaged wetlands occupy the largest percentage of SIWA wetland types. The managed wetlands usually occur within natural depressions and are controlled with the use of existing pumps and potentially new solar pumps, piping, levees and water control structures. Wildlife use of SIWA wetlands depends on both natural, and several man-made semi-natural habitats. Hydrologic changes have had a profound effect on

vegetative components of wetland habitats on SIWA that in turn influences wildlife and recreation use.

When analyzing the effectiveness of the department's efforts to manage habitat to benefit a particular species or guild, it is important to keep in perspective the myriad other factors out of our control that regulate wildlife populations, especially migratory waterbirds. The condition of waterfowl wintering and breeding grounds influences populations to a much greater extent than migration staging areas. SIWA provides habitat for all three life history stages, but is primarily a wintering ground for waterfowl. Waterbird habitats have undergone significant change and continue to be altered and/or enhanced. Throughout the Pacific Flyway, weather patterns affect distribution of waterbird populations, by influencing migration pattern and timing, as well as habitat use on SIWA.

Objectives and strategies emphasize maintenance and more intensive management of existing developments. Considerable emphasis is placed on new development and work continues annually to either create new wetlands or better manage historic wetlands. The intent of the wetland restoration program on SIWA is to mimic historic hydrologic regimes of the Columbia River prior to the construction and operation of upstream dams.

The following objectives and strategies are based on the three goals described earlier. They identify the management activities and priorities of the 2009 Sauvie Island Wildlife Area Management Plan.

Goal 1: To protect, enhance and manage wetland habitats to benefit fish and wildlife species.

The Willamette Valley Ecoregion is an important habitat area for migrating and wintering waterfowl in the Pacific Flyway. Food is thought to be to the factor most limiting to waterfowl survival and condition during winter. As a result, wintering area Habitat Joint Ventures, organized under the North American Waterfowl Management Plan, have developed programs that operate under the basic premise that, if food abundance is increased, demographic performance (e.g., survival) or the physiological condition (e.g. body fat) of wintering waterfowl will improve. The SIWA is an important area for wintering birds in the Lower Columbia River and Willamette Valley, both of which occur in the boundary of the Pacific Coast Joint Venture. Therefore, focusing on producing foods in managed wetland impoundments at SIWA is consistent with regional and national waterfowl management objectives and objectives for the area established by the department.

Waterfowl undergo a series of life history events during fall and winter (migration, molt, pair formation, pre-migration fat storage) and no single habitat type can meet the needs of each species during every life-history stage. Consequently, it is important to provide a complex of wetlands that includes a mix of habitat types. Presently, habitat management at SIWA emphasizes agricultural crops (corn, sudangrass, millet, wild rice). Agricultural grains provide the most energy per acre because they are easily digestible and high in carbohydrates. However, grains are nutritionally imbalanced and

research has shown that ducks cannot survive on a diet of strictly agricultural grains. Additionally, other than a few duck and goose species, comparatively few wetland species use agricultural foods. Seasonal wetlands on the other hand can produce large amounts of natural foods in the form of seeds, tubers and invertebrates that provide a diverse diet for waterfowl and other species of wetland birds. Semi-permanent wetlands provide similar types of foods, but not in the same balance because they are not as productive as seasonal wetlands. However, do not (e.g. brood rearing habitat). Canada geese and 11 species of ducks breed on SIWA and they will use semi-permanent wetlands for brood rearing habitat. Locally produced waterfowl constitute a proportion of waterfowl harvested by hunters early in the season. Given that food is thought to limit wintering waterfowl, and seasonal wetlands produce the greatest abundance of natural foods that benefit the most species, SIWA staff will emphasize this habitat type in managed impoundments. Agricultural crops are still important foods during periods of cold weather in the winter and farming operations will continue in the uplands associated with management of wetland impoundments.

Shorebirds make extensive use of the SIWA, migrating between breeding areas in the arctic and wintering areas in California and Central and South America. Immense concentrations of shorebirds can occur during brief time periods. The diversity of food resources in wetlands play an important role for a variety of shorebird species in replenishing or building energy reserves depleted or necessary during migration. In some cases, energy is being stored in preparation for the physiological demands of breeding. Strategies used to manage seasonal and semi permanent wetlands can provide quality shorebird habitat and SIWA staff will consider this when developing yearly work plans with priority to shorebird species identified in the OCS.

Over 20 species of wetland dependent and wetland obligate wildlife (i.e. waterbirds, turtles, frogs) utilize wetland habitats on SIWA. Life cycle demands and needs of breeding season, post breeding dispersal and migration are met for many species in the diverse habitats found on the wildlife area. These species forage extensively across all wetland types to build body reserves for migration, roost in shallow ponds or tall emergent vegetation or hunt prey. Again, wetland habitat management strategies will meet the spatial and temporal needs of OCS priority species found in this priority habitat of the Willamette Valley Ecoregion.

Proper functioning of Sturgeon Lake as habitat for fish and wildlife is a major concern of the department as is its value as a wildlife refuge. Sturgeon Lake and associated lakes and wetlands were statutorily designated as a wildlife refuge by the Oregon Legislature in 1937. Sturgeon Lake has been silting in since the early 1940s when the main Sauvie Island levee was constructed. During the 1980s and early 1990s a project was conducted to clear Dairy Creek and to dig a shortened channel to restore water flow to Sturgeon Lake. As previously discussed this project involved numerous federal and state entities. Unfortunately the flood in February of 1996 created blockages in Dairy Creek, greatly limiting its effectiveness in providing water flow to Sturgeon Lake. The department and West Multnomah Soil and Water Conservation District are currently considering options to restore the water flow to Sturgeon Lake. The Sturgeon Lake Restoration Planning Group will supervise the continuing progress of all the activities pertaining to the Sturgeon Lake restoration.

Sturgeon Lake

Objective 1.1: Conduct research on methods to improve the biological and hydrological function of the 3,000 acre Sturgeon Lake system and then implement these methods.

Rationale: Sturgeon Lake comprises approximately 3,000 acres of open water and wetlands. This significant habitat is recognized by the Recovery Planning process for ESA listed salmonids and is key to the restoration of certain populations of salmon and steelhead originating from many upstream subbasins. One of SIWA's highest management priorities is to restore the biological and hydrological functions of Sturgeon Lake to benefit waterfowl, listed anadromous fish and sensitive Pacific lamprey populations. The lake is situated between Eastside and Westside Units and is administratively managed as a separate entity by SIWA, under agreement with DSL. The lake comprises the largest contiguous wetland on SIWA with many acres of shallow, tidally influenced habitat and is usually inundated October through July. Over the years, the depth of the lake level has been dramatically reduced due to the lack of tidal flushing action which was disrupted by the large levee surrounding the south end of Sauvie Island. The natural water flow patterns of Sturgeon Lake have been severely altered by past development actions.

Strategy 1. Maintain a lead role in the Sturgeon Lake Restoration Planning Group. This group will supervise the continuing progress of all the activities pertaining to the restoration of Sturgeon Lake

Inside the levees

Objective 1.2: Protect, enhance and manage approximately 286 acres of palustrine seasonally flooded wetlands and convert approximately 200 acres of existing agricultural land into this wetland type to benefit waterfowl and other wetland dependent species.

Rationale: This habitat type usually occurs at higher elevations within larger units managed as semi-permanent wetlands. Water levels recede naturally as evapotranspiration occurs or as manipulated through active management action.

The shallow water habitat provided by seasonal wetlands provides foraging conditions for many species of wetland bird including rails, bitterns, and dabbling ducks. Timing of drawdown in spring months will increase the availability of invertebrates as a food source for migrating and breeding waterbirds.

Early summer drawdown creates excellent germination conditions for many species of wetland plants such as smartweed, plantain and beggartick. Reflooding these areas in late summer and early fall provide abundant food for fall migrating waterbirds. Depending on the drawdown date seasonally flooded wetlands may be

less valuable as brood rearing areas for many early nesting species but are high quality brood rearing habitat for late nesting species.

Many of the low elevation areas inside the levees are not practical to plant food crops because of poor drainage and their inability to dry out. Many of these areas are currently covered by a monoculture of reed canarygrass. SIWA staff are continuing to convert these low areas of approximately 200 acres into seasonally flooded wetlands.

Strategy 1. Regulate water to provide timely flooding and receding levels to improve food availability, maintain desirable emergent plant growth and invertebrate populations. Work will include monitoring and adjusting wetland water levels year round with special emphasis during fall and spring migration peaks.

Strategy 2. Utilize moist soil and marsh management methods to enhance habitat diversity and waterfowl foraging opportunities through ground disturbance (summer disking) to encourage annual food plant production. Work will entail drawdown and drying, on an annual or longer term interval, coupled with vegetation and soil disturbance using burning, disking, herbicides, mowing and plowing.

Strategy 3. Utilize integrated pest management to control invasive plant species, focusing on noxious weeds within and adjacent to wetland areas. Work will entail monitoring, searching for and treating infestations utilizing best management practices and techniques.

Strategy 4. In cooperation with partners, SIWA staff will continue to convert agricultural areas to seasonally flooded wetlands by removing existing reed canarygrass, conducting earth moving activities and installing any needed water control infrastructure.

Outside the levees

Objective 1.3: Protect and enhance approximately 2,922 acres of lacustrine seasonally flooded wetlands to benefit a wide variety of native fish and wildlife and desired game species.

Rationale: The physical demands of wildlife during migration and daily movements within wintering areas require that they have access to suitable locations for food and rest. This habitat type provides food, water, and sanctuary from disturbance during migration and overwintering. This is particularly important for waterfowl, both “resident” birds and migrating populations, during hunting season. Wildlife that do not have access to sanctuary areas during critical time periods are subject to a variety of disturbances that increase energetic costs, change distribution, prevent use of important habitats and force migration to wintering areas earlier than is desired or necessary. These habitats include three

of the largest wetlands and open water (Sturgeon, Crane and Cunningham Lakes) present on the wildlife area.

Strategy 1. Post the boundary of designated sanctuary areas with department signage as deemed appropriate and engage regulation process to provide regulatory protection. Continue the seasonal access restrictions as necessary to protect wintering wildlife. Work will entail providing public information at key entry sites as well as restricting motor vehicle or foot travel annually from early fall through early spring annually. The Sturgeon Lake Legislative Refuge is included in this sanctuary plan and will be maintained.

Strategy 2. Regulate vehicle use year-round to prevent damage to these habitats and limit disturbance to wintering waterfowl. Work will entail signing at key entry sites to these areas as well as enforcement and monitoring for compliance.

Strategy 3. Utilize integrated pest management to control invasive plant species, focusing on noxious weeds within and adjacent to wetland areas. Work will entail monitoring, searching for, and treating infestations utilizing best management practices and techniques.

Objective 1.4: Protect and manage 285 acres of lacustrine permanently flooded wetlands.

Rationale: Permanently flooded wetlands on SIWA are indirectly maintained primarily through the Columbia and Willamette River flows. Water depths at these sites remain relatively stable throughout the year. This habitat type is important for wintering waterfowl and brood rearing. Aquatic vegetation beds have tremendous populations of invertebrates which provide food for an array of wildlife species. Many of the permanently flooded wetlands are also augmented by pumps which SIWA staff use during the dry periods, summer through fall. There is also evidence that permanently flooded wetlands may provide over-wintering habitat for fish such as listed steelhead and Chinook salmon. Several lakes on SIWA are included in this habitat type (Aaron, Big and Little McNary, and Mud Lakes).

Strategy 1. Water levels will be maintained by use of pumps and water control structures to provide wildlife habitat and access for anglers and boaters.

Strategy 2. Utilize integrated pest management to control invasive plant species, focusing on noxious weeds within and adjacent to wetland areas. Work will entail monitoring, searching for, and treating infestations utilizing best management practices and techniques.

Objective 1.5: Protect, enhance and manage approximately 795 acres of palustrine permanently flooded wetlands.

Rationale: This habitat type is important to waterfowl and a variety of waterbirds during migration and for brood rearing for waterfowl throughout the breeding

season. Submerged aquatic plants generally fill the entire water column and harbor large populations of invertebrates. Stable water levels are important for the maintenance of fish and some invertebrate species. However, productivity of submerged aquatic plants diminishes over time, mainly due to introduced carp which overgraze submerged plants. Plant communities are also greatly affected by natural events such as flooding and drying. As needed, SIWA staff maintain habitat quantity and quality via water drawdowns or pumping. Infrastructure limitations and the influences of the two river systems present challenges to the effectiveness of the department's habitat management activities at these sites.

Strategy 1. Water levels will be monitored and adjusted year-round to provide stable to slowly receding levels to improve food availability, maintain submergent plant growth, and support desired fish and invertebrate populations. Periodic drawdowns of selected permanent wetlands on a time interval or cycle of approximately once every 8-10 years, will consolidate soils through oxidation and will accelerate decomposition of organic matter thereby enhancing site productivity.

Objective 1.6: Enhance and manage 62 acres of palustrine semi-permanently flooded and 52 acres of palustrine seasonally flooded wetland habitats.

Rationale: Along with permanently flooded wetlands, semi-permanently and seasonally flooded wetlands are commonly referred to as freshwater marsh. A wide variety of migrant and winter bird species take advantage of the diversity of food resources in these wetlands. Diving ducks and swans utilized open water areas to forage on submergent aquatic plants. Arctic nesting geese make extensive use of wetland plants both during migration and wintering and swans utilize wapato tubers throughout the winter. Seeds from both annual and perennial plants provide an abundant source of food to a wide variety of migrants, as well as breeding species.

These habitat types are important for many species of breeding waterbirds including ducks, geese, waders, secretive marsh birds, and wetland-dependent passerines. Robust emergent vegetation provides nesting substrate for many species and cover for broods and molting waterfowl. Open water areas with submerged aquatic bed vegetation provide important foraging areas for all species, especially broods. Small fish, aquatic and emergent insects and other invertebrates provide additional food for a wide variety of wildlife.

Timing of drawdowns can have immense effects on vegetation diversity, germination and productivity. A variety of dates will be explored to determine the most efficient strategy to meet vegetation density, diversity and interspersion objectives. Early summer drawdown creates excellent germination conditions for many species of wetland plants such as smartweed, plantain and beggartick. Reflooding these areas in late summer and early fall provide abundant food for fall migrating waterbirds.

Ground and vegetation disturbing activities such as disking, herbicide use, mowing and prescribed fire can result in an intricate mosaic of habitat features and increased habitat diversity. These activities will require dry conditions in order to operate heavy equipment. Those conditions may be met only through multiple year drawdowns, without seasonal flooding, especially in areas in the McNary Lake system. Extended periods of dry conditions will mimic natural and historically occurring drought cycles. Dry conditions combined with subsequent ground and vegetation disturbing activities increase the stress to and reduce the vigor of dense tall emergent vegetation. Hunting and viewing access and opportunities will be enhanced long-term. However, during management actions and activities, wildlife area users will experience short -term loss of opportunity in accustomed or traditional site-specific locations. Hunting and viewing access and opportunities will be enhanced long-term through these activities. However, during these management actions and activities, Area users will experience short -term loss of opportunity in accustomed or traditional site-specific locations.

Strategy 1. Regulate water to provide timely flooding and receding levels to improve food availability, maintain or enhance emergent and submergent plant growth and invertebrate populations. Work will include monitoring and adjusting wetland water levels year-round. These activities will occur annually across the entire area in conjunction with and complimenting other strategies.

Strategy 2. Utilize moist soil and marsh management methods to enhance habitat diversity, improve open water to vegetation ratios and interspersion, thereby increasing waterfowl foraging opportunities. This will occur on 20-60 acres annually and will result in the set-back of dense tall emergent vegetation and reed canarygrass. This set-back activity will foster the availability and growth of desired native wetland plant species. Work will entail drawdown and drying, on an annual or longer term interval, coupled with vegetation and soil disturbance using herbicides, disking, mowing and plowing.

Strategy 3. Utilize integrated pest management to control invasive plant species, focusing on noxious weeds within and adjacent to wetland areas. Work will entail monitoring, searching for and treating infestations utilizing best management practices and techniques.

Strategy 4. Utilize livestock grazing to enhance habitat diversity, food availability and waterbird foraging opportunities. Work will entail monitoring timing and duration of grazing, as well as maintenance of temporary and/or permanent fences to control livestock in target areas. Periodic or cyclic (once every 5-10 years) grazing will be utilized to invigorate decedent stands of vegetation and to enhance productivity where feasible.

Objective 1.7: Protect approximately 161 acres of riverine wetlands to benefit a wide variety of fish and wildlife species.

Rationale: Riverine wetlands occur along the Columbia, Willamette and Gilbert Rivers, Multnomah Channel, and Dairy Creek. Riverine habitats support a variety of

invertebrates and fish species. During high flow events, these waterways provide access to interior wetlands that offer critical refugia for listed anadromous fish. These habitats are recognized by the Recovery Planning process for listed Columbia River salmonids as key to the restoration of many of these populations of fish. These wetlands also play a vital role in supplying water to SIWA's water delivery system which is used to manage other wetland habitat types.

Strategy 1. Continue visual monitoring of riverine wetlands to address and prevent impacts due to human-caused disturbance (i.e. vegetation removal, trail-building, littering).

Strategy 2. Improve adjacent riparian vegetation and reduce erosion through plantings of woody vegetation along the wetland edge in those areas not managed for goose forage.

Strategy 3. Explore opportunities to increase the availability of off-channel, flooded refugia to benefit listed fish species, through creating or restoring hydrologic connection to historic flood channels.

Objective 1.8: Maintain and improve critical physical and functional infrastructure affecting wetland and water management activities within and outside the levees.

Rationale: Physical infrastructure is essential for water level management and subsequent habitat management across all wetland habitats. Such physical infrastructure includes pumps, piping, dikes and levees, culverts, flashboard risers, other water control structures and rock spillways.

Functional infrastructure (canals, channels and ditches) is necessary to control water delivery to inundate (flood) or drain wetlands. Most wetland habitat objectives and strategies rely on effective, efficient and timely water level manipulations. This capability is critical and necessary to implement nearly all habitat enhancement and management actions. Improving SIWA's water use and delivery system is an important conservation action recommendation specifically described in the OCS.

Vegetation response and subsequent desired wildlife use are tied to water levels, more specifically to the timing of drawdowns and flooding. Infrastructure maintenance and improvement will ultimately enhance and improve wetland condition and function. These actions will assist in meeting direction and goals of Pacific Coast Joint Venture, Pacific Flyway Species Population management, and other state, local or federal agency implementation plans involving wetland management and protection. Coordination with appropriate agencies and organizations will occur.

The water use and delivery system infrastructure is also critical for providing many fish and wildlife-related recreational opportunities. The maintenance and improvement of these systems is required to maintain or expand these recreational activities.

Strategy 1. Maintain and improve physical infrastructure through annual maintenance. Work will include using heavy equipment to stabilize and repair

erosion damage, repair burrowing rodent damage on dikes and levees, replace and repair flashboard riser structures, grade dike tops and mow vegetation. Pumps, piping, culverts, flashboard risers and other water control structures will be repaired, replaced and improved as necessary.

Strategy 2. Maintain and improve functional infrastructure through annual maintenance of canals, channels, ditches and water control structures. Work will include using heavy equipment to remove accumulated silt and invasive vegetation, monitoring water flows/distribution and removing debris and obstructions in canals, channels, ditches and at water control structures.

Strategy 3. Redesign flashboard riser and culvert locations in areas as appropriate to improve drainage and flooding of wetland units. Work will include using heavy equipment to install additional or relocate existing structures.

Strategy 4. Explore opportunities to improve energy efficiency and to develop additional water use and delivery infrastructure to improve the ability to manage wetland habitats or support fish and wildlife-related recreation. Work will include investigating opportunities to better utilize groundwater resources.

Goal 2: To protect, enhance and manage upland habitats to benefit a wide variety of wildlife species.

The department's upland habitat management priority is to provide habitat, specifically pastures, to hold wintering geese to minimize depredation on private lands. In addition, SIWA upland habitats contain grassland/pasture, oak woodland/savannah and riparian/bottomland hardwood forests, agriculture. Oak habitats, grassland and riparian forest habitats are Strategy Habitats as defined by the OCS.

Objective 2.1: Enhance habitat carrying capacity for wintering Canada geese by reviewing current habitat management practices on 1,800 acres of pasture and 1,316 acres of agricultural crops.

Rationale: Significant amounts of the natural grasslands on SIWA were altered or converted to croplands or pastures by early homesteaders, to support agricultural or livestock grazing operations. These agricultural activities continued up to the department's acquisition of SIWA and still continue on portions of the wildlife area.

Many wildlife species forage on the seeds, vegetation and invertebrates found in croplands and pastures. Breeding wildlife species (primarily passerines) occur in this structurally diverse and species rich vegetation. Any trees found in this habitat will only be removed if required by law, are safety concerns or to meet agency-directed policy.

Pastures and agricultural crops are critical for the management of wintering waterfowl, especially geese. The pastures are maintained to provide green forage for wintering geese, to keep geese on the wildlife area, and to reduce depredation on private

agricultural lands. Native and non-native vegetation (primarily reed canarygrass and Himalayan blackberry) dominate pastures. Removal of this non-native vegetation could increase habitat available for goose forage.

Many wetlands occur adjacent to pastures and agricultural areas. Ground nesting waterbirds and other birds typically use the edges of the pastures and crop areas for nesting cover because the vegetation provides structure and protection from predation and disturbance. Importantly, newly hatched broods have reduced exposure to predation as they travel from upland nests to wetlands.

SIWA staff plant crops to ameliorate limited habitat features and increase the carrying capacity of these sites to benefit desirable game species. A wide variety of native wildlife benefit as well. Small cereal grains, forbs and tree and shrub plantings provide abundant food for many species. Trees and shrubs are limited in this habitat type and additional plantings enhance wildlife diversity. Other landscape features can be developed to further increase carrying capacity and expand distribution and habitat use for many species. Alfalfa is used to improve soil condition and produce quality feed for wintering geese. In recent years, SIWA staff and partnering entities have restored several hundred acres of agricultural land to wetlands.

Strategy 1. Identify pastures and crop areas which are within SIWA management control and those which are impacted by periodic flooding. Strive to increase goose pasture carrying capacity by 20% by evaluating current pasture quality, field size and landscape composition. Verify areas which have the proper soil characteristics, topography and hydrology for optimum growing conditions. Monitor current goose utilization and use this information on conditions preferred by geese to modify existing pastures to increase green forage areas.

Strategy 2. Seed desirable grasses and forbs where restoration/rejuvenation activities would succeed. Work will include the use of herbicide application, grazing and controlled burning to restore vigor of existing plantings. This will be followed by broadcast seeding or farming with tractors and implements to establish desirable vegetation for goose forage.

Strategy 3. Annually plant and maintain up to 1,200 acres of food plots (corn, sudangrass, millet, sunflowers, wild rice, buckwheat and other small grains) for waterfowl use. Alfalfa and hay crops will be planted primarily to provide quality green forage for geese. Work will include soil preparation, planting, and cultivation of food crops. This work will primarily be conducted by sharecrop and grazing permittees.

Strategy 4. Utilize livestock grazing to enhance and restore plant vigor and reduce mowing time on pasture lands used primarily by wintering geese. This work will primarily be conducted by sharecrop and grazing permitees who are also required to control noxious weeds.

Strategy 5. Utilize integrated pest management to control invasive plant species, focusing on noxious weeds. Special emphasis will be placed on the control of Himalayan blackberry. Work will entail monitoring, searching for and treating infestations utilizing best management practices and techniques.

Strategy 6. Continue to follow agricultural Best Management Practices and Integrated Pest Management for all agricultural operations. The agricultural techniques and crops used as part of the SIWA farming program will be periodically reviewed to determine which are most beneficial to wildlife. Crop irrigation will be considered as part of the agricultural program.

Strategy 7. Water discharged from agricultural areas will be periodically monitored to assure compliance with water quality standards administered by the Oregon Department of Environmental Quality

Objective 2.2: Maintain and improve the quality of 193 acres of existing Willamette Valley oak woodlands and oak savannah.

Rationale: Oak woodlands and oak savannahs are defined as a Strategy Habitats in the OCS and as such are considered to be of high conservation priority, especially in light of the pressure in the Willamette Valley to develop oak woodlands. Recommended conservation actions include conserving and/or restoring oak woodland habitats to conserve ecological values. Oak habitats provide important habitat for more than 100 breeding migratory bird species.

Strategy 1. Manage oak woodlands and savannahs to promote natural oak regeneration and succession using methods such as conifer removal, thinning and plantings, and controlled burns where appropriate.

Strategy 2. Continue adaptive management to maintain and improve woodland habitats using techniques including periodic fire, manual removal of invasive species and woody vegetation (i.e. Himalaya blackberry), inter-planting of native species, herbicide application, and/or mechanical soil cultivation.

Strategy 3. Establish partnerships with other resource protection entities to ensure long term sound stewardship of sensitive and unique habitats. Potential partners for exchange of technical expertise and resources include Oregon State University, The Nature Conservancy, USFWS, Audubon Society, WMSWCD and private landowners.

Objective 2.3: Maintain 3,287 acres of riparian/bottomland hardwood forest and improve the quality of these habitats.

Rationale: These habitat types comprise the largest amount of acreage on the wildlife area. The predominate plant species are black cottonwood, Oregon ash and willow. Some of the Oregon ash trees are over two hundred years old and have survived both natural and human-caused alterations. The remnant hardwoods found on SIWA are representative of the original species complexes found in this ecoregion. These are

important habitats for breeding, migrating and wintering waterfowl and nesting passerines, raptors and waterbirds. Additionally, when these bottomland habitats are inundated during winter and spring, they offer substantial habitat for a variety of important fish species. The OCS refers to this habitat as Columbia River bottomlands. The OCS recommends several conservation actions which the department is already pursuing, such as maintaining and restoring riparian habitat and ecological function, ensuring habitat complexity and improving water delivery to SIWA.

Strategy 1. Continue adaptive management to maintain and improve riparian/bottomland hardwood forest habitats using methods including silviculture techniques, grazing, fire, mowing, manual removal of invasive species, planting native species and herbicide application. All of these techniques are primarily used to control non-native invasive vegetation.

Strategy 2. Monitor trees which may be a safety hazard and remove only if necessary. If trees are removed, they may be used on the wildlife area for wildlife habitat needs such as turtle basking structures, downed wood, etc. Trees may also be removed when required for administrative reasons; for example, to maintain the structural integrity of US Army Corps regulated levees.

Strategy 3. Monitor and control noxious weeds, especially Himalayan blackberry and reed canarygrass, on levees and other wildlife area lands according to state and federal regulations.

Strategy 4. Maintain and construct wood duck nest structures. Work includes identifying areas where nest habitat is deficient with subsequent construction and placement of structures.

Objective 2.4: Restore approximately 50 acres of native grasslands, an OCS priority habitat.

Rationale: As previously mentioned, significant amounts of the native grasslands on SIWA were altered or converted to croplands or pastures by early homesteaders, to support agricultural or livestock grazing operations. Remnant grassland plant species still exist, primarily on Oak Island and in the North Unit, and are interspersed within upland pastures and agricultural areas. Native grasslands are considered a Strategy Habitat as defined in the OCS. The opportunity to restore native grasslands exists in some limited areas on SIWA which are not utilized by geese. The intent is to provide approximately 50 acres of grassland habitat to benefit at risk native birds such as the western meadowlark and streaked horned lark and other ground-nesting species.

Strategy 1. Develop a native grassland management plan that will identify potential restoration sites on SIWA.

Strategy 2. Prepare restoration sites using mechanical removal, herbicide application and controlled burning to reduce invasive species (primarily reed canarygrass and Himalayan blackberry).

Strategy 3. Plant native grassland species (e.g. tufted hairgrass, western fescue, common camas, lupine). Work will include necessary ground preparation, seeding and plant care until establishment.

Objective 2.5: Maintain and enhance SIWA facilities, structures, and equipment used to conduct habitat management, public use projects and other administrative functions.

Rationale: Facilities, structures and equipment are integral to the overall operation of SIWA. Infrastructure and equipment must be maintained and kept in good working order to implement habitat and wildlife management projects and to provide public use opportunities. Infrastructure includes the Headquarters and Eastside Unit shop complexes, associated residences and outbuildings. Equipment includes heavy equipment, dump truck, tractors, backhoe, road grader, bulldozer, agricultural implements, vehicles, ATVs, trailers, boats and shop tools.

Strategy 1. Maintain current Headquarters and Eastside Shop Complexes including outbuildings, 7 residences, 3 Volunteer Host sites and associated utility infrastructure. Work will include carpentry and repair, improvement of storage, landscape maintenance, and general facility structural maintenance and improvement.

Strategy 2. Conduct annual property inventories and maintain operational integrity of facilities, structures, equipment and vehicles. Work will include conducting and reporting inventories, completing scheduled maintenance of all equipment/vehicles and completing repair and upgrades as necessary.

Strategy 3. Continue water management practices to meet wildlife area habitat goals and objectives. Work includes exercising water rights, and completing monthly measurement or estimates and annual reporting of authorized water rights use on SIWA to the Oregon Water Resources Department. Operate and maintain fish screens on the Gilbert River water diversions and monitor fish passage devices on applicable water control structures.

Strategy 4. Continue proactive project administration actions and activities to address easement, property boundary encroachment and other issues affecting or impacting wildlife area operations. Work will include identifying issues, preparing briefing documents and soliciting outside and internal assistance where appropriate**.**

Goal 3: To maintain waterfowl hunting programs and to provide a variety of other fish and wildlife-oriented recreational and educational opportunities to the public that are compatible with Goals 1 and 2.

Public hunting was one of the primary reasons for the purchase and creation of SIWA, in addition to protecting waterfowl habitat. Other wildlife-oriented recreational opportunities (trapping, angling, wildlife viewing, wildlife photography, hiking and dog

training) will be provided when such activities do not conflict with the main mission (waterfowl habitat) of the wildlife area.

Objective 3.1: Provide approximately 165,000 hunting, trapping, and angling use days annually.

Rationale: SIWA, because of its close proximity to the growing Portland Metropolitan Area, is a popular destination for hunters, anglers and trappers. As the amount of wildlife habitat decreases throughout the Willamette Valley Ecoregion and public access becomes more limited, SIWA will become an increasingly important natural resource. The department intends to manage SIWA's habitats and programs to accommodate current levels of hunting, angling and trapping (165,000 use days annually). Since one of the department's top priorities is to preserve the hunting legacy for future generations, SIWA staff will continue to provide and promote various hunting opportunities.

The SIWA is funded by the Federal Aid to Wildlife Restoration Act (Pittman-Robertson, 60%) through funds generated by the sale of hunting-related equipment, Oregon hunting license revenues (20%) and SIWA Parking Permit revenue (20%).

Hunting is a major public activity at SIWA during fall through winter months. Appropriate hunter behavior and shooting effectiveness are critical to the successful hunting experience and equitable use and enjoyment of resources by all area hunters. Users have voiced concerns regarding poor hunter behavior and a decline in effectiveness. Observational data collected by SIWA and OSP staff confirm the need for behavioral improvement. Educational approaches will be actively pursued by SIWA and regulatory enforcement will be applied when applicable.

Hunting has occurred in traditional areas with very little sanctuary or refuge boundary modification since the wildlife area's inception. The most recent changes occurred in 1987. Habitat management objectives may necessitate the need to move or rotate sanctuary areas and open new hunting areas when large-sized HMUs are taken out of production for moist soil management habitat enhancement activities.

Trapping of furbearers and predatory mammals is a traditional recreational activity, at SIWA and is used to reduce burrowing damage to dikes and water control structures and manage populations of predatory mammals on the area. Trapping is by permit only and permits are issued from the wildlife area headquarters staff.

Angling is an important recreational activity on the wildlife area. The department's NWWD fisheries biologists work with SIWA staff to manage fish populations, maintain existing angler access facilities, explore additional access and promote additional angler opportunities.

> **Strategy 1.** Continue the daily hunt programs that include black-tailed deer, mourning dove, Wilson's snipe, coot, pheasants, quail, and waterfowl hunting (youth waterfowl and general duck and goose hunting seasons). Maintain the closure for hunting of furbearers, predators, unprotected and protected wildlife

(except black-tailed deer and game birds). Work will include annually providing recommendations for seasons, program opportunities and SIWA's hunt area operation procedures.

Strategy 2. Continue the hunter permit system for tracking hunter use and success on the wildlife area. This includes the Eastside and Westside staffed check stations for waterfowl hunting and the existing hunter self-check systems in other areas. Review these programs over time to identify improvements acceptable to both the agency and the hunting public. Annually monitor hunting use of the area to review and possibly revise wildlife area hunting regulations to enhance the quality and safety of the hunting program.

Strategy 3. Maintain parking areas, informational kiosks, hunter check stations, fencing and boat access sites necessary to facilitate the hunting program.

Strategy 4. Conduct waterfowl counts and monitor wildlife population levels, distribution, and use patterns. Maintain a database for comparative analysis. Report results to staff and provide information to SIWA users. Work includes aerial counts, data analysis and recording, and reporting hunt results via telephone recording, web-site and posted documents.

Strategy 5. Continue and expand hunter education programs to improve hunter behavior and effectiveness. Work includes providing information regarding shooting skills and distance estimation verbally through hunter contacts, on kiosks and in the waterfowl check stations. Distance estimation silhouettes will be placed at two waterfowl check stations.

Strategy 6. Continue to provide area information to the public through web page postings, brochures, maps, signage and hunting and fishing regulation booklets.

Strategy 7. Maintain the travel management plan for SIWA to lessen impacts of motor vehicle and off-highway motor vehicle (OHV) use. Work includes clearly posting a core network of public access roads as well as administrative access-only roads. Other non-essential roads and trails will be physically (with equipment) or administratively (through signing) closed to all motor vehicle use.

Strategy 8. Identify and evaluate opportunities potential for improving SIWA's disabled hunter access program.

Strategy 9. Develop and maintain relationships with hunting constituent groups/organizations to assist with wildlife area management.

Strategy 10. Continue to conduct furbearer and predatory mammal trapping by permit for administrative (damage control), biological (population management) and recreational purposes.

Strategy 11. Continue to designate sanctuaries and impose access restrictions to provide for the biological needs of waterfowl, to accommodate habitat enhancement actions and permit orderly and equitable utilization during the hunting season.

Strategy 12. Periodically translocate desirable game (e.g. ring-necked pheasants) and (California quail) wildlife to SIWA to augment existing populations.

Strategy 13. Provide access for anglers, as compatible with seasonal waterfowl sanctuary closures, by maintaining trails and footbridges for river and lakeshore access and maintaining boat launch sites. Explore opportunities to improve angling access (especially for ADA anglers) and maintain parking areas, informational kiosks and fencing as part of the fishing program.

Strategy 14. Continue to partner with Columbia County Sherriff's Department and Oregon State Police to provide for regulatory enforcement.

Objective 3.2: Maintain the existing level of 300 individual dog training permits and 50 days of permitted field dog trials, annually, to assure that these activities do not conflict with current and future habitat management objectives.

Rationale: Two dog training plans (Individual Dog Training Plan and Dog Trial Plan) currently guide activities on SIWA. As stated in both dog plans, it is the department's policy to permit "field trials and individual dog training on designated units of SIWA provided the activities are compatible with state regulations and wildlife area objectives." The department recognizes that individual dog training and field trials encourage practices and techniques that enhance the tradition and quality of hunting and reduce the incidence of un-retrieved game.

These plans and the current amount of permitted use were developed during the 1993 SIWA long range management planning process by a working group of members of the dog training community and the department. There have been adjustments to the plan over time and further review will occur only as specific management conflicts arise. The department intends to maintain the current number of individual dog training permits (300) and number of days of field trials (50). Individual dog training occurs only on the Westside Unit while field trials occur on both Westside and Eastside Units.

Strategy 1. Continue the individual dog training annual permit process and adjust if conditions warrant (i.e. high water, waterfowl use patterns and administrative actions).

Strategy 2. Continue to annually convene a meeting of dog trial sponsors at SIWA to cooperatively schedule dog trial events. If conflicts arise, SIWA staff will work with these parties to resolve such issues.

Objective 3.3: Provide 100,000 wildlife viewing, wildlife oriented education and interpretation use days annually, compatible with Objective 3.1 and habitat management objectives.

Rationale: Wildlife viewing constitutes a significant portion of the public use on the wildlife area. Wildlife-oriented education and interpretation are critical to inform and educate the public of the wildlife area's natural resources and management actions. SIWA staff are challenged to provide ever increasing levels of access, infrastructure and information requested by the public. SIWA will seek to expand opportunities for interpretation and environmental education that will foster visitors' appreciation, understanding, and stewardship of the wildlife area's fish and wildlife species and their associated habitats. Currently, SIWA is maintained entirely by funds generated from hunters, through Federal Aid and hunting license revenue, and SIWA Parking Permit Program revenues. In order to meet continued maintenance needs it will be necessary to explore additional funding or support resources.

Strategy 1. Maintain public facilities during the non-hunting period to provide opportunities for wildlife-oriented users. Work includes posting signs and maintaining viewing blinds, overlooks, nature trails, kiosks and parking areas.

Strategy 2. Continue to provide wildlife area information to the public through web page postings, weekly recreational reports, other media publications, bird checklists, brochures, maps, regulations, and species backgrounders.

Strategy 3. Continue participation in the Fish and Wildlife Host and Northwest Region Volunteer Program to maintain volunteers to enhance the public use program and address other wildlife area needs.

Strategy 4. Provide guidance and support to educational institutions, civic groups, conservation entities and state/federal agencies. Support includes providing facilities, tours and presentations for outdoor educational and training purposes.

Strategy 5. Maintain the existing car counter system to monitor public use.

Strategy 6. Develop and/or expand internship programs with colleges and universities to support education, management, inventory and monitoring needs.

Strategy 7. The trap shooting area will be maintained on the Westside Unit during the open public use period.

Strategy 8. SIWA seasonal closure periods will be maintained from October 1 through May 1 to protect wintering waterfowl. Wintering waterfowl use will be monitored and closure periods could be adjusted accordingly (note that current data indicates a closure may need to be extended through May 15 in certain areas to protect wintering cackler geese). The public wildlife viewing areas at Coon Point, Eastside viewing platform, Rentenaar Road, Gilbert River dock and

Disabled Fishing Pier, and the Columbia River beaches will remain open year around.

Strategy 9. Daily closure periods will be maintained on SIWA from the hours of 10:00 PM to 4:00 AM to maintain security of the wildlife area and limit disturbance associated with public use to neighboring private landowners.

Strategy 10. Maintain temporary portable restrooms to serve user needs, and explore options to fund permanent self-decomposing restroom facilities.

Strategy 11. Continue to partner with Columbia County Sheriff's Department and Oregon State Police to provide for regulatory enforcement

Strategy 12. Continue to allow camping, by permit only, on Oak Island from May-September. Only youth educational groups are authorized to camp at SIWA and these groups are required to perform a beneficial public service project (i.e. litter pick-up, invasive plant removal, trail maintenance) on the wildlife area. No open fires will be are permitted.

Goal 4: To control other public uses to minimize impacts on fish and wildlife, their habitats, and fish and wildlife related recreation and to maintain the security of the wildlife area and reduce disturbance to neighboring private lands.

Non-wildlife oriented public uses are increasing each year as the population of the Portland Metropolitan Area grows. These other uses include beach use, windsurfing, horseback riding and bicycling among others. Beach use constitutes the largest public use of the area. Along with rising numbers of visitors, SIWA staff has observed significant increases in littering and vandalism. Innovative approaches to control visitor numbers will need to be implemented when public use jeopardizes the primary mission of SIWA.

Objective 4.1: Manage public use to minimize disturbance to wildlife species on SIWA.

Rationale: Many strategies listed under Objective 3.3 are similar to those listed for this objective. Beach use and non-wildlife oriented recreation are highly desirable to the public and the demand for these opportunities is increasing. Over the next ten years these activities will potentially impact SIWA's core mission of protecting fish and wildlife and their habitats for use and enjoyment by present and future generations of visitors. These public uses must be managed. Increased educational and informational efforts will be necessary to enhance enjoyment while affording protection for natural resources. SIWA will seek to expand opportunities for interpretation and environmental education that will foster visitors' appreciation, understanding, and stewardship of the wildlife area. Public education will focus on protecting key OCS and state sensitive species such as wintering waterfowl, sandhill cranes, raptors and listed fish runs.

Currently, SIWA is maintained largely by funds generated from hunters, through the Federal Aid for Wildlife Restoration program, Oregon hunting license purchases and

SIWA Parking Permit fees. In order to meet continued needs for maintenance and facilities to support non-hunting public uses, it will be necessary to explore additional funding or support resources. Public use associated with beach recreation is funded completely by the parking permit program. No Federal Aid funds can be utilized for beach use purposes.

Strategy 1. Manage public use compatible with the biological needs of wildlife and the wildlife area's hunting program.

Strategy 2. Continue to monitor public use of the wildlife area through the existing car counter system. Explore options to regulate the number of non-wildlife related recreational visitors if use exceeds one million visitor days annually.

Strategy 3. Maintain public facilities during the non-hunting period to provide for safe, enjoyable and healthy opportunities for visitors. Work includes posting signs and maintaining portable toilets, kiosks and parking areas.

Strategy 4. Continue to provide wildlife area information to the public through web page postings, weekly recreational reports, other media publications, bird checklists, brochures, maps, regulations, and species backgrounders.

Strategy 5. Continue participation in the Fish and Wildlife Host and Northwest Region Volunteer Program to maintain volunteers to enhance the public use program and address other wildlife area needs.

Strategy 6. Boating use includes both power boats and paddlers (canoe and kayak). The boating use on SIWA has been increasing in popularity over the past few years and options need to be explored to potentially develop additional facilities to accommodate this use. Existing boat ramps at Oak Island, Steelman Lake, Round Lake and Gilbert River will be maintained.

Strategy 7. Maintain a travel management plan for SIWA, to lessen impacts of motor vehicle and off-highway motor vehicle (OHV) use.

Strategy 8. Restrict the use of horses and bicycles will be to areas which are open to public vehicle traffic, to minimize impacts to habitats.

Strategy 9. SIWA seasonal closure periods will be maintained from October 1 through May 1 to protect wintering waterfowl. Wintering waterfowl use will be monitored and closure periods could be adjusted accordingly (note that current data indicates a closure may need to be extended through May 15 in certain areas to protect wintering cackler geese). The public wildlife viewing areas at Coon Point, Eastside viewing platform, Rentenaar Road, Gilbert River dock and Disabled Fishing pier and the Columbia River beaches will remain open year around.

Strategy 10. Daily closure periods will be maintained on SIWA from the hours of 10:00 PM to 4:00 AM to maintain security of the wildlife area and limit disturbance associated with public use to neighboring private landowners.

Strategy 11. Maintain temporary portable restrooms to serve user needs, and explore options to fund permanent self-decomposing restroom facilities.

Strategy 12. Continue to partner with Columbia County Sherriff's Department and Oregon State Police to provide for regulatory enforcement.

Strategy 13. Continue to allow camping, by camping permit only, on Oak Island from May-September. Only youth educational groups are authorized to camp at SIWA and these groups are required to perform a beneficial public service project (i.e. litter pick-up, invasive plant removal, trail maintenance) on the wildlife area. No open fires will be permitted.

Strategy 14. Maintain membership in the Sauvie Island Safety Action Team.

Objective 4.2: Initiate a review of the SIWA parking permit program to determine its effectiveness.

Rationale: The SIWA Parking Permit Program has been in place since 1990. Parking permit fees provide the funds to maintain safe, healthy and enjoyable recreational opportunities and support services such as law enforcement, portable toilets, inmate litter patrols, facilities maintenance and program administration. The parking permit fee has remained unchanged since its inception so revenues to support these services have not increased significantly over time. With increasing public use and rising maintenance costs, current service levels cannot be maintained without additional financial resources.

Strategy 1. Maintain the current SIWA Parking Permit Program and explore a possible funding increase to provide base services to the public.

Objective 4.3: Continue implementation of the 1993 SIWA beach use plan.

Rationale: The current Beach Use Plan is adjudicated through the Columbia County Circuit Court. Any action the department takes that significantly deviates from the 1993 Beach Use Plan must be reviewed by the court.

Strategy 1. Implement the current Beach Use Plan as directed by the Columbia County Circuit Court. Options may be explored to limit the number of visitors to the beaches as use increases.

Plan Implementation

Funding

Since its inception in 1947, funding for the operation and maintenance of the SIWA has been accomplished through an annual federal grant under the Federal Aid to Wildlife Restoration Program. This program was created with the passage of the Pittman-Robertson (PR) Act in 1937. The PR Act authorizes the U.S. Fish and Wildlife Service to cooperate with the states, through their respective state fish and wildlife departments, to fund wildlife restoration projects. Eligible types of projects include restoration, conservation, management, and enhancement of wild birds, wild mammals and their habitats, and providing for public use and benefit from these resources.
Federal Aid funding is derived from a federal excise tax on the sale of firearms, ammunition, and archery equipment. Funding is then apportioned to states based on a mathematical formula of area of the state in square miles (50%) and total number of hunting licenses sold annually (50%). Under the program no state may receive more than 5%, nor less than 0.5% of the total money available.

To be eligible, states must have assented to the provisions of the PR Act and passed laws for the conservation of wildlife that include a prohibition against the diversion of license fees paid by hunters for any other purpose than the administration of the State fish and wildlife department. Another major requirement is that states have to contribute up to 25% of the total grant cost using non-federal funds, since federal participation is limited to 75% of eligible costs incurred under a grant. The department provides its 25% cost share from annual license and tag revenues. An additional source of funding for SIWA habitat related projects and equipment comes from state Game Bird Stamp revenues.

Over the past five years, funding for the operation and maintenance of the SIWA has averaged approximately $750,000 annually. To implement many of the proposed actions and achieve the objectives and goals of this plan, the department will need additional funding and staff to undertake several types of projects including: upgrades of existing facilities, habitat improvement, construction of new facilities or amenities (educational/orientation kiosks and interpretive signs), and species and habitat monitoring.

Staffing / Organization

The Oregon Department of Fish and Wildlife manages sixteen major wildlife areas throughout the state. The wildlife areas encompass approximately 200,000 acres and are found in all four of the department's administrative regions. The Sauvie Island Wildlife Area is located in the Northwest Region, in the North Willamette Watershed District. One full-time Manager 2**,** one full-time Fish and Wildlife Supervisor, two full-time Fish and Wildlife Senior Technicians, two full-time Fish and Wildlife Technicians, one full-time Office Coordinator and one seasonal (six month) Fish and Wildlife Technician currently staff the area.

Compliance Requirements

The 2009 Sauvie Island Wildlife Area Management Plan was developed to comply with all Federal and State laws, Oregon Revised Statutes (ORSs), Oregon Administrative Rules (OARs), and department policies. Full implementation of all components of this plan will require compliance with laws, regulations, rules, and policies listed in Appendix F.

Partnerships

A number of other state, federal, and local agencies and interest groups assist with management activities on SIWA. A list is below. These partners play an important role in helping the department achieve its mission and reach SIWA goals. The department will continue to rely on these and other partners in the future to help implement this plan and provide input for future updates. This plan identifies projects that provide new opportunities for existing or new partners. There is great potential for more public participation and assistance in the management of the wildlife area, given its proximity to the Portland Metropolitan Area. The department welcomes and encourages more public participation in the administration of the wildlife area.

U.S. Fish and Wildlife Service
U.S. Army Corp of Engineers
NOAA Fisheries
Natural Resource Conservation Service
Northwest Oregon Resource Conservation and Development Council
Oregon Department of State Lands
Oregon Department of Environmental Quality
Washington Department of Fish and Wildlife
West Multnomah Soil and Water Conservation District
Sturgeon Lake Restoration Planning Group
Oregon State University
Portland State University
University of Portland
Portland Metro
Columbia County
Multnomah County
Oregon Farm Bureau
Sauvie Island Conservancy
Sauvie Island Boosters
Sauvie Island Grange
Oregon Duck Hunters Association
Ducks Unlimited
Oregon Hunters Association
Oregon Bass and Panfish
Audubon Society of Portland
The Nature Conservancy
Oregon Equestrian Trails
Lower Columbia River Estuary Partnership
Paddling Clubs
Dog Clubs
Clothing Optional Beach User Clubs

Adaptive Management

This plan provides for adaptive management of the wildlife area. Adaptive management is a flexible approach to long-term management of resources that is directed by the results of ongoing monitoring activities and latest data. Management techniques and strategies are regularly evaluated in light of monitoring results, new scientific understanding, and other new information. These periodic evaluations are used over time to adapt both management techniques and strategies to better achieve the area goals.

Monitoring is an essential component of adaptive management in general, and of this plan in particular. Specific monitoring strategies have been integrated into the goals and objectives described in this plan whenever possible. Where possible, habitat management activities will be monitored to assess whether the desired effects on wildlife and habitat components have been achieved.

Plan Amendment and Revision

Wildlife area management plans are meant to evolve with each individual wildlife area, and as such each plan will be formally revisited after five years and updated every ten years. In the meantime, however, the department will be reviewing and updating this plan periodically (at least as often as every five years) based on the results of the adaptive management program. This plan will also be informally reviewed by area staff while preparing annual work plans. It may also be reviewed during routine inspections or programmatic evaluations. Results of any or all of these reviews may indicate a need to modify the plan. The goals and objectives described in this plan will not change until they are re-evaluated as part of the formal plan revision process. However, the strategies may be revised to better address changing circumstances or as a result of improved knowledge of the resources on the area. If changes are required, the level of public involvement and associated compliance requirements will be determined by the department.

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Appendix A. Land Acquisitions and Adjustments Involving the Sauvie Island Wildlife Area

Date	Acres	Action	Cooperator
02/16/40	5.14	Acquired from	Feldman
03/16/48	489.09	Acquired from	Rentenaar, Milo
05/05/48	904.58	Acquired from	Lyons, Max
10/18/48	200.42	Acquired from	Domeyer, George
11/12/48	18.78	Acquired from	Dietz, J
12/15/48	174.00	Acquired from	Sauvie Island Duck Club
01/11/49	5.65	Acquired from	Grea, John
04/05/49	146.00	Acquired from	Oregon Iron & Steel Co
05/00/49	67.59	Acquired from	Cooper, Kenneth L
05/23/49	283.43	Acquired from	Col Co Lumber Co
05/00/49	164.34	Acquired from	Johnston, David A
06/23/49	31.38	Acquired from	Jensen, Irving
06/00/49	23.90	Acquired from	Bollenbeck, Clarence
06/27/49	5.76	Acquired from	Hall, Albert S
08/09/49	48.20	Acquired from	Giselman & Carlson
10/17/49	669.52	Acquired from	Pope & Talbot Inc
11/22/49	125.29	Acquired from	Minoggie, E & Hadley
03/22/50	109.10	Acquired from	Harder, J M
06/02/50	59.00	Acquired from	Brennan, Robert
06/30/50	135.14	Acquired from	Stonebrink, Melvin
10/31/50		Quitclaim	Minoggie & Hadley
10/31/50		Quitclaim	Smith, Ruth
12/29/50	392.00	Acquired from	Stutzer, Klem
01/31/51	19.60	Acquired from	Watson, Ella
06/29/51	411.02	Acquired from	Smith, John Estate
04/29/52	266.50	Acquired from	Browning, Charles
07/23/52	4.40	Acquired from	Columbia County
10/31/52	898.72	Acquired from	Ferrell, Jessie & Et Al
01/31/53	5.80	Acquired from	Dillon, L & Fisher
04/24/53	940.00	Acquired from	Autzen & Woerner
04/27/53	145.48	Acquired from	Malarkey/US BK Comrie Est
04/27/53	150.00	Acquired from	Collins, John
05/19/53	80.00	Acquired from	Aaron, James Et Al
06/09/53	12.98	Acquired from	Watters, Henry
04/15/54	363.97	Gift from	John Blodgett Jr
03/15/54		Quitclaim Gift	Blodgett Jr, John
02/21/56	5.14	Acquired from	Schoop, E Henrici EST
09/24/56		Quitclaim	Hunt, H & Hammon J
10/05/56	48.58	Acquired from	Rodgers Const Co Inc
10/08/56	28.35	Acquired from	Sauvie Island Duck Club
01/23/57	6.19	Acquired from	Rosenstreter, Rod

11/27/59	0.31	Acquired from	Wallace
11/28/59	0.21	Acquired from	Munsen
04/29/60	11.55	Acquired from	Bissio, J – McIntire J
09/22/61		Quitclaim	Rogers Const Co Inc
09/25/61	100.00	Acquired from	Hunt, Jep
08/16/62	57.00	Acquired from	Reeder, Paul
02/28/64	-5.14	Sold to	Dondo, Constante
06/04/64	49.00	Acquired from	Grae, Walter
04/16/70	157.83	Acquired from	Kampfer, Johnson EST
04/26/70	166.99	Acquired from	Eade, Grant
07/02/75	115.00	Acquired from	Richardsen, M & A
07/02/75		Correction	Richardsen, M & A
01/31/77	0.73	Acquired from	Minoggie & Gross
09/01/78	-363.97	Sold to	OR Dept of Transportation
09/11/79	66.50	Acquired from	Jayvee Brands V
09/15/83	3.79	Acquired from	Reeder, F J
09/17/86	1.13	Land Trade from	Cereghino, Michael
09/15/86	-3.36	Trade Away to	Cereghino, Michael
09/18/87	86.90	Acquired from	Hancock, Mary
03/24/98	-0.04	Sold to	Multnomah County

Appendix B. Plant Species Known to Occur on the Sauvie Island Wildlife Area

ACERACEAE
Big leaf maple *(Acer macrophyllum)*

ALISMATACEAE
Water Plantain *(Alisma plantago aquatica)*
Narrowleaf / Lanceleaf water plantain *(Alisma lanceolatum)*
Northern waterplantain *(Alisma triviale)*
Wapato, Arrowhead *(Sagitaria latifolia)*

ANACARDIACEAE
Poison oak *(Toxicodendron diversiloba)*

APIACEAE
Wild carrot *(Daucus carota)*
Cow parsnip *(Heracleum lanatum)*
Water parsley *(Oenanthe sarmentosa)*

APOCYNACEAE
Common dogbane *(Apocynum cannibinum)*

AQUIFOLIACEAE
Holly *(Llex aquifolium)*

ARALIACEAE
Ivy *(Hedera helix)*

ASTERACEAE
Big devils beggars-tick *(Bidens cernua)*
False dandelion *(Hypochaeris radicata)*
Leafy beggars-tick *(Bidens frondosa)*
Lowland cudweed *(Gnaphalium palustre)*
Nodding beggars-tick *(Bidens cernua)*
Oxe-eye daisy *(Leucanthemum vulgare)*
Pearly everlasting *(Anaphalis margaritaceae)*
Purple cudweed *(Gnaphalium purpureum)*
Canada thistle *(Cirsium arvonso)*
Bullthistle *(Cirslum vulgare)*
Prickly lettuce *(Lactuca serriola)*
Common dandelion *(Taraxacum officinale)*
Smooth Hawksbeard *(Crepis capillaris)*
Tarweed *(Madia sativa)*
Tansy ragwort *(Senecio jacobaea)*

BERBERIDACEAE
Oregon-grape *(Berberis aquifolium)*

BETULACEAE
Beaked hazelnut *(Corylus cornuta)*
Common filbert *(Corylus avellena)*
Red alder *(Alnus rubra)*

BRASSICACEAE
Wintercress *(Barbarea orthoceras)*
Wild radish *(Raphanus sativus)*

CARYOPHYLLACEAE
Chickweed *(Cerastium glomeratum)*
Chickweed *(Stellaria media)*
Coontail *(Ceratophyllum demersum)*

CAPRIFOLIACEAE
Snowberry *(Symphoricarpos albus)*

CYPERACEAE
Dense sedge *(Carex densa)*
Green-sheath sedge *(Carex feta)*
Slough sedge *(Carex obnupta)*
Ross' sedge *(Carex rossii)*
Pointed broom sedge *(Carex scoparia)*
One-sided sedge *(Carex unilateralis)*
Red-rooted flatsedge *(Cyperus erythrorhizos)*
Common spike-rush *(Eleocharis obtuse)*

DIPSACACEAE
Teasel *(Dipsacus fullonum)*

ERICACEAE
Pacific madrone *(Arbutus menziesii)*

EQUISETACEAE
Field horsetail *(Equisetum arvense)*

FABACEAE
White clover *(Trifolium repens)*
Red clover *(Trifolium pretense)*
Hairy vetch *(Vicia hirsuta)*
Birds-foot trefoil *(Lotus cornculatus)*

FAGACEAE
Oregon white oak *(Quercus garryana)*

GROSSULARIACEAE
Gooseberry *(Ribes divaricatum)*

HALORAGIDACEAE
Variable leaf milfoil *(Myriophyllum aquaticum)*
Eurasian water milfoil *(Myriophyllum spicatum)*
Whorled water milfoil *(Myriophyllum verticulatum)*

IRIDACEAE
Flag Iris (*Iris pseudocorus*)

JUNCAGINACEAE
Sharp fruited rush (J*uncus acuminatus*)
Bolander's rush (*Juncus bolanderi*)
Toad rush (*Juncus bufonius*)
Soft rush (*Juncus effusus*)
Daggerleaf rush (*Juncus ensifolius*)
Grass-leaf rush (*Juncus marginatus*)
Nevada rush (*Juncus nevadensis*)
Pointed rush (*Juncus oxymeris*)
Spreading rush (*Juncus patens*)
Slender rush (*Juncus tenuis*)

LAMIACEAE
Pennyroyal (M*entha pulegium*)
Self-heal *(Prunella vulgaris)*

LEMNACEAE
Common duckweed *(Lemna minor)*

LILIACEAE
Common camas (C*amassia quamash*)

LYTHRACEAE
Purple loosestrife *(Lythrum salicaria)*

OLEACEAE
Oregon ash *(Fraxinus latifolia)*

ONAGRACEAE
Hairy willow-herb (*Epilobium cilatum*)
False loose-strife (*Ludwigia palustris*)
Autumn willow-herb (*Epilobium brachycarpum*)
Fireweed *(Epilobium anguatifolium)*

PAPAVERACEAE
California poppy (*Eschscholzia californica*)

POACEAE
European sliver hairgrass (Aira caryophylla)
Sweet vernal grass (Anthoxanthum odoratum)
Western mannagrass (Glyceria occidentalis)
Velvet grass (Holcus lanatus)
Meadow barley (Hordeum brachyantherum)
Knot grass (Paspalum distichum)
Reed canarygrass *(Phalaris arundinacea)*
Barnyard grass *(Echinochloa crus-galli)*
Tufted hairgrass *(Deschampsia cespitosa)*
Tall fescue *(Festuca arundinacea)*

POLEMONIACEAE
Needle-leaf navarretia *(Nararretia intertexa)*

POLYGONACEAE
Water knotweed (P*olygonum amphibium*)
Oval-leaf knotweed (P*olygonum arenastrum*)
Knotweed (P*olygonum coccineum*)
Black bindweed (P*olygonum convolvulus)*
Japanese knotweed (P*olygonum cuspidatum)*
Douglas' knotweed (P*olygonum douglasii)*
Marshpepper smartweed (P*olygonum hydropiperoides)*
Curlytop knotweed (P*olygonum lapathifolium)*
Heartweed (P*olygonum persicaria)*
Sheep sorrel *(Rumex acetosella)*

POLYPODIACEAE
Lady fern *(Athyrium felix-femina*
Licorice fern *(Polypodium glycirriza)*
Sword fern *(Polystichum munitum)*

POTAMOGETONACEAE
Curly pondweed *(Potamageton crispus)*
Ribon-leaf pondweed *(Potamageton epihydrus)*
Sage pondweed *(Potamageton pectinatus)*

RANUNCULACEAE
Western buttercup *(Ranunculus occidentalis)*

RHAMNACEAE
Cascara *(Rhamnus purshiana)*

ROSACEAE
AngloAmerican hawthorn *(Crataegus monogyna x susdorfii)*
Bird cherry *(Prunus avium)*

English hawthorn *(Crataegus monogyna)*
Evergreen blackberry *(Rubus laciniatus)*
European mountain ash *(Sorbus aucuparia)*
Himalayan blackberry *(Rubus armeniacus)*
Multiflora rose *(Rosa multiflora)*
Nootka rose *(Rosa nutkana)*
Oregon avens (*Geum macrophyllum*)
Osoberry *(Oemleria cerasiformis)*
Suksdorf's hawthorn *(Crataegus suksdorfii)*
Spiraea, Hard hack *(Spiraea douglasii)*
Serviceberry *(Amelanchier alnifolia)*
Thimbleberry *(Rubus parviflorus)*
Western crabapple *(Malus fusca)*
Wild strawberry *(Fragaria vesca)*

RUBIACEAE
Catchweed bedstraw (*Galium aparine*)

SALICACEAE
Columbia rivier willow *(Salix fluviatilis)*
Cottonwood *(Populus trichocarpa)*
Scouler's willow *(Salix scouleriana)*
Northwest willow *(Salix sessifolia)*
Sitka willow *(Salix sitchensis)*
pacific willow *(Salix lucida)*

SAXIFRAGACEAE
Fringecup *(Tellima grandiflora)*

SOLANACEAE
Climbing nightshade *(Solanum dulcamara)*

SPARGANIACEAE
Bur reed *(Sparganium decurrens)*

TAXACEAE
Western red-cedar *(Thuja plicata)*

TYPHACEAE
Narrow-leaf cattail *(Typha angustifolia)*
Cat tail *Ttypha latifolia)*

URTICACEAE
Stinging nettle *(Urtica dioica)*

Appendix C. Wildlife Species Known to Occur on Sauvie Island Wildlife Area.

Birds

Symbols

S -	March – May	C - Common
S -	June – August	R – Rare
F -	September – November	U – Uncommon
W -	December - February	A - Accidental
# -	Threatened or Endangered Species	O - Occasional
*	Breeds locally	

	SEASON			
Loons and Grebes	**S**	**S**	**F**	**W**
Red-throated Loon	R		R	O
Pacific Loon	R		R	O
Common Loon	R		R	O
Pied-billed Grebe*	C	C	C	C
Horned Grebe	O		O	R
Red-necked Grebe				A
Eared Grebe	O		O	O
Western Grebe	O	O	O	O
Clark's Grebe	O	O	O	O

Pelicans and Cormorants	**S**	**S**	**F**	**W**
American White Pelican	R	R	R	R
Brown Pelican	A	A	A	
Double-crested Cormorant	C	O	C	C

Bitterns, Herons and Ibis	**S**	**S**	**F**	**W**
American Bittern	C	U	U	O
Black-crowned Night Heron	R	R	R	R
Green Heron*	U	U	U	R
Cattle Egret			R	R
Snowy Egret			R	
Great Egret	U	U	U	U
Great Blue Heron*	C	C	C	C
White-faced Ibis				A

Waterfowl	**S**	**S**	**F**	**W**
Tundra Swan	U	R	U	C
Trumpeter Swan	R	R	R	R
Greater White-fronted Goose	U	R	U	O
Snow Goose	O		O	U
Ross's Goose				R
Emperor Goose			R	R
Canada Goose	C	U	C	C
Cackling Goose	C		C	C
Brant	O	O	O	

Wood Duck*	C	C	U	U
Mallard*	C	C	C	C
American Black Duck				A
Gadwall*	U	O	U	U
Green-winged Teal	C	U	C	C
American Wigeon	C	U	C	C
Eurasian Wigeon	O		O	O
Northern Pintail*	C	U	C	C
Baikal Teal				A
Northern Shoveler*	C	O	C	C
Blue-winged Teal*	R	R	R	R
Cinnamon Teal*	U	C	U	O
Canvasback	O		O	O
Redhead				O
Ring-necked Duck	C		U	C
Greater Scaup	O		O	O
Lesser Scaup	C	R	U	C
Black Scoter				A
White-winged Scoter			A	A
Surf Scoter				A
Harlequin Duck	R	R		
Long-tailed Duck				A
Barrow's Goldeneye				R
Common Goldeneye				U
Common Merganser	U		O	U
Red-breasted Merganser	R	R		R
Hooded Merganser*	U	O	O	O
Ruddy Duck	U	O	U	U
Bufflehead	U		U	U

Raptors	**S**	**S**	**F**	**W**
Turkey Vulture*	U	U	O	R
Osprey*	U	U	U	R
White-tailed Kite	R		R	
Northern Harrier*	C	U	C	C
Golden Eagle	R	R		R
Bald Eagle*	U	O	C	U
Sharp-shinned Hawk	U	U	U	U
Cooper's Hawk*	O	O	O	O
Northern Goshawk	R			R
Red-shouldered Hawk				A
Red-tailed Hawk*	C	C	C	C
Swainson's Hawk	A		A	
Rough-legged Hawk	O		O	U
Ferruginous Hawk	A			A
American Kestrel*	C	C	C	C
Merlin	O	O	O	O
Prairie Falcon	R	R	R	R
Peregrine Falcon		O	O	O
Gyrfalcon				A

Gallinaceous Birds	**S**	**S**	**F**	**W**
Ring-necked Pheasant*	U	O	U	U
Ruffed Grouse	O	O	O	O
Bobwhite	O	O	O	O
California Quail*	R	R	R	R
Chukar	O	O	O	O

Rails, Coots and Cranes	**S**	**S**	**F**	**W**
Virginia Rail*	U	U	O	O
Sora*	U	U	R	R
Common Moorhen	A			
American Coot*	C	C	C	C
Sandhill Crane	C	R	C	O

Shorebirds	**S**	**S**	**F**	**W**
Black-bellied Plover			R	R
Pacific Golden Plover			A	
Semipalmated Plover		O	O	O
Killdeer*	C	C	C	C
American Avocet		A	A	
Black-necked Stilt	A			
Greater Yellowlegs	O	O	U	O
Lesser Yellowlegs	U	O	U	
Solitary Sandpiper	R	R	R	
Spotted Sandpiper	O	O	O	
Whimbrel		O		
Long-billed Curlew		A		
Marbled Godwit		A	A	
Sanderling		A	A	
Durlin	C		C	
Semipalmated Sandpiper			A	
Western Sandpiper	U	U	U	
Least Sandpiper	U	U	U	O
Baird's Sandpiper	R		R	
Pectoral Sandpiper			O	
Willet	O		O	
Sharp-tailed Sandpiper				A
Dunlin	U		U	U
Stilt Sandpiper				A
Buff-breasted Sandpiper				A
Ruff				A
Short-billed Dowitcher				U
Long-billed Dowitcher	U	U	U	O
Wilson's Snipe*	U	O	U	C
Wilson's Phalarope	O	R	O	
Red-necked Phalarope	A	A	A	
Red Phalarope	R		R	

Gulls and Terns	**S**	**S**	**F**	**W**
Parasitic Jaeger			A	
Franklin's Gull	A	A	A	A

Bonaparte's Gull	O	R	O	R
Ring-billed Gull	C	U	U	C
Mew Gull	U	O	O	C
California Gull	C	O	U	C
Herring Gull	U		O	U
Glaucous Gull	R			O
Thayer's Gull	O		O	U
Western Gull	O	O	U	U
Glaucous-winged Gull	C	O	U	C
Slaty-backed Gull				A
Sabine's Gull			A	A
Black-legged Kittiwake			A	
Caspian Gull	O	O	O	
Forster's Tern			A	
Common Tern	A		A	
Arctic Tern	A		A	
Black Tern	A			

Doves and Cuckoos	**S**	**S**	**F**	**W**
Band-tailed Pigeon	O	O	O	O
Eurasian-collared Dove	O	O	O	O
Rock Dove*	C	C	C	C
Mourning Dove*	U	C	U	O
Yellow-billed Cuckoo			A	

Owls	**S**	**S**	**F**	**W**
Barn Owl*	O	O	O	O
Short-eared Owl	O		O	O
Long-eared Owl	R	R	R	R
Great Horned Owl*	U	U	U	U
Snowy Owl			R	R
Western Screech-Owl*	U	U	U	O
Northern Pygmy-Owl	O	O	O	O
Northern Saw-whet Owl	A	A	A	A
Northern Hawk-Owl				A
Burrowing Owl	A	A	A	
Barred Owl			A	

Nighthawks and Swifts	**S**	**S**	**F**	**W**
Common Nighthawk			O	O
Vaux's Swift*	U	U	O	

Hummingbirds	**S**	**S**	**F**	**W**
Anna's Hummingbird	R	R	R	R
Rufous Hummingbird	C	C	U	

Kingfishers	**S**	**S**	**F**	**W**
Belted Kingfisher*	U	C	U	U

Woodpeckers	**S**	**S**	**F**	**W**
Acorn Woodpecker	A	A	A	A

Lewis's Woodpecker	O		R	R
Northern Flicker*	C	C	C	C
Red-breasted Sapsucker*	O	O	O	O
Downy Woodpecker*	C	C	C	C
Hairy Woodpecker	O	O	O	O
Pileated Woodpecker	O	O	O	O

Flycatchers	**S**	**S**	**F**	**W**
Olive-sided Flycatcher		O	O	
Western Wood-Peewee*	R	C	O	
Willow Flycatcher*	U	U		
Least Flycatcher	R	R		
Hammond's Flycatcher	O	O	R	
Dusty Flycatcher	A			
Pacific-slope Flycatcher*	U	C	R	
Say's Phoebe	R			
Ash-throated Flycatcher				A
Western Kingbird	R	R		
Tropical Kingbird		A		
Eastern Kingbird	R			

Shrikes	**S**	**S**	**F**	**W**
Loggerhead Shrike	R			
Northern Shrike	O		O	O

Vireos	**S**	**S**	**F**	**W**
Hutton's Vireo	R	R	R	R
Cassin's Vireo	U	O		
Red-eyed Vireo	R	R		
Warbling Vireo*	O	U	O	

Jays and Crows	**S**	**S**	**F**	**W**
Blue Jay			A	
Steller's Jay	C	U	U	C
Gray Jay	R			R
Western Scrub Jay*	C	C	C	C
Black-billed Magpie	A		A	
American Crow*	C	C	C	C
Common Raven	A	A	A	A

Larks and Swallows	**S**	**S**	**F**	**W**
Horned Lark	U		U	U
Tree Swallow*	C	C	R	R
Violet-green Swallow*	U	C	O	R
Purple Martin*	O	U	O	
Bank Swallow	R	R		
Cliff Swallow*	U	U	R	
No. Rough-winged Swallow*	O	U	O	
Barn Swallow*	U	C	C	R

Chickadees and Bushtits	**S**	**S**	**F**	**W**

Black-capped Chickadee*	C	C	C	C
Mountain Chickadee				A
Chestnut-backed Chickadee*	R	R	R	R
Bushtit*	C	C	C	C

Nuthatches and Creepers	**S**	**S**	**F**	**W**
Brown Creeper*	O	O	O	O
White-breasted Nuthatch*	C	C	C	C
Red-breasted Nuthatch*	O	O	O	O

Wrens	**S**	**S**	**F**	**W**
House Wren*	U	C	O	R
Winter Wren	R	R	R	R
Bewick's Wren*	C	C	C	C
Marsh Wren*	C	C	U	U

Kinglets	**S**	**S**	**F**	**W**
Golden-crowned Kinglet	U	O	U	O
Ruby-crowned Kinglet	U	O	U	O

Thrushes	**S**	**S**	**F**	**W**
Western Bluebird	R		R	R
Swainson's Thrush*	U	U		
Hermit Thrush	R		O	R
Varied Thrush	U		U	C
American Robin*	C	C	C	C
Townsend's Solitaire	A		A	A

Mockingbirds and Starlings	**S**	**S**	**F**	**W**
North Mockingbird	A			
Cedar Waxwing	U	U	U	U
European Starling*	C	C	C	C
American Pipit	U	U	U	U

Warblers	**S**	**S**	**F**	**W**
Orange-crowned Warbler*	C	U	O	O
Nashville Warbler	O	O		
Northern Parula			A	
Yellow-rumped Warbler*	C	O	U	U
Black-throated Gray Warbler*	U	R	U	
Townsend's Warbler	O		O	O
Blackpoll Warbler			A	
Palm Warbler	A			
Yellow Warbler*	U	U	O	
MacGillivray's Warbler	U	U	R	
Wilson's Warbler	U	O	O	
Common Yellowthroat*	C	C	O	O
Yellow-breasted Chat	R	R		

Tanagers	**S**	**S**	**F**	**W**
Western Tanager	U	U	O	

Sparrows	**S**	**S**	**F**	**W**
Spotted Towhee*	C	C	C	C
American Tree Sparrow	A			
Chipping Sparrow	O	O	O	R
Clay-colored Sparrow				A
Brewer's Sparrow				A
Lark Sparrow	A		A	
Fox Sparrow	O		O	U
Savannah Sparrow*	C	C	U	U
Lincoln's sparrow	O	O	O	O
Song Sparrow*	C	C	C	C
Vesper Sparrow	R	R	R	
Swamp Sparrow			R	R
White-throated Sparrow				R
Harris's Sparrow				R
White-crowned Sparrow	U	U	U	U
Golden-crowned Sparrow	C		C	C
Dark-eyed Junco	C	R	C	C
Lapland Longspur				A
Snow Bunting				A
Black-headed Grosbeak*		U		
Lazuli Bunting		U		

Blackbirds	**S**	**S**	**F**	**W**
Western Meadowlark*	U	O	U	O
Yellow-headed Blackbird*	O	O		
Red-winged Blackbird*	C	C	O	C
Tricolored Blackbird		A		
Rusty Blackbird	A			A
Brewer's Blackbird*	C	C	C	C
Brown-headed Cowbird*	C	C	U	O
Bullock's Oriole*	U	U	O	

Finches and Grosbeaks	**S**	**S**	**F**	**W**
Purple Finch*	U	U	U	U
House Finch*	C	C	U	C
Red Crossbill	O	R	R	R
Pine Siskin*	O	O	O	O
American Goldfinch*	C	C	U	U
Lesser Goldfinch	A	A	A	A
Common Redpoll	A			A
Evening Grosbeak	O			

Weaver Finches	**S**	**S**	**F**	**W**
House Sparrow*	U	U	U	U

Mammals
(* denotes non-native species.)

Virginia Opossum*	*Didelphis virginiana*	Douglas' Squirrel	*Tamiasciurus douglasii*
Vagrant Shrew	*Sorex vagrans*	Camas Pocket Gopher	*Thomomys bulbivorus*
Pacific Shrew	*Sorex pacificus*	American Beaver	*Castor canadensis*
Black-Tailed Deer	*Odocoileus hemionus*	Deer Mouse	*Peromyscus maniculatus*
Trowbridge's Shrew	*Sorex trowbridgii*	Dusky-Footed Woodrat	*Neotoma fuscipes*
Shrew Mole	*Neurotrichus gibbsii*	Bushy-Tailed Woodrat	*Neotoma cinerea*
Townsend's Mole	*Scapanus townsendii*	Gray-Tailed Vole	*Microtus canicaudus*
Little Brown Myotis	*Myotis lucifugus*	Townsend's Vole	*Microtus townsendii*
Yuma Myotis	*Myotis yumanensis*	Creeping Vole	*Microtus oregoni*
Long Eared Myotis	*Myotis evotis*	Muskrat	*Ondatra zibethicus*
Fringed Myotis	*Myotis thysanodes*		
Long Legged Myotis	*Myotis volans*	Porcupine	*Erethizon dorsatum*
California Myotis	*Myotis californicus*	Nutria	*Myocastor coypus*
Silver Haired Bat	*Lasionycteris noctivagans*	Coyote	*Canis latrans*
Big Brown Bat	*Eptesicus fuscus*	Red Fox	*Vulpes vulpes*
Hoary Bat	*Lasiurus cinereus*	Gray Fox	*Urocyon cinereoargenteus*
Townsend's Big-Eared Bat	*Plecotus townsendii*	Raccoon	*Procyon lotor*
Pallid Bat	*Antrozous pallidus*	Long-Tailed Weasel	*Mustela frenata*
Brush Rabbit	*Sylvilagus bachmani*	Mink	*Mustela vison*
Black-Tailed Jack Rabbit	*Lepus californicus*	Short-tailed Weasel	*Mustella erminea*
Townsend's Chipmunk	*Tamias townsendii*	Western Spotted Skunk	*Spilogale gracilis*
California Ground Squirrel	*Spermophilus beecheyi*	Striped Skunk	*Memphitis memphitis*
Eastern Fox Squirrel*	*Sciurus niger*	River Otter	*Lutra canadensis*
Eastern Gray Squirrel	*Sciurus carolinensis*		
Western Gray Squirrel	*Sciurus griseus*	Elk	*Cervus elaphus*
Pacific Jumping Mouse	*Zapus trinotatus*	Pacific Water Shrew	*Sorex bendirii*

Amphibians and Reptiles

Northwestern Salamander	*Ambystoma macrodactylum*	Northwestern Pond Turtle	*Clemmys marmorata*
Long-toed Salamander	*Ambystoma macrodactylum*	Northern Alligator Lizard	*Elgaria coerulea*
Ensatina	*Ensatina eschscholtzi*	Southern Alligator Lizard	*Elgaria multicarinata*
Dunn's Salamander	*Plethodon dunni*	Western Fence Lizard	*Sceloporus occidentalis*
Western Red-backed Salamander	*Plethodon vehiculum*	Western Skink	*Eumeces skiltonianus*
Roughskin Newt	*Taricha granulosa*	Rubber Boa	*Charina bottae*
Western Toad	*Bufo boreas*	Racer	*Coluber constrictor*
Pacific Treefrog	*Hyla regilla*	Sharptail Snake	*Contia tenuis*
Red-Legged Frog	*Rana aurora*	Ringneck Snake	*Diadophis punctatus*
Foothill Yellow-Legged Frog	*Rana boylei*	Gopher Snake	*Pituophis melanoleucus*
Bullfrog*	*Rana catesbeiana*	W. Terrestrial Garter Snake	*Thamnophis elegans*
Spotted Frog	*Rana pretiosa*	Northwestern Garter Snake	*Thamnophis ordinoides*
Painted Turtle	*Chrysemys picta*	Common Garter Snake	*Thamnophis sirtalis*

Fish

Coho Salmon	*Oncorhynchus kisutch*	Dace	*Rhinichthys* spp.
Chinook Salmon	*Oncorhynchus tshawytscha*	Bridgelip Sucker	*Catostomus columbianus*
Sockeye Salmon	*Onchorhynchus nerka*	Longnose Sucker	*Catostomus catostomus*
Chum Salmon	*Onchorhynchus keta*	Largescale Sucker	*Catostomus macrosheilus*
Steelhead	*Onchorhynchus gairdneri*	Asian Weatherfish	
Black Crappie	*Pomoxis nigro-annularis*	American Shad	*Alosa sapidissima*
White Crappie	*Pomoxis annularis*	Mosquitofish	*Gambusia affinis*
Bluegill	*Lepomis macrochirus*	Redside Shiner	*Richardsonius balteatus*
Largemouth Bass	*Micropterus salmoides*	Sculpin	*Cottus* spp.
Warmmouth Bass	*Lepomis gulosus*	Northern Pikeminnow	*Ptychocheilus oregonensis*
Pumpkinseed	*Lepomis gibbosus*	Common Carp	*Cyprinus carpio*
Brown Bullhead	*Ictalurus nebulosus*	Yellow Bullhead	*Ictalurus natalis*

Appendix D. State Water Rights on Sauvie Island Wildlife Area

Tract	Permit Number	Acres/Feet	Rate
Crane Lake, Willow Hole	R51620		4.0 cfs
Crane Lake	R11551	23.8	
Gilbert River, The Narrows	R51614		22.3 cfs
Cunningham Slough, Deep Lake	R12903	102.0	
Cunningham Slough, Ruby Lake	R12904	240.0	
Cunningham Slough, Millionaire Lake	R12905	120.0	.
Gilbert River	R51633		10.0 cfs
Pete's Slough	R7341	1,040.0	
Pete's Slough	S43072		1.0 cfs
McNary Lake	S31789		13.0 cfs

Appendix E. Easements and Agreements on Sauvie Island Wildlife Area

Easements

Principles	Purpose	Date	Acres
Portland General Electric	Power line	04/12/61	-1.00
Portland General Electric	Power line	05/24/69	-1.00
City of St Helens	Sewer line	03/18/71	-1.00
Portland General Electric	Power line	06/25/71	-1.00
Richardsen, M & A		07/02/75	1.00
Richardsen, M & A	Correction	07/02/75	-1.00
Portland General Electric	Power Line	01/24/83	-1.00
Portland General Electric	Power Line	08/10/92	-1.00

Agreements

Principles	Purpose	Date	Acres
Dept. of State Lands	Wildlife Use	04/05/50	3476.00
Western Union Telegraph	Repeater Station	01/02/63	
Columbia County Court	Road Vacated	09/11/68	
Dept. of State Lands	Amendment	12/19/68	
Burns, A B	Land Use	06/09/82	
Oregon State Land Board	Land Use	01/27/83	
Oregon Dept. of Forestry	Fire Protection	06/21/82	
Oregon Highway Division	Fish Access	07/23/68	
U.S. Coast Guard	Navigating Light	11/29/67	
Dept. of State Lands	Wildlife Use	09/01/81	3.60

Appendix F. Legal Obligations Influencing Management Of the Sauvie Island Wildlife Area

Federal Laws

Federal Aid in Wildlife Restoration Act
Pittman- Robertson Act of 1937
The Endangered Species Act of 1973, as amended
National Historic Preservation Act
National Environmental Policy Act
Americans with Disabilities Act

Oregon Revised Statutes

ORS 496.012 Oregon's Wildlife Policy
ORS 496.138 General Duties and Powers; Rulemaking Authority
ORS 496.146 Additional Powers of the Commission
ORS 496.162 Establishing seasons, amounts and manner of taking wildlife; rules
ORS 496.992 Penalties

Oregon Department of Fish and Wildlife Mission and Authority

The mission of the department is to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations. Oregon Department of Fish and Wildlife is the only state agency charged exclusively with protecting Oregon's fish and wildlife resources. The state Wildlife Policy (ORS 496.012) and Food Fish Management Policy (ORS 506.109) are the primary statutes that govern management of fish and wildlife resources.

Oregon Administrative Rules

Division 008 - Department of Fish and Wildlife Lands

635-008-0015 Agreements to Restrict Motor-propelled Vehicles
635-008-0040 Forage Removal from State Lands
635-008-0050 Fish and Wildlife Commission to Post and Enforce Rules
635-008-0146 Sauvie Island Wildlife Area Management Plan
635-008-0147 Rules Regarding Public Use for Sauvie Island Wildlife Area
635-008-0148 Purpose Parking Permit System for Sauvie Island Wildlife Area
635-008-0149 Definition Parking Permit System for Sauvie Island Wildlife Area
635-008-0151 Procedures for Issuance and Enforcement of Parking Permits for Sauvie Island Wildlife Area

Division 011 - Statewide Angling Regulations

635-011-0050 Procedure of Promulgation of Angling Regulations
635-011-0100 General Rule

Division 044 - Holding, Propagating, Protected Wildlife

Division 051 - General Game Bird Regulations
635-051-0000 Purpose and General Information
635-051-0065 State Wildlife Area Regulations

Division 065 - Game Mammal General Seasons and Regulations
635-065-0001 Purpose and General Information
635-065-0625 Regulations on State Wildlife Areas, Refuges and Special Areas

Pacific Flyway and Species Plans

- The North American Waterfowl Management Plan
- Pacific Flyway Management Plans
- Pacific Population of Western Canada Geese
- Pacific Population of Trumpeter Swans
- Western Population of Tundra Swans
- Pacific White-fronted Goose Plan
- Dusky Canada Goose Plan
- Lesser and Taverner's Canada Goose Plan
- Northwest Oregon / Southwest Washington Canada Goose Agricultural Depredation Control Plan
- The Western Waterfowl Initiative
- The Western United States and Canada Cooperative Duck Banding Program
- The Pacific Flyway Fall and Winter Goose Surveys
- The Oregon Conservation Strategy (2006)
- Oregon Statewide Waterfowl Plan (Draft)

Fish Species Plans

25 Year Recreational Angling Enhancement Plan (ODFW)
2009 Draft Recovery Plan for Federally Listed Salmon in the Lower Columbia River
Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead
Native Fish Conservation Policy
ODFW Fish Passage Criteria (ORS 509.580)

Appendix G: Description of Management Units

Introduction

SIWA is divided into four separate management units. The boundaries of these units are based on physical, administrative and operational characteristics.

Sturgeon Lake, approximately 3,000 acres in size, is not considered one of SIWA's management units because it falls under the jurisdiction of DSL. It is however managed by the department through a cooperative agreement with DSL.

Soils on SIWA are primarily Sauvie-Rafton Series Loams. The soils show medium clay content with characteristically high percolation. These soils are associated with a high water table, are well suited for agricultural operations, but are challenging for wetland habitat management. The moist soil impoundments present on SIWA are managed to provide a combination of semi-permanent and seasonal wetlands. SIWA staff balance the timing and duration of summer drawdown, with the intent of providing suitable conditions for seed germination and fostering a green zone of desirable vegetation as the impoundments' water levels recede.

Table 6. Sauvie Island Wildlife Area Habitat Types by Management Unit.

Unit Name	Acres
Eastside	6,685
Westside	1,981
Oak Island	870
North Unit	1,791
Sturgeon Lake*	2,466
River Channels	216
Total	**11,543**

* Sturgeon Lake is included in the Eastside Total

See Figures 1.1, 1.2 and 1.3.

Eastside Unit

Background

The Eastside Unit encompasses approximately 6,685 acres and is located west of the Columbia River and east of the Gilbert River and Sturgeon Lake. Reeder and Rentenaar roads allow access to the bulk of the Eastside unit. Numerous parking lots are located throughout the unit, but the majority of these lots are along Reeder Road. The unit consists of low and flat floodplains topography from historic Columbia River flows. Approximately 1,200 acres of the Eastside Unit is protected by a 27-foot high levee constructed in the late 1930's. The remainder of the unit is outside of this levee and SIWA staff have no control of water levels arising from the river systems. Sturgeon Lake is included in the Eastside Unit for habitat management purposes.

Management Strategies
This unit, managed mainly to benefit waterfowl, is the most intensively managed unit on the wildlife area. SIWA staff follow a moist soil management approach using a series of more than twenty impoundments, water control structures, pumps, and pipelines.

The majority of the wildlife-related food crops are planted within this unit. In a typical year, 1,200 to 1,400 acres are planted in millet (*Panicum miliaceum*), corn (*Zea mays* ssp.), buckwheat (*Fagopyrum esculentum*), sudangrass (*Sorghum bicolor*), sunflowers (*Helianthus annus*), and/or wild rice (*Zizania aquatica*). Other crops have been used experimentally but have not proved successful. Crop locations are selected annually on a rotational basis. All field preparation, planting, and tending is conducted by department staff but most harvesting is done by wildlife.

There are four sharecroppers and four livestock grazing permittees which provide benefit to the wildlife area.

The Eastside Unit is divided into twelve hunt units, to enable the department to allow the most number of hunters yet still maintain a quality hunt program for them. The public use in this unit is restricted during October 1 to April 30, unless the use is permitted bird hunting. The Eastside Viewing Platform and Rentenaar Road are both accessible throughout the year.

The area outside the levee is within the river floodplain, and thus highly susceptible to periodic inundation. For example, when the Columbia River at Vancouver reaches 14 feet high, a large portion of this area is flooded.

Westside Unit

Background
The Westside Unit encompasses 1,981 acres and is located at the north end of Sauvie Island Road and is bordered by the Multnomah Channel on the east and the Gilbert River on the west. Private land (Flight's End Duck Club) borders the unit on the north.

The habitats within this unit consist primarily of riparian forest, grasslands/pastures, and actively and passively managed wetlands. All of the wetlands in this unit are subject to regular flooding from the Gilbert River and Multnomah Channel.

Management Strategies
Just prior to waterfowl hunting season, SIWA staff can use two water pumps to recharge the wetlands and six water control structures to control water levels as needed.

The Westside Unit is divided into six hunt units to better able us to allow the maximum number of hunters while still maintaining a quality hunt program.

Oak Island Unit

Background

The Oak Island Unit encompasses 870 acres and is located near the southeast corner of Sturgeon Lake. Steelman Lake is the west boundary and Sturgeon Lake is the north, south and east, except for a few small parcels along the western edge of Oak Island. Oak Island Road enters the unit and proceeds north to a split, with one fork continuing to the north and the other to the east, past Webster and Haldeman Ponds, to Sturgeon Lake. There is one private boat ramp at Sturgeon Lake and a public three mile Nature Trail which loops around the north end of the island.

This unit consists primarily of oak woodland/savannah, riparian/bottomland hardwood forest, grassland/pasture, agriculture, and passively managed wetlands.

Management Strategies

Agricultural practices on Oak Island consist of row crop planting in the bottomlands inside the Sauvie Island levee, and grass seed fields outside the levee.

There are two ponds within this unit. Webster Pond is a natural pond with warmwater fish and Haldeman Pond is an abandoned gravel pit which is used by the department to provide a trout fishery. Public use in this unit is restricted during the period of October 1-May 1.

North Unit

Background

The North Unit encompasses 1,791 acres and is located at the north end of Sauvie Island between the Columbia River on the east and the Multnomah Channel on the west. The south boundary is the Gilbert River Boat Ramp Road. There are two pieces of private property in the North Unit, one of which is landlocked with a road easement. This area is typical of the Columbia River bottomlands flood plain. This unit is primarily riparian/bottomland hardwood forest, pastures, and passively managed wetlands.

Management Strategies

There are three natural wetlands which have water control structures that were installed to conduct moist soil management in and numerous other wetlands which are passively managed. The largest passively managed wetland is Cunningham Lake at 174 acres.

The public use in this unit is restricted during the period of October 1-May 1, except the Columbia River beaches and the trail to Warrior Rock Lighthouse.

SAUVIE ISLAND WILDLIFE AREA LAKES & PONDS

LOCATION (UNIT)	LAKE OR POND
SIWA	STURGEON LAKE
EASTSIDE	MALARKY LAKE
EASTSIDE	AARON LAKE
EASTSIDE	BIG MCNARY LAKE
EASTSIDE	LITTLE MCNARY LAKE
EASTSIDE	STANSLAKE
EASTSIDE	RAYS LAKE
EASTSIDE	MUDHEN LAKE
EASTSIDE	RENTENAAR LAKE
EASTSIDE	QUICK LAKE
EASTSIDE	NUMBER 2 LAKE
EASTSIDE	DEADWILLOW LAKE
EASTSIDE	FOOTBRIDGE LAKE
EASTSIDE	NORTH LAKE
EASTSIDE	CATFISH SLOUGH
EASTSIDE	BROWNING LAKE
EASTSIDE	POPE LAKE
EASTSIDE	SPUD LAKE
EASTSIDE	LOST PRAIRIE
EASTSIDE	RACETRACK LAKE
EASTSIDE	STUTZER LAKE
EASTSIDE	GAY LAKE
EASTSIDE	HUNT BOTTOM
EASTSIDE	JOHNSON LAKE
WESTSIDE	STEELMAN LAKE
WESTSIDE	MUD LAKE
WESTSIDE	ROUND LAKE
WESTSIDE	LITTLE MARTIN LAKE
WESTSIDE	BIG MARTIN LAKE
WESTSIDE	GRASS LAKE
WESTSIDE	SEAL LAKE
WESTSIDE	WILLOW HOLE
WESTSIDE	CRANE LAKE
WESTSIDE	DOMEYER LAKE
NORTH	THREE-FINGER JACK LAKE
NORTH	CUNNINGHAM LAKE
NORTH	RUBY LAKE
NORTH	MILLIONAIRE LAKE
NORTH	H & R POND
NORTH	WIGEON LAKE
NORTH	DEEP LAKE
NORTH	LILLY POND
NORTH	LOG POND LAKE
OAK ISLAND	HALDEMAN POND
OAK ISLAND	WEBSTER POND