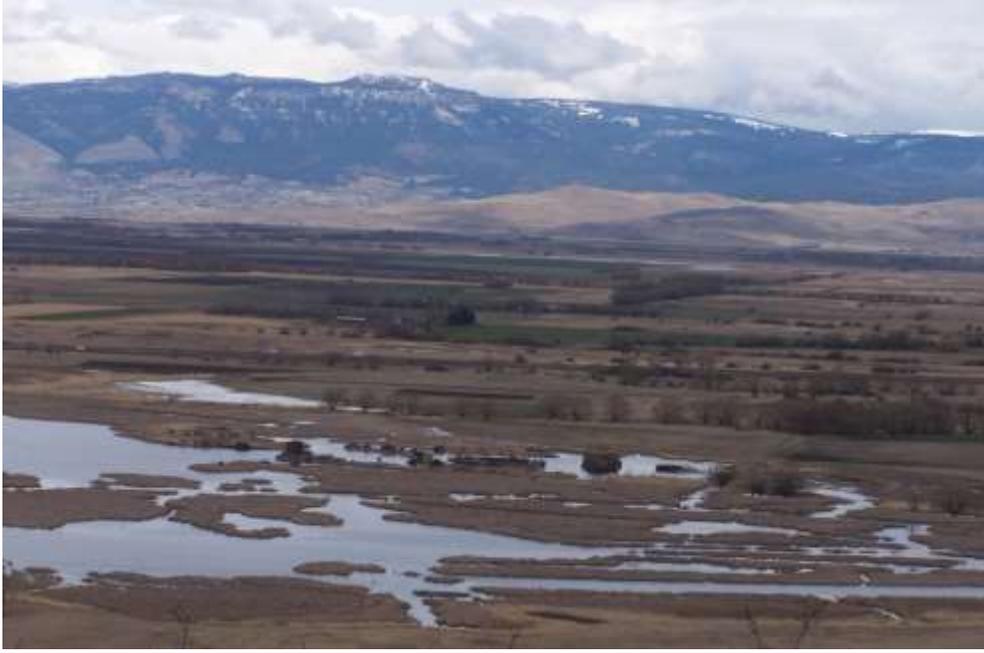


LADD MARSH WILDLIFE AREA MANAGEMENT PLAN



**April 2008
(Updated June 2018)**

**Oregon Department of Fish and Wildlife
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Salem, Oregon 97302**



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Executive Summary

Purpose of the Plan

This plan will guide management of Ladd Marsh Wildlife Area (LMWA) for the next 10 years. Purposes of this plan are:

- To provide clear direction for management of LMWA;
- To provide long-term continuity in wildlife area management;
- To communicate the department's management priorities for LMWA to its neighbors, visitors, and the public;
- To ensure management programs on LMWA are consistent with the original mandate and purpose of the area when first established;
- To ensure management of LMWA is consistent with Federal, State, and local natural resource plans;
- To ensure management activities address conservation priorities and recommendations described in the 2016 Oregon Conservation Strategy (OCS), and;
- To provide a basis for budget requests to support LMWA needs for staffing, operations, maintenance, and capital improvements.

Historical Background

Following droughts in the 1930s that affected most of North America, major conservation efforts, by both private and governmental entities, were enacted to reverse trends of degrading and disappearing wetlands. During this time period there was a major creation and expansion of federal wildlife refuges and state wildlife areas. As the concept of waterfowl flyway management was endorsed and developed, wildlife areas were acquired and managed as part of a larger plan focused on migratory waterfowl needs. LMWA is one of several wetland-focused wildlife areas established in Oregon.

LMWA was established in 1949, with primary objectives of protecting and improving waterfowl habitat and providing a public hunting area. The wildlife area is located in southern Union County, six miles southeast of La Grande. The wildlife area is approximately 6,019 acres in size.

LMWA is located in the Northern Rockies Region of the Intermountain West. It is further defined as the Blue Mountain ecoregion in the OCS. LMWA has a significant land base well suited to support indigenous fish and wildlife species and migratory water birds. Wetlands and associated uplands provide habitat for a diverse array of wildlife species. The habitat types found on LMWA are of quality and quantity to make a significant contribution to wildlife resources in this portion of the state.

The LMWA is a popular destination for hunting, wildlife viewing and environmental education due to its geographic setting and the abundance and diversity of its wildlife.

Planning Approach

This plan revises the 2008 plan for LMWA initially adopted by the Oregon Fish and Wildlife Commission (Commission) in 1993. The 1993 plan focused on habitat goals, objectives and strategies towards meeting specific wildlife population objectives. Wetland restoration and management were the focus of LMWA staff throughout the period since adoption of the first management plan.

The goals, objectives and actions (strategies) described in the 2018 revised plan were derived following an ecosystem based management philosophy. This plan takes a strong habitat based management approach with descriptions of wetland habitat types in plan goals and objectives following the classification scheme of Cowardin et al. (1979). Of primary importance, most actions undertaken on LMWA are for the benefit of wildlife, and public use must be compatible with the wildlife resource.

This plan describes issues and provides actions for addressing them. These actions will be implemented during the life of this plan, but are subject to funding and personnel availability. The management plan will be reviewed in 2023 to gauge the progress of implementation and make necessary revisions and revised in its entirety in 2028.

Ladd Marsh Wildlife Area Vision

The vision for Ladd Marsh Wildlife Area is as follows:

Wetlands and associated upland habitats are preserved, restored and enhanced at LMWA through management utilizing sound stewardship measures to support wetland dependent wildlife and a diverse array of other wildlife and plant species, for use and enjoyment by present and future generations.

Wildlife Area Goals

The goals for Ladd Marsh Wildlife Area 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 provide a variety of wildlife oriented recreational and educational opportunities to the public which are compatible with Goals 1 and 2.

Specific objectives and strategies to implement each goal, as well as detailed rationale, are provided in this plan on pages 43-58.

Implementation Approach

The primary action for benefiting wildlife is restoring, managing and preserving the range of habitat types that historically occurred at LMWA. These habitats were created and maintained by a suite of ecological processes, most importantly fire and hydrology. Management activities such as water level management (drawdowns and flooding) and vegetation manipulations (controlled burning, disking, farming, grazing, mowing) are tools that LMWA staff use to maintain important ecological processes needed to create and maintain healthy habitats. Due to the wide variety of habitat use among the different species utilizing LMWA, 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, will be quite variable and specific uses will not be maximized in all cases.

The natural ecosystem of the Grande Ronde Valley has been irreversibly altered since initiation of European settlement in the late 1800s. The most noticeable changes have been land use changes, major disruption of hydrology and the proliferation of invasive species. Recently, suspected climate changes seem to have added other perturbations to a significantly altered system. Hydrologic changes have had a profound effect on vegetative components of wetland habitats on LMWA that in turn influences wildlife and public use.

Current direction is to manage for specific habitat types or features in an attempt to meet the life-history needs of specific wildlife species or guilds.

Introduction

Purpose of the Plan

This document is a plan designed to guide management of the Ladd Marsh Wildlife Area for the next ten years. The Oregon Department of Fish and Wildlife's (Department) management planning process for Wildlife Areas (WAs) involves development of broad goals, and formulation of specific objectives and management strategies to achieve those goals. Purposes of this plan are:

- To provide clear direction for management of LMWA over the next ten years;
- To provide long-term continuity in wildlife area management;
- To communicate the Department's management priorities for LMWA to its neighbors, visitors, and to the public;
- To ensure management programs on LMWA are consistent with the original mandate and purpose of the area when first established;
- To ensure management of LMWA is consistent with Federal, State, and local natural resource plans;
- To ensure that management activities address conservation priorities and recommendations described in the 2016 Oregon Conservation Strategy, and;
- To provide a basis for budget requests to support the LMWA needs for staffing, operations, maintenance, and capital improvements.

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. The Department 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.

Purpose and Need of Ladd Marsh Wildlife Area

Wetland estimates in the lower 48 states at the time of European settlement were approximately 221 million acres. A survey completed in 1997 (Dahl 2000) reported 105.5 million acres remained, a loss of over 50%. Oregon has lost an estimated 38% of its wetlands. The acquisition of 120 acres of the largest remaining wetland in Northeastern Oregon in 1949 established LMWA. The project was approved for funding under the Federal Aid in Wildlife Restoration Act in 1952. The original 1949 Project Statement for LMWA states that the "Wildlife species to be primarily benefited would be waterfowl. The benefits created for upland birds and furbearers, although substantial would be secondary."

LMWA is one of 12 staffed wildlife areas managed by the Department. The wildlife area is located in the Grande Ronde Watershed of the Department's Northeast Region.

Project coordination is provided by the Wildlife Habitat Program at the Department's headquarters to integrate wildlife area management activities with larger scale

landscape planning including intergovernmental agreements, flyway plans, and individual species plans.

This management plan is the guiding document that will ensure natural resources on the LMWA will be managed in such a manner as to protect, maintain, enhance, and restore fish and wildlife habitat to support optimum population levels of many species for the enjoyment of present and future citizens. To protect these natural resources, management programs and strategies utilized on the LMWA will meet or exceed habitat protection policies and standards set by the department.

Ladd Marsh Wildlife Area Vision Statement

The vision for Ladd Marsh Wildlife Area is as follows:

Wetlands and associated upland habitats are preserved and enhanced on Ladd Marsh Wildlife Area through management utilizing sound stewardship measures to support wetland dependent wildlife and a diverse array of other wildlife and plant species, for use and enjoyment by present and future generations.

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.

The goals and objectives for Ladd Marsh Wildlife Area are:

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

Objective 1.1: Manage approximately 45 acres of palustrine permanently flooded wetland habitats. Emphasis will be on maintaining productive stands of submerged aquatic vegetation such as sago pond weed interspersed with cattail and hardstem bulrush stands.

Objective 1.2: Manage approximately 110 acres of palustrine intermittently exposed wetlands. This habitat will be managed for a ratio of 3:1, open water to emergent wetlands.

Objective 1.3: Manage approximately 1,811 acres of palustrine semi-permanent wetlands with a ratio of no greater than 1:1, robust emergent vegetation to open water.

Objective 1.4: Manage approximately 658 acres of palustrine seasonally flooded wetlands (wet meadow) for foraging and nesting areas for waterfowl and other wetland birds.

Objective 1.5: Manage approximately 113 acres of palustrine intermittently flooded wetlands.

Objective 1.6: Manage approximately 116 acres of palustrine forested wetlands.

Objective 1.7: Manage approximately 26 acres of palustrine scrub-shrub wetlands.

Objective 1.8: Restore, enhance and manage approximately 11 acres of riverine wetlands on LMWA.

Objective 1.9: Maintain and improve critical physical and functional infrastructure affecting wetland management activities.

Objective 1.10: Evaluate the effectiveness of the existing sanctuary for waterfowl and wetland dependent wildlife. Designate 15-35% of the managed wetlands as seasonal sanctuary.

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

Objective 2.1: Enhance and manage approximately 1,581 acres of grassland habitat to benefit a wide variety of native wildlife and desired game species.

Objective 2.2: Enhance and manage approximately 307 acres of shrub habitat to benefit a wide variety of native wildlife and desired game species.

Objective 2.3: Enhance and manage approximately 397 acres of agricultural upland habitat to benefit a wide variety of native wildlife and desired game species.

Objective 2.4: Enhance and manage approximately 760 acres of mixed conifer habitat to benefit a wide variety of native wildlife and desired game species.

Objective 2.5: Enhance and manage approximately 38 acres of deciduous tree habitat to benefit a wide variety of native wildlife and desired game species.

Objective 2.6: Maintain and improve wildlife area facilities, structures and equipment used to conduct habitat management and public use projects.

Objective 2.7: Provide supplemental big game feed to protect upland habitats on Ladd Marsh Wildlife Area and adjacent private land.

Goal 3: To provide a variety of wildlife oriented recreational and educational opportunities to the public which are compatible with Goals 1 and 2.

Objective 3.1: Provide hunting and angling opportunities in a manner compatible with habitat management objectives.

Objective 3.2: Provide wildlife viewing and education/interpretation opportunities compatible with Objective 3.1 and habitat management objectives.

Specific objectives and strategies to implement each goal, as well as detailed rationale, are provided in this plan on pages 43-58.

Wildlife Area Establishment

The original Tule Lake in the south end of the Grande Ronde Valley encompassed over 20,000 acres at an elevation of 2,750 feet. Extensive draining of the marsh was initiated in the late 1800s to provide agricultural and grazing land. By 1948 the original tule marsh was reduced to 400 acres. In 1949, the Department pursued the purchase of the last original wetland acreage left in the valley. Today the tule marsh located on the LMWA is the largest remnant wetland in northeast Oregon.

LMWA currently consists of 6,019 acres, with the most recent acquisition of 136 acres occurring in 2004. (See **Appendix A** for detailed acquisition history).

Description and Environment

Physical Resources

Location

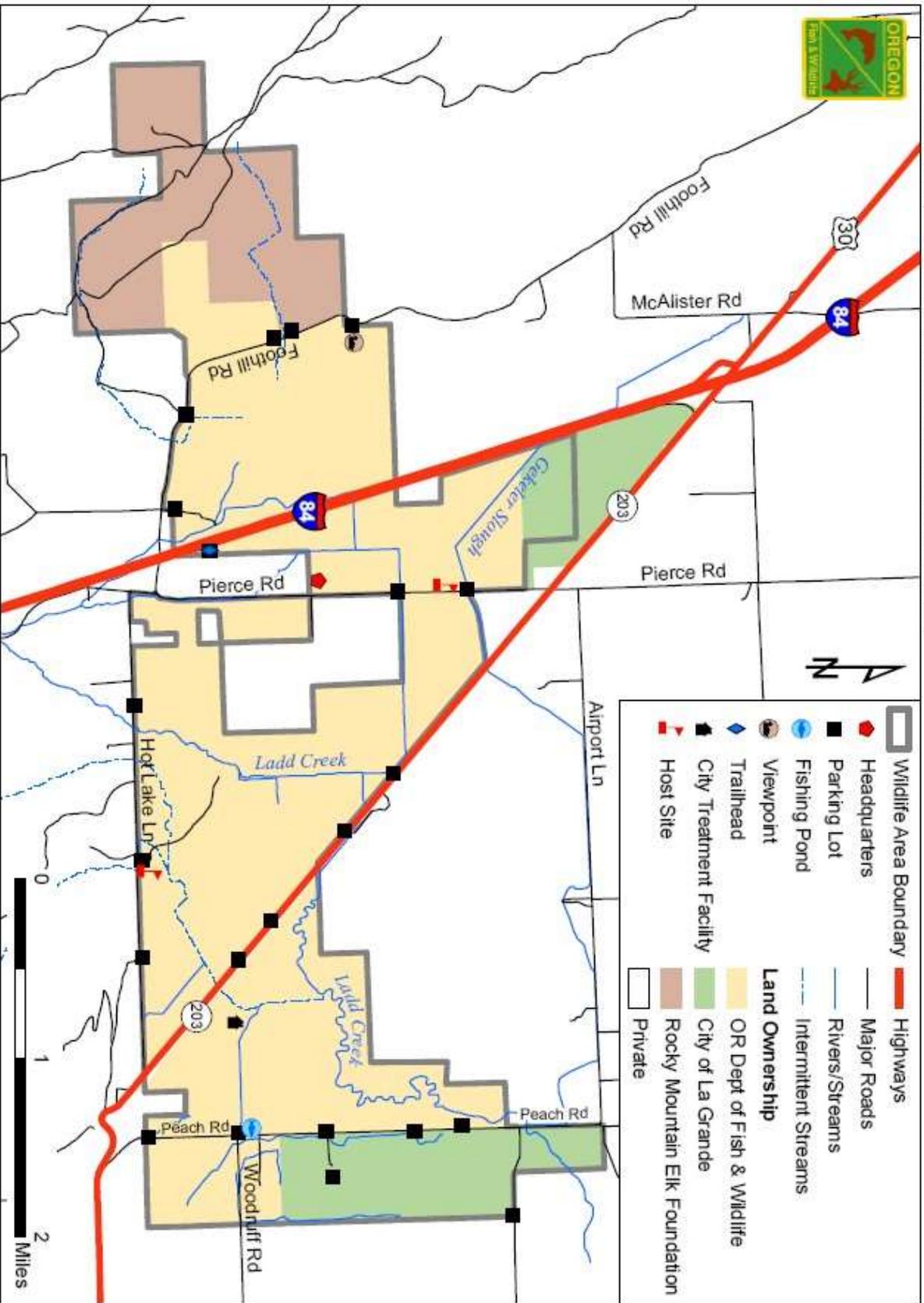
The LMWA is located in the southwest corner of the Grande Ronde Valley in northeast Oregon. The headquarters is located at 59116 Pierce Road, approximately six miles southeast of the city of La Grande. LMWA is located in the Intermountain West region of the North American Waterfowl Management Plan and the Blue Mountains ecoregion described in the 2016 OCS.

The wildlife area consists of eight Habitat Management Units (HMUs). See **Appendix G** for detailed Habitat Management Unit descriptions. **Figure 1** shows the location and key features of LMWA.

Climate

The Grande Ronde Valley has a modified continental climate. Winters are cool and moist, and summers are warm and dry. Temperature extremes range from -34°F to 108°F, with prevailing winds regularly exceeding 20 mph. Precipitation averages 19 inches with most of this falling during the winter months. Wetlands may freeze from November through February. The growing season is approximately 115 days with mild to hot days followed by cool nights. Killing frost is possible throughout the season.

Figure 1 - Ladd Marsh Wildlife Area Features and Ownership



Topography and Soils

LMWA is located in the Grande Ronde Valley with the Wallowa Mountains to the east and the Blue Mountains to the west. LMWA elevations range from 2,685 feet at the mouth of Ladd Creek to 5,391 feet on Glass Hill. A total of twenty-four soil types are present on LMWA. The soils on the valley floor (below 2,700 ft.) are moderately deep, somewhat poorly drained that formed in lacustrine sediment mixed with diatomaceous sediment and volcanic ash. The most prevalent soil types are moderately fertile silt loams with low to severe salinity and/or alkalinity, and are often associated with a hardpan. Wind erosion ranges from moderate to severe.

The mid elevation soils (2,700 – 2,800 ft.) are shallow to moderately deep, well drained soils that formed mainly in colluvium and residuum derived from basalt and volcanic tuff. These soils historically supported mixed shrub-grassland habitats.

Soils above 2,800 ft. are moderately deep, well drained soils that formed in volcanic ash and loess and in colluvium and residuum derived from volcanic tuff and basalt. These soils support predominately mixed conifer habitats.

Habitat Types

Currently, LMWA contains a variety of palustrine wetland types including palustrine forested (riparian areas) and palustrine emergent vegetation that includes a range of hydroperiods from intermittently to seasonally, semi-permanently and permanently flooded (wet meadows, marshes, shallow lakes). Each wetland type occurred historically in the Ladd Marsh area and each provides different resources or similar resources at different times of year to birds, other wildlife and fish.

LMWA provides habitat for migrating, wintering and breeding waterfowl as well as a variety of other waterbirds, including breeding greater sandhill crane (*Grus canadensis*), a sensitive species in Oregon. The wildlife area also supports significant numbers of elk and deer in winter. Historically, habitats in the Ladd Marsh area consisted of a large shallow lake and associated fringe wetlands maintained by snow melt and runoff through Ladd Creek and artesian springs. There was also considerable wetland habitat associated with Ladd Creek and other streams in the region. River channelization, tile drains, and water diversion for irrigation led to loss of the lake and a considerable reduction in wetlands. In lieu of the natural ecosystem, LMWA staff has recreated specific habitat types using a series of managed impoundments. Recent infrastructure improvement projects have considerably increased the total acreage of wetlands under management.

Physical features (elevation, aspect, soil type and presence of water) and historical and ongoing management has created a broad array of habitat types at LMWA. Nearly half of the area consists of shallow fresh water wetlands. Wetland water depths rarely exceed three feet in borrow areas, canals and ponds. The remaining wetlands vary between a few inches to two feet in depth. Wetlands are delineated into additional sub-types based on hydrology modifiers (Cowardin et al., 1979). Upland habitats include mixed conifer at the higher elevations, upland shrub at mid elevations, and agricultural areas and grasslands on the valley floor.

LMWA habitat types are shown in **Figure 2**.

Wetland, riparian, grassland, shrubland and ponderosa pine habitats are considered Key Habitats within the Blue Mountain ecoregion as defined in the OCS. The OCS recommends conservation actions such as wetland, riparian and grassland restoration, which are high priority activities ongoing at LMWA. **Table 1** shows the approximate acreage of each habitat type occurring on LMWA.

Table 1. Habitat composition on the Ladd Marsh Wildlife Area.

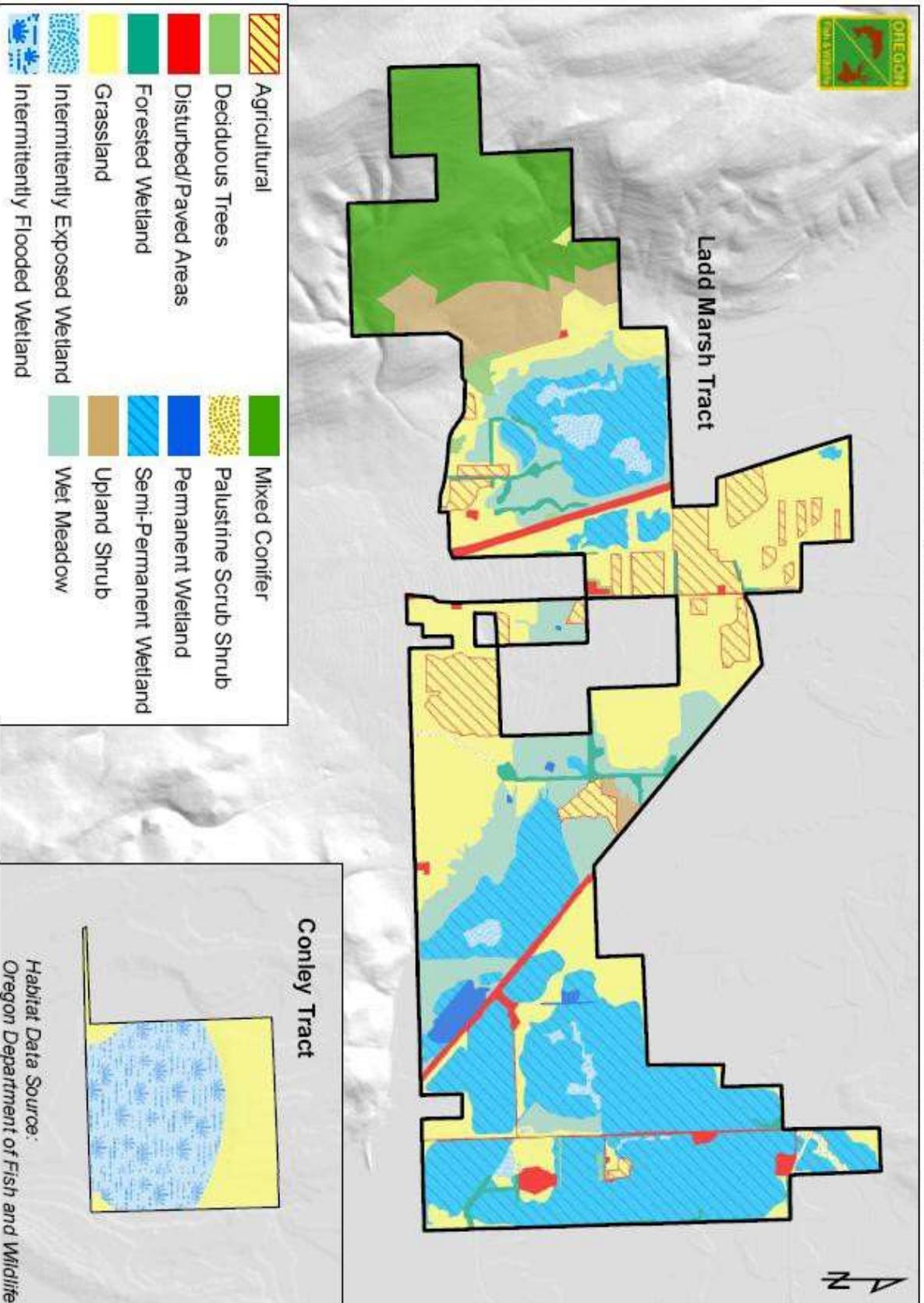
Habitat Type	Approximate Acres
Palustrine wetlands	
Permanently flooded	45
Intermittently exposed	110
Semi-permanent wetlands	1,811
Seasonally flooded (wet meadows)	658
Intermittently flooded	113
Forested wetlands	116
Palustrine shrub-scrub	26
Total	2,879
Riverine wetlands	11
Uplands	
Grasslands	1,581
Upland shrub	307
Agricultural uplands	397
Mixed conifer (includes Ponderosa pine)	760
Deciduous trees	38
Facilities	46
Total	3,129
Total	6,019

Habitat types found on LMWA are described in greater detail below.

I. Wetlands

Descriptions of wetland habitat types follow the classification scheme of Cowardin et al. (1979). 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 influence bird use. Consequently, additional habitat descriptions are provided based on hydrology modifiers defined by Cowardin et al. (1979). Nearly all of the semi-permanent wetlands and the intermittently exposed wetlands are managed with dikes and individual water delivery systems. While the habitat associations are

Figure 2 - Habitat Types within Ladd Marsh Wildlife Area



described below as discrete, they represent a continuum from dry to wet and when considering topographical variation on LMWA, each may occur in close juxtaposition to others in a single habitat management unit.

IA. Palustrine wetlands

1. **Permanently flooded:** Permanently flooded wetlands are covered with water throughout the year, in all years. They are mostly open water areas with water depths of four feet or less. They are maintained by constant water sources including springs and high ground water. Vegetation is dominated by obligate hydrophytes including sago pondweed (*Stuckenia pectinata*) and mare"s tail (*Hippuris vulgaris*). Wetland edges are often dominated by cattails (*Typha latifolia*) and hardstem bulrush (*Scirpus acutus*). These areas are extremely important for waterfowl broods during dry periods.
2. **Intermittently exposed:** Intermittently exposed wetlands have water present throughout the year except in years of extreme drought. These areas function similarly to permanently flooded areas during most years but dry completely during extremely dry summers. Periodic drying is important for nutrient recycling and carp (*Cyprinus carpio*) control. They are dominated primarily by sago pond weed (*Stuckenia pectinate*) and mare"s tail (*Hippuris vulgaris*). Much like permanently flooded wetlands, these areas are extremely important for wildlife in late summer.
3. **Semi-permanent wetlands:** Semi-permanent wetlands have surface water present for extended periods, especially early in the growing season, but water is absent by the end of the season in most years. The majority of Ladd Marsh wetlands are semi-permanently flooded and managed with dikes and water delivery systems. Since 1998, LMWA staff has restored approximately 1,200 acres of this habitat type. Therefore, different wetlands are in varying successional stages. Recently restored wetlands are dominated by annual species including biennial wormwood (*Artemesia biennis*), alkali aster (*Aster frondosa*) and beggar"s-tick (*Bidens vulgata*). Mid-succession wetlands have wapato (*Sagittaria cuneata*), waterplantain (*Alisma plantago-aquatica*) and common spikerush (*Eleocharis palustris*) as dominant species with patches of cattails and hardstem bulrush. Late successional wetlands begin to show monocultures of cattails and reed canarygrass (*Phalaris arundinacea*). Semi-permanent wetlands are extremely productive for annual plant seeds which are important for migrating waterfowl. They also provide important habitat for invertebrates. Invertebrates are important for waterfowl egg production, broods and molting. They also provide food for other water birds such as American avocets (*Recurvirostra americana*) and black-necked stilts (*Himantopus mexicanus*).
4. **Seasonally flooded (wet meadow):** In this habitat type, surface water is present for extended periods early in the growing season, but absent by the middle of the season in most years. Tufted hairgrass (*Deschampsia caespitosa*), camas (*Camassia quamash*), a variety of sedges and reed

canarygrass are the major plant species in these areas. Wet meadows are extremely important Canada (*Branta Canadensis*) and white-fronted (*Anser albifrons*) goose foraging areas during spring migration. Some of these areas are mowed annually after the nesting period to provide better quality forage. Seasonally flooded wetlands are also important for invertebrate production in spring and early summer.

5. Intermittently flooded: The substrate of this habitat type is usually exposed, but surface water is present for variable periods. Weeks, months, or even years may intervene between periods of inundation. The dominant plant communities under this regime may change as soil moisture conditions change. The wetlands of this type on the Conley Lake unit are an important spring migration area in northeast Oregon during years with average or above average precipitation. In 1997, when Conley Lake was inundated, over 1,000 swans, 3,000 white-fronted geese and numerous other waterbirds were observed on the area. Conley Lake is a shallow playa that is dry most of the year. Salt grass and various forb species are common. Hardstem bulrush was present in the deepest area in the past. Historically this area was filled by high ground water and spring runoff almost every year. Northeast Oregon has been experiencing extremely dry conditions for several years. Consequently, Conley Lake has not had sufficient water to attract migratory water birds during that period. Several irrigation wells were recently put in which may contribute to changes in ground water conditions in the area.
6. Forested Wetland: Forested wetlands are characterized by woody vegetation that is 20 feet tall or taller. Forested wetlands on LMWA generally occur along streams, borrow areas and canals. Common overstory species are non-native willow (*Salix* spp.) and native black cottonwood (*Populus trichocarpa*). Understory species include snowberry (*Symphoricarpos albus*) and reed canarygrass. Forested wetlands provide foraging and nesting habitat for numerous bird species including red-tailed hawk (*Buteo jamaicensis*), Bullock's oriole (*Icterus galbula*) and willow flycatcher (*Empidonax trailii*).
7. Palustrine Scrub-shrub: Scrub-shrub wetlands are dominated by woody vegetation less than six meters (20 feet) tall. Scrub-shrub wetlands on Ladd Marsh are generally found adjacent to the three branches of Ladd Creek. Dominant plant species include coyote willow (*Salix exigua*), red-osier dogwood (*Cornus stolonifera*) and golden currant (*Ribes aureum*). These areas provide habitat for a wide array of neo-tropical migrant bird species including common yellowthroat (*Geothlypis trichas*), eastern and western kingbirds (*Tyrannus tyrannus* and *T. verticalis*) and a number of warblers.

IB. Riverine wetlands

The riverine system on LWMA consists of several miles of three branches of Ladd Creek and several small intermittent streams. This habitat type includes wetlands contained within a channel. A channel is an open conduit either naturally or artificially created which periodically or continuously contain moving water. Ladd Creek provides migration, wintering and spawning habitat for several fish species including steelhead. Most of

Ladd Creek and the small streams were channelized in the late 1800s and early 1900s.

II. Uplands:

1. Grasslands: Wetlands and grasslands dominated the Grande Ronde valley prior to European settlement. Grasslands consisted primarily of basin wild rye (*Elymus cinereus*) on the deeper soils of the valley floor and bluebunch wheatgrass (*Agropyron spicatum*) and Idaho fescue (*Festuca idahoensis*) on the drier, shallow soils on the hillsides. Conversion to agricultural and intensive grazing has eliminated or degraded many of the grassland areas on Ladd Marsh. The introduction of exotic annuals including medusahead rye (*Elymus caput-medusae*) and cheatgrass (*Bromus tectorum*) has also had a negative impact on this habitat type. Several hundred acres of grassland have been restored in recent years. However, with recent expansion of the area, many new areas are in need of restoration or enhancement actions. Native seed collected on or near the area was used for most grassland restoration projects.
2. Upland Shrub: Two community types have been included in this habitat type. Greasewood-basin wild rye habitat occurs on slightly elevated, sandy soils on the valley floor. Interspersed with the grasslands, this habitat type provides excellent winter cover for pheasant and California quail. It also provides foraging and nesting habitat for shrub-grassland dependant species.

Another upland shrub habitat type exists between the mixed conifer and the grasslands. This type historically had bitterbrush (*Pursha tridentata*), sagebrush (*Artemisia ludoviciana var. ludoviciana*) and black hawthorn (*Crataegus douglasii*) as the dominant shrub species with bluebunch wheatgrass and Idaho fescue in the understory. Hawthorn is the only native species remaining in this habitat. Invasive species including sweetbriar rose (*Rosa eglanteria*), medusahead rye and cheatgrass have invaded and now dominate many areas. Bitterbrush was successfully restored to a small area in the Bench Management Unit in 1998. Another area in the Glass Hill Management Unit was burned, chemically treated and seeded in 2005. Although drought conditions slowed initial native grass seed establishment, the site now has a great stand of native grass.

3. Agricultural uplands: Excluding permanent wetlands, the entire LMWA was either grazed or farmed before Department management. Large tracts have been restored to wetlands and grasslands over time but approximately 397 acres of agricultural land still exists today and are part of the our crop share leases. These areas produce a variety of food crops for wildlife including elk, pheasants and waterfowl. Irrigation is available in several areas to improve the quantity and quality of crops. Crops include cereal grains such as wheat (*Agropyron intermedium*) and barley (*Hordeum jubatum*) as well as sunflowers (*Helianthus annuus*) and sorghum (*Sorghum bicolor*). Alfalfa (*Medicago sativa*) is grown for spring and fall elk habitat as well as winter feed.

About two-thirds of the food production is accomplished through a sharecrop system where the cooperator produces a crop but leaves one-third for wildlife. The sharecropping plan is reviewed each year by LMWA staff and the cooperator(s) to assess how the program contributes to achieving management objectives. Specific crops raised are selected by the cooperator, with department staff review to ensure the crops are compatible with wildlife area objectives. Earliest annual harvest dates and other guidelines are provided by LMWA staff in order to minimize disturbance to nesting birds and other wildlife.

Livestock grazing is not currently utilized for vegetation management on the LMWA. Nevertheless, grazing was utilized in the past and may be again if it is deemed the most effective method to achieve management objectives. If grazing is reinstated on the area, an agreement will be drawn up between the grazing permittee and the department to describe allowable stocking rates, grazing period and other guidelines.

4. Mixed Conifer: This habitat type is in the higher elevations on the west side of the wildlife area within the Glass Hill Management Unit. It has been moderately logged in several areas. Conifer species present include Ponderosa pine (*Pinus ponderosa*) on the lower drier sites and a mixture of grand fir (*Abies grandis*), Douglas-fir (*Pseudotsuga menziesii*) and western larch (*Larix occidentalis*) at higher elevations. Ponderosa pine habitats have been designated as a priority habitat for the Blue Mountain ecoregion in the Oregon Conservation Strategy. Some areas have an understory of shrubs including serviceberry (*Amelanchier* sp.), mallow ninebark (*Physocarpus malvaceus*) and snowberry. Understory grasses include Sandberg bluegrass (*Poa bulbosa*), bluebunch wheatgrass and Idaho fescue. This habitat type provides habitat for an array of forest birds including white-headed (*Picoides albolarvatus*) and pileated (*Dryocopus pileatus*) woodpecker, dusky (*Dendragopus obscurus*) and ruffed (*Bonasa umbellus*) grouse, lazuli bunting (*Passerina amoena*) and red-breasted nuthatch (*Sitta Canadensis*). This area is important as thermal and hiding cover for resident and migratory elk. A resident herd of 30-50 elk use this area throughout the year. Winter numbers of elk may reach 400.
5. Deciduous Trees: This habitat is mostly planted trees and shrubs consisting of old home sites, orchards and wildlife plantings. Various volunteer groups including schools, scouts, and other conservation groups have planted trees and shrubs over the years. Many non-native species such as Siberian pea (*Caragana arborescens*) and Russian olive (*Elaeagnus angustifolia*) were planted in the 1960s for upland game food and cover. More recently, plantings have shifted to native species such as Ponderosa pine, black cottonwood (*Populus trichocarpa*) and golden currant.

This habitat provides food and cover for ring-necked pheasant (*Phasianus colchicus*), California quail (*Callipepla californica*) and gray partridge (*Perdix perdix*). Passerine birds use these areas for foraging and nesting as well. Old orchards and scattered fruit trees provide food for a variety of wildlife including bear (*Ursus americanus*), white-tailed deer (*Odocoileus virginianus*) and

numerous bird species.

Description of Management Units

LMWA consists of eight habitat management units (HMUs), shown in **(Figure 4)**. These units have been delineated based on historic uses, physical features or boundaries, vegetation types, current or past management activities and water sources **(Appendix G)** describes these management units in further detail.

To understand habitat management on LMWA, it is important to understand the sources of water and the distribution, timing and volume of water available. The wetlands on the LMWA get their water from a variety of sources including ground water; year-round or seasonal springs; Ladd Creek, either direct flooding or through diversions; Barney and un-named intermittent streams; irrigation diversions from Catherine Creek; and treated wastewater from the City of La Grande. The descriptions of HMUs **(Appendix G)** include a discussion of the sources of water in each unit. Wetland cells within a HMU may be located in series so that one cell must be filled before water will move into another. In these cases, management actions in one cell may affect adjacent or “downstream” cells. In other cases, cells may be managed completely independently from adjacent cells within the same HMU.

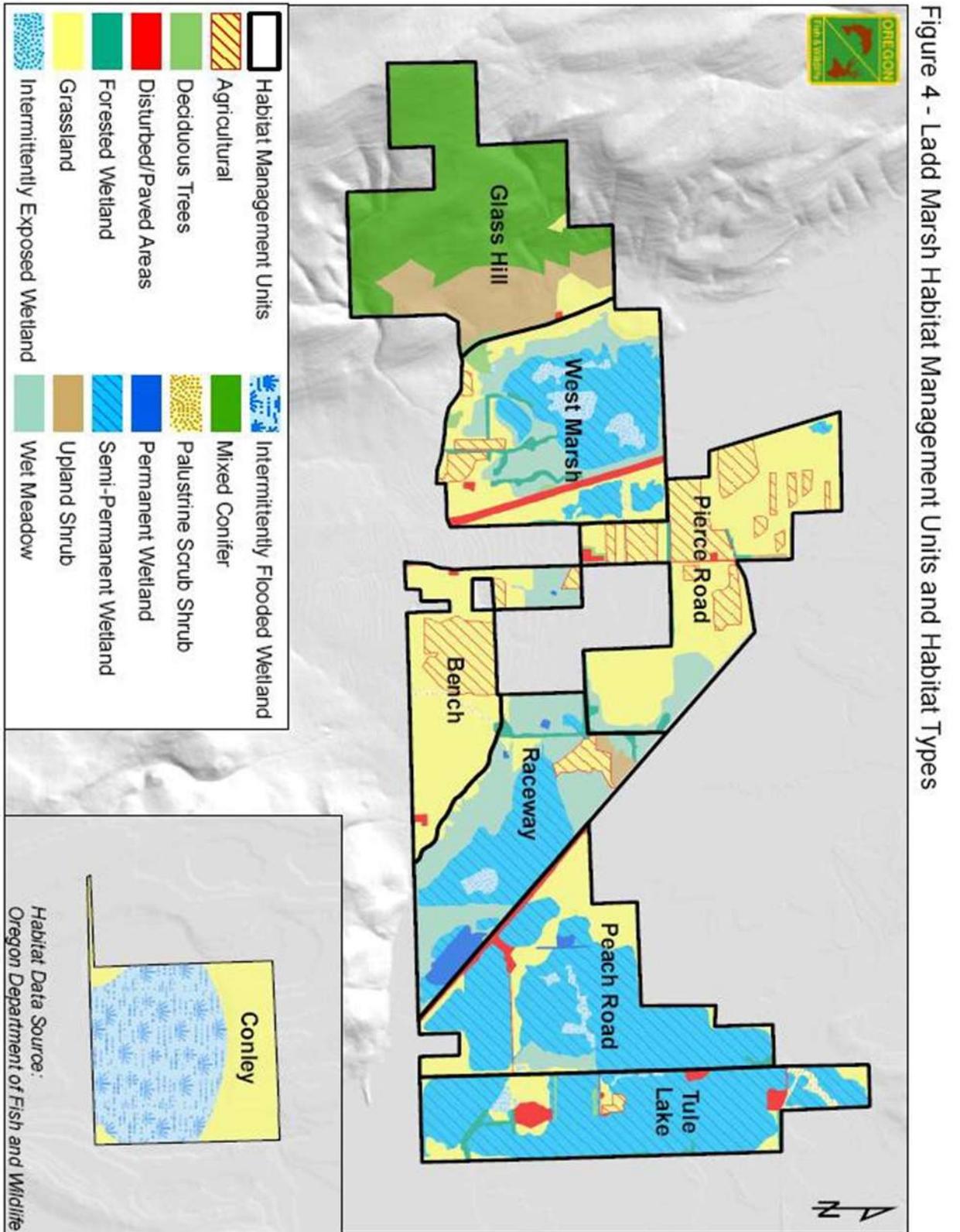
By late summer, virtually all sources of water dry up and very little water is available for management activities. Ladd Creek, Barney Creek and the un-named streams become completely dewatered by late June or July and groundwater levels drop below the level of most pond bottoms. Huge evaporation losses from the wastewater treatment facilities preclude the delivery of water to LMWA from these facilities during the hot, dry weather of late summer. Only the permanent wetlands, fed by springs, typically retain water during this period.

During late summer and early autumn, water management options on LMWA are extremely limited and most wetland cells dry out. These limitations on water availability are important considerations affecting habitat management on the wildlife area.

Biological Resources

Wetland dependent or wetland obligate wildlife, primarily birds, are the major wildlife resource on LMWA. Over 240 species of birds have been recorded on LMWA and over 120 species nest on the area. Comprehensive inventory data for mammal and amphibian and reptile (herptile) species is lacking, but at least 50 mammal and 14 herptile species have been documented on the area. Invertebrate occurrence and abundance has not been inventoried and is unknown although some species have been recorded incidental to other activities. These include 20 species of the family *Odonata* (dragonflies and damselflies), 240 species of *Lepidoptera* (including 60 butterflies and 180 moths), 15 *Hymenoptera* (honeybee and native bumblebees) and several species of flies, beetles and other insects.

See **Appendix C** for a list of wildlife species.



Birds

Birds are the most important and dominant wildlife component at LMWA in terms of numbers of species and individuals. Waterfowl and other water birds are the major species complexes utilizing LMWA. Breeding season use has expanded over the past ten years in response to wetland habitat restoration and management activities. Habitat management activities and improvement projects have been designed with wildlife diversity as a focus and essentially all species utilizing LMWA have benefited. LMWA plays an important role in meeting life-cycle needs for a wide variety of species. Natural areas that meet those needs are generally lacking elsewhere in the Blue Mountains ecoregion.

Waterfowl

LMWA has moderate breeding populations of ducks (13 species represented) and Canada geese. Populations nesting on LMWA are estimated at approximately 250 pairs of Canada geese and 1,500 pairs of ducks including mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*) and cinnamon teal (*Anas cyanoptera*). Smaller numbers of other duck species such as northern shoveler (*Anas clypeata*), redhead (*Aythya americana*), lesser scaup (*Aythya affinis*), northern pintail (*Anas acuta*), ruddy duck (*Oxyura jamaicensis*) and wood duck (*Aix sponsa*) also nest on LMWA.

These breeding species, supported by the diverse habitats of Ladd Marsh, contribute to continental waterfowl population goals set in the North American Waterfowl Management Plan and support conservation efforts under the Intermountain West Joint Venture. Recoveries and recaptures of ducks and Canada geese banded at LMWA over the past ten years reveal a contribution to harvest in a variety of Pacific Flyway states and Canadian provinces.

The LMWA is an important migration stopover for waterbirds in the Pacific Flyway; it provides important feeding and resting habitat for those populations. Most conspicuous among spring migrants, because they are rarely seen in other seasons, are tundra swans (*Cygnus columbianus*) and Pacific greater white-fronted geese. Flocks of white-fronted geese numbering up to several hundred typically use LMWA for two to four weeks each spring. Small numbers of the tule subspecies (*A. albifrons elgas*) usually occur with these flocks as well.

Swans occur on the LMWA during winter and spring. Groups of 60 to more than 300 tundra swans spend one to two months on LMWA each spring preparing to move north to their breeding areas. Trumpeter swans (*Cygnus buccinator*) are occasional winter visitors to Ladd Marsh. These are thought to be resident birds from Summer Lake or other southern Oregon locales that make brief forays to find open water when their home habitats have frozen.

Shorebirds

LMWA supports breeding and migrant shorebirds. Common breeding species are estimated as follows.

- *American avocet* 100-125 pairs

- *Black-necked stilt* 50-75 pairs
- *Wilson's phalarope (Phalaropus tricolor)* 30-50 pairs
- *Killdeer (Chadrius vociferous)* 100-150 pairs
- *Wilson's snipe (Gallinago delicata)* 100-150 pairs
- *Long-billed curlew (Numenius americanus)* 2-5 pairs
- *Spotted sandpiper (Actitis macularia)* 30-50 pairs

Of the shorebirds that nest on LMWA, American avocet, black-necked stilt, Wilson's phalarope and long-billed curlew (*Numenius americanus*) are all considered *Critically Important* in the Intermountain West (Oring et al. 2000). Additionally, long-billed curlew is an Oregon *Strategy Species* (ODFW, 2016). Oregon's *Strategy Species* were selected because their populations are "low and declining" or are otherwise at risk" (ODFW, 2016: 314).

Spring and fall migrational use of LMWA by shorebirds is variable and determined by both weather patterns and water levels and is generally limited to small numbers of any given species. Shorebird species observed on the LMWA during migration include:

- *Long-billed dowitcher (Limnodromus scolopaceus)*
- *Long-billed curlew*
- *American avocet*
- *Black-necked stilt*
- *Killdeer*
- *Western (Calidris mauri)*
- *Least sandpiper (Calidris minutilla)*
- *Red-necked phalarope (Phalaropus lobatus)*

Generally, good to excellent habitat conditions coincide with spring migration time periods. Within the wetlands of LMWA, decreased precipitation and increased evapotranspiration exposes mudflats and muddy shorelines in the spring creating favorable foraging conditions that extend well into the breeding season.

Fall migration use is generally protracted, beginning as early as late June and extending into October as non-breeding birds and unsuccessful breeders return from northern breeding locales en route to southern wintering areas. Weather and climatic patterns affect the timing and duration of fall migration and stopovers at LMWA. Many of the wetlands on Ladd Marsh dry out over the summer and into the fall. Receding water lines along the edges of ponds and wetlands expose muddy shores and create favorable foraging conditions for migrating shorebirds. These conditions persist until water levels rise due to autumn rains and/or management actions or until freezing temperatures push migrants farther south.

Colonial Nesting Waterbirds

Ladd Marsh has not, historically, hosted waterbird nesting colonies with the exception of black-crowned night herons (*Nycticorax nycticorax*). However, a sizeable heron rookery is located on private land along Catherine Creek approximately 0.5 miles from the boundary of the LMWA. Occupancy of the rookery is estimated at 20-25 pairs of great blue herons (*Ardea herodias*). In addition to great blue herons, black-crowned night herons, double-crested cormorants (*Phalacrocorax auritus*) and great egrets (*Ardea alba*) have also begun nesting in the colony in recent years. Adult and post-fledging juvenile birds from the rookery utilize Ladd Marsh during the non-breeding seasons and for foraging during the breeding season. Black-crowned night heron nesting areas vary from year to year with one to three colonies on LMWA in any given season.

The area's first nesting colony of white-faced ibis (*Plegadis chihi*) was documented in 2007. This pioneering colony numbered four or five pairs. Although a few ibis have been observed annually during the spring for several years, they had not nested on LMWA previously. Land acquisition and wetland restoration from 2004- 2014 improved both the quality and availability of habitat, creating more favorable conditions for a nesting colony. No nesting by white-faced ibis has been documented since 2007. Given that white-faced ibis colonies are somewhat nomadic, it is expected that nesting will occur again at some time.

A small colony of eared grebes (*Podiceps nigricollis*), numbering 10-15 pairs, has been nesting on LMWA for over a decade. Changing water levels cause the colony to move to different locations each year.

Great blue heron, black-crowned night heron and white-faced ibis are all species of moderate concern and eared grebe is a species of low concern in the Intermountain West Waterbird Conservation Plan (Ivey and Herziger 2006).

Other Waterbirds

Greater sandhill cranes are a regular breeding species on LMWA that have increased in number from the first documented nesting pair in 1972 to 20 – 25 pairs currently. Cranes found on LMWA were previously thought to all be part of the Central Valley Population (CVP) which is receiving considerable management attention by the Pacific Flyway states. This population is recognized as a threatened species in California and endangered in Washington. Color-marking and satellite telemetry monitoring since 2007 has shown that, although most do winter with the CVP at least some of the cranes nesting at LMWA are affiliated with the Lower Colorado River Valley Population.

Ladd Marsh is also used by several hundred greater sandhill cranes and lesser (*G. c. canadensis*) sandhill cranes during spring and fall migration. Just as the population to which the breeding birds belong is unknown, it is also unknown where cranes that migrate through LMWA breed or spend the winter.

The greater sandhill crane is listed as Sensitive/vulnerable in Oregon and is an Oregon Strategy Species. It is also a species of concern in the Intermountain West

Waterbird Conservation Plan (Ivey and Herziger 2006). Increased monitoring of both breeding and migratory sandhill cranes on LMWA may help determine changes in vegetation management needed to meet the objectives of the wildlife area while contributing to the overall health of the Intermountain West population of sandhill cranes.

LMWA provides habitat to several species of secretive marsh birds such as Virginia rail (*Rallus limicola*), and Sora (*Porzana Carolina*), all of which breed on the area. This group of species is of particular interest because their secretive habits make it difficult to assess population status. In 2006 - 2008, LMWA staff participated in a continent-wide effort to survey secretive marsh birds using audio playback of recorded calls. Beyond the formal surveys, secretive marsh birds are documented incidental to other activities.

American coots (*Fulica americana*) are common breeders on the wildlife area with annual production estimated at 300 - 500 young. Pied-billed grebes (*Podilymbus podiceps*) are also common, having been detected at over half of the 50 locations (stations) surveyed in 2006 - 2008. Virginia rail and sora are abundant on LMWA wetland habitats during the breeding season. One or both of these species was detected at three-quarters of the stations surveyed, with many of the stations reporting two to five birds. One or more Virginia rails are typically detected on Ladd Marsh during the Christmas Bird Count indicating some winter use or very late migration by the species.

American bittern (*Botarus lentiginosus*) is less common than rails but nests in relatively high numbers on Ladd Marsh. American bittern is less likely to respond to recorded calls so it is more difficult to detect during surveys; most detections were of birds calling spontaneously, not in response to playback. This, combined with their very secretive nature, may result in an underestimate of numbers of American bitterns on LMWA.

Ladd Marsh is outside the normal range of yellow rail (*Coturnicops noveboracensis*). However, suitable habitat for the species is present on LMWA and a single yellow rail was observed near the wildlife area boundary in the early 2000's.

Upland game birds

California quail are very numerous especially in upland habitats scattered throughout LMWA. Grasslands bordered by shrubs provide food and security cover for this species.

Ladd Marsh hosts a self-sustaining, breeding population of ring-necked pheasants. Annual production numbers several hundred and is enough, in most years, to off-set losses to predation. During years of low rodent populations, pressure on pheasants is increased as raptors and other predators take what prey they can find, including young pheasants. As emergent wetlands dry out in the fall and remain dry into winter, the remaining robust emergent vegetation provides excellent winter cover for ring-necked pheasants.

Ruffed grouse and dusky grouse are found in the higher elevation conifer habitats on the west side of LMWA and are occasionally seen in the uplands on the valley floor. Gray partridge also occurs on Ladd Marsh, although in relatively low numbers. This

species utilizes upland habitats throughout the wildlife area.

Other Birds

Passerine birds are very numerous during migration periods, utilizing virtually all of the habitats found on the LMWA. The variety of habitats, from emergent wetlands to higher elevation mixed conifer, available on LMWA offer a range of food and cover options important to migrating birds in both spring and fall.

Over 50 species of passerine birds are known to breed on the wildlife area. These include species of regional and continental concern to Partners in Flight as well as state sensitive species.

In 2018, the non-profit group Friends of Ladd Marsh began a constant effort mist netting station which follows the Institute for Bird Populations (IBP) Monitoring Avian Productivity and Survivorship (MAPS) protocol. The data collected through this project will significantly increase our understanding of passerine presence, abundance and use of the area.

LMWA is also home to a variety of raptors, both diurnal and nocturnal. Twelve species of hawks and eagles nest on Ladd Marsh or nearby and hunt the varied habitats of the wildlife area. A number of species also use the LMWA during the winter including bald eagles (*Haliaeetus leucocephalus*), red-tailed hawks (*Buteo jamaicensis*), northern harriers (*Circus cyaneus*) and rough-legged hawks (*Buteo lagopus*).

Nine species of owls nest and rear young on LMWA. These predatory birds hunt waterfowl and other birds in addition to the small and mid-size mammals found on the wildlife area.

Mammals

At least 50 species of mammal occur on LMWA. Although no comprehensive surveys for mammals have been conducted, mammal species have been documented through incidental observation and small-scale trapping efforts.

The LMWA supports several species of ungulate either seasonally or as year-round residents. The most significant of these in terms of population numbers, public visibility and habitat need is Rocky Mountain elk (*Cervus elaphus*). As many as 700 elk from two herds utilize the LMWA primarily from late summer through winter. During these seasons, approximately 200 – 300 head move almost daily from the higher elevation conifer habitat on Glass Hill down slope into the wetlands of the West Marsh unit.

Similarly, 300-400 head move from private lands on Craig Mountain down slope into the Bench and Pierce Road units. These animals provide excellent wildlife watching opportunities as they can be observed from public roads during their daily movements or while feeding or resting on the wildlife area.

The LMWA provides critical winter range for these elk herds that likely wandered widely around the valley prior to settlement by Euro-Americans. The winter feed and security offered by the habitats of LMWA help in keeping the elk from moving onto

private agricultural lands and causing damage to crops and/or haystacks. During severe winters, elk may be fed at one, and less often two, locations on the wildlife area. Supplemental feeding encourages elk to stay within the wildlife area during times of thermal stress and relieves pressure from such concentrated herds on the limited natural winter habitat.

Both mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*) occur year-round on the LMWA. Both species take advantage of a variety of habitats throughout the area to meet their life-history needs. From the mixed conifer zone of the Glass Hill unit to the robust emergent vegetation of the wetlands, deer can be found virtually anywhere on the LMWA.

A small herd of pronghorn (*Antilocapra americana*) had become near year-round residents of the LMWA. Up until 2000, pronghorns generally moved onto the wildlife area in the spring and stayed a few weeks until after their fawns were born. They then moved off the area to higher elevation pastures to the southeast. Pronghorns currently spend the majority of the year on adjacent landowners and visit Ladd Marsh periodically. As restoration took place creating vast open areas the Pronghorn spent increasingly more time on the area but now that the habitat has grown in, less desirable habitat exist. When visiting the marsh, they prefer open fields and are usually visible from public roads, creates excellent viewing opportunities for the public.

Furbearers present on LMWA include beaver (*Castor canadensis*), bobcat (*Lynx rufus*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), and raccoon (*Procyon lotor*). Muskrats are especially numerous throughout LMWA wetlands. This species provides considerable habitat benefits through vegetation clipping and house construction, but may cause problems due to burrowing activity and den construction in dikes and levees. However, given that most of the wetlands on Ladd Marsh dry out each summer, habitat limitations serve to somewhat regulate muskrat populations and problems with them are minimal.

Beavers are thought to have once been abundant in the habitats of LMWA but they were virtually absent from the wildlife area for several decades. However, stream and riparian area restoration activities since 2000 will, over time, result in an increase in the quantity and quality of riparian habitat. It is expected that beavers will take advantage of those improvements and re-colonize LMWA in the future.

Bobcats occur primarily on Glass Hill but may venture into the lowlands on occasion. Raccoons and mink are both relatively common and can be significant predators on ground-nesting birds and their eggs.

Species that occur in relatively high numbers include coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), long-tailed weasel (*Mustela frenata*), mountain cottontail (*Sylvilagus nuttallii*), Belding's (*Spermophilus beecheyi*) and Columbian (*S. columbianus*) ground squirrels, northern pocket gopher (*Thomomys talpoides*) and a variety of small rodents and shrews (species occurrence or abundance is unclear).

Species that occur but are less numerous include river otter (*Lontra canadensis*),

badger (*Taxidea taxus*), yellow-bellied marmot (*Marmota flaviventris*), porcupine (*Erethizon dorsatum*), black bear and cougar (*Puma concolor*). Black bear and cougar are found primarily on Glass Hill but occasionally move into the lowlands, presumably in search of food.

Additionally, Glass Hill provides habitat for red squirrel (*Tamiasciurus hudsonicus*), fox squirrel (*Sciurus niger*), yellow pine chipmunk (*Tamias amoenus*) and, likely but not verified, northern flying squirrel (*Glaucomys sabrinus*) and bushy-tailed woodrat (*Neotoma cinerea*).

Five bat species have been confirmed on LMWA: fringed myotis (*Myotis thysanodes*), little brown bat (*Myotis lucifugus*), long-legged bat (*Myotis volans*), big brown bat (*Eptesicus fuscus*) and Yuma myotis (*Myotis yumanensis*). These bats forage extensively throughout the area consuming vast numbers of night-flying insects. Many of the areas numerous old barns and outbuildings provide suitable roost sites although no maternity roosts or hibernacula have been identified. The fringed myotis, Yuma myotis and long-legged bat are all species of conservation concern. Comprehensive surveys to locate potential maternity and hibernation locations would help inform management activities to benefit these species.

Amphibians and Reptiles

Native species of amphibians and reptiles are plentiful on the area, as are introduced bullfrogs:

- Long-toed salamanders (*Ambystoma macrodactylum*) occur on LMWA and at least one major breeding site has been identified.
- Columbia spotted frog (*Rana luteiventris*), a federal Candidate species, has been documented in several locations on LMWA but just a single breeding site has been identified. The effects of water level and vegetation management on spotted frogs within the LMWA are poorly understood. Research, including surveys and/or telemetry studies, will be necessary to locate additional potential breeding sites and non-breeding habitat use by this species. Improved knowledge of how spotted frogs utilize the wildlife area will facilitate management to benefit this species.
- Pacific chorus frogs (*Pseudacris regilla*) are abundant and scattered throughout the wildlife area.
- Great Basin spadefoot toads (*Scaphiopus intermontanus*) were first documented on LMWA in 2003. Since Union County was not included in the accepted range of the species, trapping was conducted in 2005 and both adults and larvae were collected and deposited with the vertebrate museum at Eastern Oregon University in La Grande. The new county record was accepted by Herpetological Review and published in September, 2005 (Vol. 36, No. 3). This species has been documented in the Peach Road and Conley Lake units of the wildlife area.
- Western fence lizard (*Sceloporus occidentalis*) and western skink (*Eumeces skiltonianus*) are known to occur on LMWA although distribution and abundance are unknown.
- At least six species of snake have been observed on LMWA. These include both common and western terrestrial garter snakes (*Thamnophis sirtalis* and *T. elegans*), gopher snake (*Pituophis catenifer*), western rattlesnake (*Crotalus oreganus*), racer

(*Coluber constrictor*) and rubber boa (*Charina bottae*). These species are thought to be widespread in appropriate habitats but abundance is unclear. All of the above species have been observed at two known hibernacula within the wildlife area where they apparently hibernate in a mixed-species group.

- Western painted turtle (*Chrysemys picta belli*) also occurs on the LMWA. Abundance and distribution of this species is unclear although an effort was begun in 2007, in partnership with Eastern Oregon University, to learn more about how turtles use the habitats of the area. Additionally, in 2007, a project aimed at rescuing painted turtles from a nearby reservoir that was to be drained, resulted in the translocation of a total of 56 western painted turtles to LMWA. The translocated turtles included both males and females and individuals from two years to more than 20 years old. A radio telemetry study of painted turtles on LMWA from 2010 through 2012 provided some information about how this species uses the area. A few over-wintering sites were located and the few nesting sites found suggest they nest opportunistically in appropriate substrate scattered across the wildlife area. Western painted turtles are listed as Sensitive – Critical in Oregon and are a *Conservation Strategy Species*.
- Bullfrogs (*Rana catesbeiana*), an introduced and invasive species, are widespread on LMWA. They are found in nearly all of the wetland areas and reproduce prolifically. Because of their large size and gape and their voracious appetites, bullfrogs are a threat to many native species including spotted frogs and painted turtles.

Fish

Portions of Ladd Creek, including its west, middle and east forks are contained within the LMWA. A wide variety of fish species are found within Ladd Creek and its tributaries as shown in **Table 2**. Ladd Creek, as it flows through LMWA, is in a low gradient unconfined valley that has been highly modified from historic conditions (NPPC, 2004). The stream channels were extensively ditched and straightened to benefit agriculture and other development, significantly changing the hydrologic function of the system. Wetlands that were more abundant historically in the system served to attenuate and cool stream flows, providing better habitat and water quality for once abundant populations of summer steelhead (*Oncorhynchus mykiss*) and spring Chinook salmon (*Oncorhynchus tshawytscha*).

While Ladd Creek once provided spawning and rearing habitat for summer steelhead and spring Chinook salmon, a combination of altered hydrology, habitat degradation and passage barriers led to their current minimal use. Neither species is currently known to spawn in Ladd Creek. Juvenile rearing is limited to winter and spring in the lower part of the drainage. However, habitat restoration efforts on Ladd Creek both on and off LMWA in the past 20 years have made conditions more suitable for these species. Barriers to migration have been addressed and habitat has been improved along all of Ladd Creek within LMWA and recent efforts have addressed passage and habitat issues upstream with unrestricted passage throughout this system steelhead and spring Chinook may recolonize it up to the potential the habitat can provide under modern watershed conditions.

Ladd Creek provides year-round habitat for redband trout (*Oncorhynchus mykiss*) and several other native fish species including bridgelip sucker (*Catostomus columbianus*),

northern pikeminnow (*Ptychocheilus oregonensis*), speckled dace (*Rhinichthys osculus*), redband shiner (*Richardsonius balteatus balteatus*) and chiselmouth (*Acrocheilus alutaceus*). As native fish adapted to local conditions, all are spring spawners, making use of flows when they are abundant. Both historically and currently, migratory fish such as redband trout and bridgelip suckers move throughout the system, seeking the most advantageous habitat conditions from season to season. For redband trout, this typically means that they are more widely distributed in the winter and spring months, their distribution shrinking as flows decline and water temperatures increase during summer.

The presence of numerous non-native introduced fish is a concern for conservation of native fish on LMWA. All of the centrarchids (bass (*Micropterus ssp*), crappie (*Poximis ssp*)) are predatory during a significant portion of their life history, potentially foraging on native fish. In addition, introduced species provide competition for both food and space that vary considerably depending on many factors. In light of these concerns, it would be beneficial to see reduction in the numbers of introduced fish species within Ladd Creek and the greater LMWA. Within stream environments there is not currently a practical way of effectively removing introduced fish without significant impacts to native aquatic organisms. The best method to reduce an introduced warm water species in stream environments is to restore habitat to that more conducive to native cold water fish. Efforts are underway to accomplish this. Standing water environments do provide an opportunity for either physical or chemical removal of introduced fish. Removal of introduced fish species will be considered where opportunities exist to capture them from standing waters, and there are no pathways for them to recolonize these habitats.

Table 2 Fish species known to inhabit Ladd Creek and its tributaries within the LMWA.

Common Name	Scientific Name	Life History Stage	Status – Comments
Bull trout	<i>Salvelinus confluentus</i>	Subadult	Federal ESA listed: threatened State listed: sensitive – critical
Snake R. Summer Steelhead	<i>Oncorhynchus mykiss</i>	Parr	Federal ESA listed: threatened State listed: sensitive –vulnerable
Inland redband trout	<i>Oncorhynchus mykiss</i>	All	Federal species of concern State listed: sensitive –vulnerable
Spring Chinook salmon	<i>Oncorhynchus tshawytscha</i>	Parr	Federal ESA listed: Threatened State listed: sensitive – critical
Bridgelip sucker	<i>Catostomus columbianus</i>	All	Native – common
Northern pikeminnow	<i>Ptychocheilus oregonensis</i>	All	Native – common
Speckled dace	<i>Rhinichthys osculus</i>	All	Native – common
Longnose dace	<i>Rhinichthys cataractae</i>	All	Native – common
Redside shiner	<i>Richardsonius balteatus balteatus</i>	All	Native – common
Chiselmouth	<i>Acrocheilus alutaceus</i>	All	Native – common
Yellow perch	<i>Perca flavescens</i>	All	Introduced – common
Common carp	<i>Cyprinus carpio</i>	All	Introduced – common
White crappie	<i>Poxomis annularis</i>	All	Introduced – common
Black crappie	<i>Poxomis nigromaculatis</i>	All	Introduced – common
Bluegill	<i>Lepomis macrochirus</i>	All	Introduced – common
Largemouth bass	<i>Micropterus salmoides</i>	All	Introduced – common

Smallmouth bass	<i>Micropterus dolomieu</i>	All	Introduced – common
Warmouth	<i>Lepomis gulosus</i>	All	Introduced – common
Pumkinseed sunfish	<i>Lepomis gibbosus</i>	All	Introduced – common
Brown bullhead	<i>Ictalurus nebulosis</i>	All	Introduced – common

Plants

Due to the variety of topography (elevation, slope, and aspect), hydrology and soils, the LMWA supports diverse communities of plant species. These communities are generally described as habitat types in the discussion beginning on page 9. Within these habitats exist hundreds of species of plants ranging from wetland obligate annuals such as showy downingia (*Downingia elegans*) and American slough grass (*Beckmannia syzigachne*) to long-lived upland species such as ponderosa pine (*Pinus ponderosa*). Appendix C contains the current list of plant species occurring on LMWA; this list is incomplete and is added to as species are observed and documented with the assistance of Dr. Karen Antell, a botanist and Professor at Eastern Oregon University.

Douglas' clover (*Trifolium douglasii*), a federal Species of Concern and Oregon List 1 Sensitive species, was first observed on LMWA in 2004. This species has been documented from only 5 locations in Oregon and may have been extirpated in Washington. Douglas' clover grows in damp or wet meadows; surveys by LMWA staff and volunteers have documented the species in 3 separate meadows on LMWA. Management of these meadows will be aimed at conservation of Douglas' clover and its community associates.

Species of Conservation Concern

LMWA is host to a number of species listed under the Oregon and Federal Endangered Species acts (Table 3). Federally listed species that occur on LMWA include summer steelhead, Chinook salmon and bull trout (*Salvelinus confluentus*). All three have been documented only in low numbers in Ladd Creek within LMWA. However, stream restoration efforts have improved, and will continue to improve stream habitat for both of these species creating opportunities for increasing numbers to utilize the wildlife area.

There are several species of federal or state concern including Douglas' clover, Columbia spotted frog, western painted turtle, northern goshawk (*Accipiter gentilis*), burrowing owl (*Athene cunicularia*), bald eagle, great gray owl (*Strix nebulosa*) Swainson's hawk (*Buteo swainsoni*), olive-sided flycatcher (*Contopus cooperi*), willow flycatcher, bobolink (*Dolichonix oryzivorus*), black-necked stilt, greater sandhill crane, yellow-breasted chat (*Icteria virens*), Lewis' woodpecker (*Melanerpes lewis*), pileated woodpecker (*Dryocopus pileatus*), white-headed woodpecker (*Picoides albolarvatus*), long-billed curlew, American white pelican (*Pelecanus erythrorhynchos*), fringed myotis, long-legged myotis, redband trout, Snake River Chinook salmon and bull trout.

Many of these species are summer migrants (Swainson's hawk, willow flycatcher, greater sandhill crane, black-necked stilt, Lewis' woodpecker, long-billed curlew, olive-sided flycatcher) and breed on LMWA, some in good numbers. Others are former breeding species (burrowing owl (*Athene cunicularia*) and bobolink or species that breed in nearby habitats with a high likelihood of becoming or returning as breeding species (bald eagle, American peregrine falcon (*Falco peregrinus*)). These species utilize wildlife area habitats during migration and the breeding season. Several species (northern goshawk, pileated woodpecker and the bat species) utilize LMWA habitats but their population status and whether they breed

on the wildlife area is unknown. Some species (e.g., American white pelican) utilize LMWA in relatively low numbers during migration.

The species discussed above are strategy species as defined in the 2016 OCS. The Strategy prescribes conservation actions to be implemented that contribute to the overall health of strategy habitats and associated species. LMWA's diverse habitat management actions, activities and programs contribute to the conservation of strategy species in the Blue Mountains Ecoregion and the Grande Ronde Valley Conservation Opportunity Area.

Table 3. Federal- or State-listed Endangered, Threatened, Candidate and Species of Concern potentially present on Ladd Marsh Wildlife Area. (Federal Status: LE-Endangered; LT-Threatened; C-Candidate; SoC-Species of Concern. State Status: LE-Endangered; LT-Threatened; SC-Sensitive; Critical; SV-Sensitive; Vulnerable; SP-Sensitive; peripheral or naturally rare; SU-Sensitive; Undetermined Status. Oregon Conservation Strategy (OCS) Species-X).

Common Name	Scientific Name	Federal Status	State Status	OCS
Amphibians				
Columbia spotted frog	<i>Rana luteiventris</i>	C	SU	X
Birds				
Bufflehead	<i>Bucephala albeola</i>			X
White-faced Ibis	<i>Plegadis chihi</i>	SoC		
Bald eagle	<i>Haliaeetus leucocephalus</i>		SV	
Northern goshawk	<i>Accipiter gentilis</i>	SoC	SV	X
Swainson's hawk	<i>Buteo swainsoni</i>		SV	X
Peregrine falcon	<i>Falco peregrinus</i>		SV	X
Greater sandhill crane	<i>Antigone canadensis</i>		SV	X
Black-necked stilt	<i>Himantopus mexicanus</i>			X
Long-billed curlew	<i>Numenius americanus</i>		SV	X
Black tern	<i>Chlidonias niger</i>	SoC		
Burrowing owl	<i>Athene cunicularia</i>	SoC	SC	X
Great gray owl	<i>Strix nebulosa</i>		SV	X
Lewis' woodpecker	<i>Melanerpes lewis</i>	SoC	SC	X
White-headed woodpecker	<i>Picoides albolarvatus</i>	SoC	SC	X
Black-backed woodpecker	<i>Picoides arcticus</i>		SC	X
Pileated woodpecker	<i>Dryocopus pileatus</i>		SV	X
Olive-sided flycatcher	<i>Contopus cooperi</i>	SoC	SV	X
Willow flycatcher	<i>Empidonax trailii</i>	SoC	SV	X
Yellow-breasted chat	<i>Icteria virens</i>	SoC	SC	X
Bobolink	<i>Dolichonix oryzivorus</i>		SV	X
Fish				
Redband trout	<i>Oncorhynchus mykiss</i>	SoC	SV	X
Snake R. summer steelhead	<i>Oncorhynchus mykiss</i>	LT	SV	X
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	LT	LT	X
Bull trout	<i>Salvelinus confluentus</i>	LT	SC	X

Mammals				
Preble's shrew	<i>Sorex preblei</i>	SoC		
Fringed myotis	<i>Myotis thysanodes</i>	SoC	SV	
Yuma myotis	<i>Myotis yumanensis</i>	SoC		
Long-legged bat	<i>Myotis volans</i>	SoC	SV	X
Reptiles				
Western painted turtle	<i>Chrysemys picta belli</i>		SC	
Plants				
Douglas' clover	<i>Trifolium douglasii</i>	SoC		

Non-Native Species

Non-native wildlife on the area includes invasive pest species such as European starling (*Sturnus vulgaris*) and house sparrow (*Passer domesticus*). These species compete with cavity nesting native species. Game birds such as ring-necked pheasants have been introduced and are managed to provide hunting opportunities. Feral cats (*Felis domesticus*), although relatively uncommon on LMWA, can exert considerable predation pressure on native species as well as desirable game birds. House mice (*Mus musculus*) occur at the Headquarters complex and other buildings and residences.

Bullfrogs are common in the wetlands of LMWA and can be a significant predator of native species, especially western painted turtle and Columbia spotted frog, both species of concern. Common carp is also present in areas with access to Ladd Creek. This species is reduced each year as Ladd Creek and its adjacent wetlands dry out but an influx of carp from Catherine Creek, via Ladd Creek, repopulates the area each spring. Carp are damaging to potential off-channel rearing habitat for salmonids as they stir up the substrate uprooting aquatic plants and increasing turbidity.

The occurrence and distribution of non-native plants species is unknown since comprehensive surveys have not been conducted. However, a large number of non- native plants are present on LMWA. The origin of most is unknown, but some desirable species have been cultivated in agricultural and other upland areas as well as in pastures and meadows and continue to be utilized. Many species appear to be beneficial as forage or cover as evidenced by wildlife use and do not appear to have serious deleterious effects on habitat.

Several species of noxious weeds found on LMWA are listed in **Table 4**. Most noticeable and of great concern are: knapweeds (*Centaurea* sp.) (diffuse and spotted), perennial pepperweed (*Lepidium latifolium*), white top (*Cardaria draba*), sulfur cinquefoil (*Potentilla recta*) and thistles (Canada (*Cirsium arvense*) and Scotch (*Onopordum acanthium*)). Many of these species displace native vegetation and/or are of limited value to wildlife. Annual noxious weed control efforts involving chemical spraying, mowing and hand pulling or chopping. Additionally, biological control agents have been introduced for control of Canada thistle and diffuse knapweed.

Table 4. Noxious weeds on the Union County Noxious Weed List and known to be present on Ladd Marsh Wildlife Area. (Species in **bold** are subject to active control efforts on LMWA, *Invasive plants identified in 2016 Oregon Conservation Strategy)

Common Name	Scientific Name	Clas
*Hoary cress (white top)	<i>Cardaria draba</i>	A
Rush Skeletonweed	<i>Chondrilla Juncea</i>	A
*Perennial pepperweed	<i>Lepidium latifolium</i>	A
Canada thistle	<i>Cirsium arvense</i>	B
*Leafy spurge	<i>Euphorbia esula</i>	B
*Sulfur cinquefoil	<i>Potentilla recta</i>	B
Madusahead Rye	<i>Taeniatherum caput-medusae</i>	B
*Purple loosestrife	<i>Lythrum salicaria</i>	B
*Diffuse knapweed	<i>Centaurea diffusa</i>	B
*Scotch thistle	<i>Onopordum acanthium</i>	B
Kochia	<i>Kochia scoparia</i>	
Houndstongue	<i>Cynogossium officinale</i>	B
Puncture vine	<i>Tribulus terrestris</i>	B
Spotted knapweed	<i>Centaurea maculosa</i>	C
Poison hemlock	<i>Conium maculatum</i>	C
* Jointed goatgrass	<i>Aegilops cylindrica</i>	C
Wild oat	<i>Avena fatua</i>	C
Quackgrass	<i>Agropyron repens</i>	C
Cereal rye	<i>Secale cereale</i>	C
Western water-hemlock	<i>Cicuta douglasii</i>	C
Catchweed bedstraw	<i>Galium aparine</i>	C
“C” is a non-native species of concern by management		

The first release of a biological control agent for Canada thistle on LMWA occurred in 1988 in collaboration with the Oregon Department of Agriculture (ODA). This gall-forming fly, (*Urophora cardui*), is a spring emergent. It attacks the growing points of the thistle, the leaf buds and the tip of the plant, and lays its eggs there. Through a mechanism that is not well understood, this causes the plant to form a gall in which the eggs hatch and the larvae develop, pupate and spend the winter. In the spring, adults emerge and the cycle begins again. The presence of galls precludes the formation of flowers and thus prevents reproduction by the plant. The formation of the galls also consumes significant resources leaving the plant weakened and vulnerable to other stressors. *Urophora* took several years to become established and spread throughout the wildlife area; LMWA was the first site of successful introduction of the species east of the Cascade Mountains. For over a decade, the population increased every year but it has now apparently leveled off. This is likely due to reductions in the population of Canada thistle. *Urophora* is still present on the marsh and does provide some assistance in Canada thistle control but does not seem to spread easily.

The second release of a Canada thistle bio-control agent on LMWA occurred in 1996. *Ceutorhynchus litura*, a stem-mining weevil, was released in collaboration with the U.S. Forest Service and ODA. *Ceutorhynchus* larvae attack the stem of the plant, hollowing it out and increasing vulnerability to attack by other agents. The action of the larvae in the stem also uses valuable nutrients and disrupts the transportation of nutrients through the stem, weakening the plant. In 2007 the population of *Ceutorhynchus* was

documented as still increasing and had likely spread outside the boundaries of LMWA. *Ceutorhynchus* was found in virtually every Canada thistle plant on LMWA. Although the Canada thistle population has decreased significantly, the number of *Ceutorhynchus* larvae per stem had increased, increasing the overall population of the weevil (Markin and Larson 2011). The population of *Ceutorhynchus* on LMWA is adapted to the higher elevation of the area and in 2007 was considered likely the best population in the Interior Rocky Mountain Region.

Sometime before 1996, another Canada thistle bio-control agent found its way onto LMWA. This agent, *Larinus plainus*, was an accidental introduction that spread onto LMWA from some other area. *Larinus plainus* is a seed-head weevil that also attacks several other species and thus is not an “approved biological control agent.” The larvae of this species get into the flower and resulting seed head and eat the seeds, greatly reducing seed production and slowing the spread of Canada thistle.

These three species, *Urophora cardui*, *Ceutorhynchus litura* and *Larinus plainus*, working in concert, have had success on LMWA. Canada thistle is still a threat to habitats throughout LMWA. Chemical control for Canada thistle continues to be utilized in high density sites as well as agricultural areas. The department of Agriculture does continue to monitor the spread and density of these bio controls. Additionally ODA continues to do research on other potential Bio controls and has recently inquired about establishing test plots on LMWA. The rust fungus *Puccinia punctiformis* as shown great potential in research conducted at the University of Colorado and may prove to be far more effective than all three previous bio controls.

Several biological control agents for diffuse knapweed are also present on the LMWA. The precise date when *Larinus minutus* (weevil) reached LMWA is unknown, but it was introduced by ODA to private land throughout the valley in the 1990s with a release near Hot Lake in 1998. This was probably the release that prompted its spread to LMWA. It has become established on LMWA and has been successful at slowing the spread of diffuse knapweed. Like the *Larinus* that attacks Canada thistle, *Larinus minutus* attacks the flower and resulting seed head, eating the seeds and greatly reducing reproduction. In addition to the *Larinus*, another seed-head weevil, *Bangasternus fausti*, is present. This weevil acts on diffuse knapweed in a similar fashion to the *Larinus* but emerges earlier in the year.

Two band-wing flies, *Urophora affinis* and *Urophora quadrifasciata* were released by ODA in various Grande Ronde Valley locations in the 1980s. These flies are characterized as “good fliers and good finders” of knapweed (Dan Sharrat, ODA, personal communication). Thus, they have spread to LMWA and can be found in nearly every patch of the weed on the wildlife area. These two species cause the plant to form galls in the seedhead displacing seeds and creating an energy sink for the plant. These species combined are thought to cause a 50% reduction in seed production by infected plants (D. Sharrat, p.c.). An additional biological control agent for diffuse knapweed is present on LMWA although its date of arrival is unknown. *Sphenoptera jugoslavica* is a root borer which, by damaging the roots of the plant, creates a vector for other pathogens and stresses the plant by slowing uptake of water and nutrients.

Medusahead rye (*Taeniatherum caput-medusea* (L.) Nevski) is not on the Union County Weed List but is abundant on LMWA and efforts are ongoing to attempt control of this invasive species. In addition to noxious weed species known to occur within the LMWA, there are species that occur in Union County but have not been documented on LMWA. These include musk thistle (*Carduus nutans*), tansy ragwort (*Senecio jacobaea*) and yellow starthistle (*Centaurea solstitialis*). Surveillance is conducted each year in an effort to remove any individuals that may occur and avoid colonization by those species.

Sweetbriar rose (*Rosa eglantheria*) is an introduced shrub that is established and becoming invasive on the LMWA. This species is found primarily in the Glass Hill and West Marsh units but is spreading throughout the wildlife area. Sweetbriar is of marginal food value to wildlife and may compete with native shrubs such as black hawthorn and native roses (*R. nootkana* and *R. woodsii*). Control of this potentially invasive species will be necessary to maintain the integrity of natural shrub and grassland habitats.

Monitoring

Annual program activities are in place to monitor wildlife populations, habitat use and other features. Wildlife response to habitat developments is a major objective of most surveys. Data are collected by management units and in some cases, specific localities, habitats or vegetative types based upon survey objectives. Population data are used to monitor effectiveness of habitat management activities for a variety of wildlife species. Data are analyzed, summarized, and maintained on site. A database of incidental wildlife observations is maintained in addition to formal survey data. Appropriate data are available to department personnel and interested members of the public upon request.

Waterfowl and other Waterbirds

- Routine surveys include duck and goose pair counts and brood surveys.
- Monitoring and reporting of neck collared waterfowl, band encounter/recovery data are collected and reported.

Other Wildlife

- Monthly bird surveys are conducted year-round on established transects to document and monitor passerines and other nongame bird species.
- Marsh bird surveys are conducted using recorded calls during the breeding season.
- Monthly area count bird surveys are conducted in specific habitat types by volunteer observers.
- Eastern Oregon University faculty conducts periodic surveys for species or groups of species of interest on the wildlife area and shares the data with LMWA staff.

Upland Game Birds

- Upland game bird brood surveys are conducted to document production within those populations.

Big Game

- Elk numbers are periodically monitored to document the potential for damage on surrounding lands and to determine the need to feed during severe winter weather.

Fish

- Fish species presence and abundance are monitored every few years through operation of a two-way fish trap in Ladd Creek.
- Fish species presence and abundance are monitored through stream surveys by Department district fisheries personnel.

Wildlife Diseases

- Minor outbreaks or individual birds afflicted with avian cholera, botulism and lead poisoning occur occasionally and are monitored by LMWA staff. Animals that appear to be sick are sent to the Department's wildlife veterinarian for disease testing as necessary.
- West Nile Virus (WNV) has been confirmed to occur in horses and at least one human in Union County and has been documented in mosquitoes on LMWA. The wildlife area staff works closely with the local Vector Control District to test mosquitoes, monitor for affected wildlife and implement the Ladd Marsh Wildlife Area Vector Control Plan which was incorporated into the Union County Vector Control Plan in 2006.
- The Department is currently testing waterfowl on LMWA for Avian Influenza. This testing follows recently developed statewide and national testing protocols for live birds trapped during banding operations and dead birds harvested legally during waterfowl seasons.

Vector Control

- The LMWA Vector Control Plan, adopted as an addendum to the Union County Vector Control Plan in 2006, includes recommendations for capture and testing of mosquitoes as well as a map showing priority areas for larvicide treatment.
- The Union County Vector Control District has committed to sharing all mosquito testing data as well as actual treatment areas with Ladd Marsh staff for the purpose of adaptive management of key WNV areas.

Vegetation

- Coarse vegetation mapping has been conducted using recent aerial photography and staff knowledge of the area to document habitat types. Fine scale mapping and surveys are planned to document distribution, changes in abundance and composition of various species and/or habitat types. A noxious weed distribution inventory is desirable and would help inform planning of chemical and mechanical treatment. Additionally, annual mapping of mechanical vegetation management, including disking and mowing, is planned.

Restoration

- Restoration was completed in phases within the Tule Lake, Peach Road and West Marsh management units between 2001 and 2004 and 6.2 miles of Ladd Creek. These project areas are monitored through a variety of methods including permanent photo points, habitat evaluation procedures (HEP), vegetation transects and long-term monitoring of Ladd Creek channel morphology. The data collected through these efforts assists in evaluating the effectiveness of restoration actions as well as guiding management activities.

Water Use

- Water use for irrigation and wildlife use is monitored monthly through meters installed on all diversion structures. Water level measurement devices are planned for installation in managed wetlands in order to monitor water levels and correlate them with management actions to evaluate the effectiveness of those actions. Use reports are prepared annually and submitted to the Department's Engineering Section for submission to Oregon Water Resources Department.

Public Use

- In 2013 LMWA implemented a Daily Access Permit system. This is a free, self-Check In process. LMWA has both Hunting season and Non-hunting season permits that it uses to track public use and activities. Current data shows hunting related activities attracts an estimated 2000 hunter use days. LMWA has virtually unlimited points of entry and due to its infancy, struggling compliance, it is not an accurate representation at this time.
- The non-hunting permits have shown wildlife viewing and other non-hunting recreational use is estimated at 400 user days. LMWA has virtually unlimited points of entry and due to its infancy, struggling compliance, it is not an accurate representation at this time.
- Use of LMWA for education by school and other groups is recorded as it occurs to document the number of participants annually.

Cultural Resources

The Grande Ronde Valley has a rich cultural history including use of the area by Native American peoples and passage of thousands of Euro-Americans on the Oregon Trail. Because of this rich history, numerous cultural resource surveys have been conducted prior to ground-disturbing activities within the LMWA. Each survey completed was site-specific for the planned project and resulted in a report of findings. Any sites deemed culturally significant were avoided and/or left undisturbed during project activities.

The area of the present LMWA lies within lands ceded to the federal government by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). According to ethnographic and historic accounts, a number of Indian groups of the Southern Columbia Plateau cultural tradition shared this territory at various times. These were the Nez Perce and tribes now part of the CTUIR, to whom the Nez Perce are closely related linguistically and culturally. The CTUIR include the Cayuse, Umatilla and Walla Walla tribes. Several Northern Paiute bands of the Great Basin cultural tradition were also present in the area, often warring with the other inhabitants of the Grande Ronde Valley. The Nez Perce and CTUIR often used the same territory at the same time for

hunting, fishing and gathering.

Prior to disturbance by Euro Americans, the Grande Ronde Valley held huge fields of camas (*Camassia ssp*), remnants of which can be seen within the LMWA today. The abundant camas as well as the hot springs and other natural resources associated with what was later called Tule Lake attracted native peoples to the area. During cultural resource surveys, artifacts have been found that suggest the presence of encampments near the edge of Tule Lake and oral histories tell of permanent villages at Hot Lake and Catherine Creek.

The earliest recorded Euro Americans to visit the area were employees of John Jacob Astor's Pacific Fur Company who entered the valley in 1812. In the 1840s, travelers on the Oregon Trail passed through the valley across land now included within LMWA. Remnants of the Oregon Trail can be seen in the Glass Hill Management Unit. By the fall of 1863, the General Land Office (GLO) was surveying the area for future land claims and major Euro American settlement had begun.

Social Environment

Demographics

LMWA is situated near the cities of La Grande (population: 13,173), Union (2,121), Elgin (1,711), Cove (552) and Island City (1016) in Union County (pop. 26,222). U.S. Census Bureau figures for 2017 indicate the median age in Union County was 39.8 years and residents were 94% self-identified as White. The median household income in the county was \$49,209, well below the statewide figure of \$57,532. Employment in Union County is provided by a variety of industries including education, health and social services (18.9%), agriculture, forestry and natural resources (17.6%) and others.

Northeast Oregon in general and Union County in particular has a long history and tradition of participation in agriculture and natural resources. The county boasts numerous Century Farms and ranches and favorite hunting areas are often traditions passed down several generations. In addition, firewood cutting, mushroom picking and other natural resource uses are long-standing traditions for many residents.

Land Use

LMWA is surrounded primarily by agricultural and rural residential land on the valley floor in addition to timber land adjacent to the Glass Hill Management Unit. Other land uses nearby include light industrial and two major transportation corridors including Interstate 84, State Highway 203 and a railroad. These transportation corridors pass through portions of the LMWA creating some challenges to wildlife area management as high-speed vehicles pose a threat to wildlife moving about the area. Further, large animals and large groups of small animals can, at times, pose a risk to the traveling public. The Oregon Department of Transportation (ODOT) installed large mammal crossing signs on both Highway 203 and Interstate 84 because of the number of incidents and close calls documented. Additional seasonal signage about small animal crossings are still being investigated about their need and effectiveness.

The La Grande Municipal airport has some influence on land management within the

Wildlife Area. In 1989, the county adopted an airport overlay zone that restricts any new uses that are designed to attract birds such as created wetlands. The overlay zone extends 10,000 feet from the airport. If the Department considers any new uses within the overlay zone, it is required to go through a conditional use process. Wetlands established prior to 1989 are considered pre-existing uses and are not subject to county regulation.

Figure 3 shows the land uses which border the Wildlife Area.

Infrastructure

Developments/Facilities

LMWA facilities consist of four home sites, three host sites (trailer pads), City of La Grande treatment facility and two storage areas. They occupy approximately 46 acres. In addition there are several scattered buildings on the area from old farm sites. Their condition and potential safety risk are monitored annually. These building, although empty, do provide habitat for bats, barn owls, and a host of other species. The headquarters area has a residence, an office/shop, a storage barn, an equipment barn, two garages and a grain bin. The following are facilities and developments on LMWA.

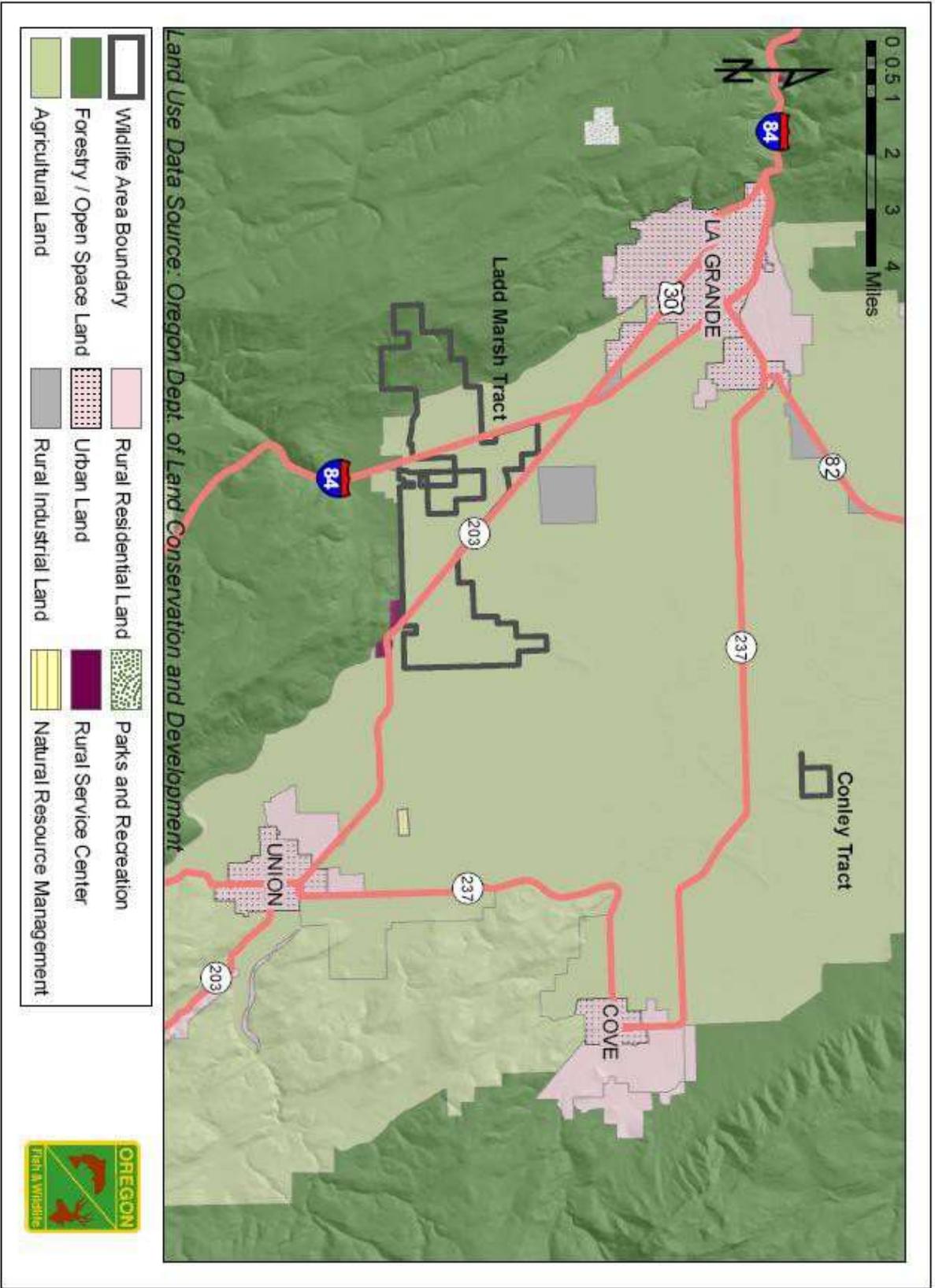
Major facilities development occurs primarily at LMWA's Headquarters Complex (see **Table 5**).

The wildlife area has 21 miles of boundary and pasture fence.

Table 5. Facilities and Developments on the Ladd Marsh Wildlife Area.

Development Type	Location/ Tract Name
Viewing Areas (3)	Tule Lake Access Area (hiking trails and Auto Route), West Marsh Overlook, Nature Trail
Fishing Pond	Peach Road Fishing Pond
Public Restrooms (2)	Headquarters, Peach Road Fishing Pond
Office	Headquarters
Residences (4)	Headquarters, H.Simonis, City of La Grande, Intern House
Shops (3)	Headquarters, City of La Grande, H. Simonis
Storage Buildings (12)	Headquarters 3), RMEF, Peebler (2), March (2), H. Simonis, Bench, Host Sites (1), Intern House
Grain Storage Bins (4)	H. Simonis, Headquarters, Peebler
Parking Areas	Throughout the wildlife area 18
Fences (21.35 miles)	Various boundary and cross fences

Figure 3 - Land Use Surrounding Ladd Marsh Wildlife Area



Water Resources

Currently, LMWA has 34 recorded water rights scattered throughout the area. Water right use includes crop irrigation, winter storage and wetland management. Water availability for these rights depends on winter snowpack and associated stream flows. The quantity of water available is extremely variable and often nonexistent in late summer for many areas. Management strategies reflect the amount of annual water available.

LMWA and the City of La Grande began discussions in the early 1990s to use treated effluent for wetland management. These discussions resulted in a pilot program beginning in 1993. Four wetland cells, 50 acres in total, were constructed to begin the program. Isolated from other LMWA wetlands, they have been maintained since that time entirely with treated effluent. These wetlands provide productive foraging areas for migrating waterfowl as well as nesting and brooding areas. The level of treatment prohibits public access to these ponds. Therefore, these 50 acres have been included in one of the area's posted refuges.

The pilot program's success and an Oregon Department of Environmental Quality (DEQ) requirement that the City no longer discharge treated effluent into the Grande Ronde River led to discussions to enlarge the project. The level of treatment and lack of public access with the pilot project concerned LMWA staff. These concerns and water quality regulations resulted in a treatment system that no longer restricts discharge location or public access.

Treated effluent is an important management tool in many of the semi-permanent wetlands near Peach Road. Output varies from one million to several million gallons per day. This water source has become the only reliable water as Union county continues to experience average to below average annual precipitation. **Appendix D** shows water rights which are currently held on LMWA.

Easements/Access Agreements

Numerous easements are associated with LMWA. They include easements for pipeline and transmission lines, effluent treatment facilities and wetland and restoration projects.

Other agreements include:

- 1) A cooperative management agreement between the Rocky Mountain Elk Foundation (RMEF) and the Department for management of 850 acres owned by RMEF.
- 2) A cooperative management agreement between the department and the City of La Grande to manage land owned by the city.
- 3) Sharecrop agreement for one permittee and three permittees for forage removal on LMWA.

Appendix E lists the easements associated with Ladd Marsh Wildlife Area.

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 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 or 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.).

Twenty-nine acquisitions and adjustments, totally 6,019 acres, have been made since 1949 to create and expand LMWA. Early efforts were intended to protect remaining wetlands in the area. Recent acquisitions have focused on wetland restoration and big game winter habitat.

Public Use

Public Access

The LMWA is made up of a mosaic of four public access management regimes (**Table 6**). Information regarding access restrictions is available to the public through boundary signs, signs at each major access point, informational signs at parking areas and in the annual Big Game and Game Bird hunting regulations printed by the Department. Additional information signs and interpretive kiosks are planned.

The West Marsh Viewpoint, Peach Road Fishing Pond and the Nature Trail are small areas that are open to public access year-round. The West Marsh Viewpoint is accessible by vehicle and offers views of the West Marsh Unit and the Glass Hill Unit. Benches are provided for visitor use. The Peach Road Fishing Pond is a small pond (~one acre) located in the Peach Road Unit and open to angling year-round. The pond is accessible by vehicle and includes fishing piers accessible to persons with disabilities. The fishing pond is stocked by the Department with catchable rainbow trout and surplus steelhead. The Nature Trail is a one and one quarter mile walking trail located in the West Marsh Unit and open to the public year-round. Also open year-round is the Glass Hill Unit, which is within the Starkey Wildlife Management Unit. This portion of LMWA contains upland shrub, grassland and the only mixed conifer habitat in the wildlife area. Visitors to this area engage in hunting (during authorized seasons), wildlife viewing, hiking, horse-back riding and other recreational and educational activities. Motorized travel by visitors is prohibited in the Glass Hill Unit.

About 820 acres (14%) of the LMWA is closed to public access at all times except by special permit. This closure applies to two posted refuges, West Marsh and Hot Lake and includes the city treatment facility and its associated ponds. Refuge areas are necessary to provide a sanctuary for wildlife to escape hunting pressure. Without

available refuges, birds would likely leave the area for locations with fewer disturbances.

The Tule Lake Public Access Area, located in the Tule Lake Unit is approximately 400 acres with more than five miles of hiking trails and a one mile auto tour. This area is open to the public from March 1 through July 31 each year. Motor vehicles are permitted only on the auto tour road and trails are restricted to foot traffic only.

Most of LMWA (~70%) is open to the public only on Saturday, Sunday, Wednesday and state-observed holidays during the waterfowl, quail and pheasant hunting seasons. The area is open to hunting, hiking and wildlife viewing at those times but hunters make up the majority of users. Additionally, those portions of the wildlife area not in posted refuges or safety zones are open to Ladd Marsh youth deer tag holders during the season authorized by their tag.

Table 6. Public Access Management on the Ladd Marsh Wildlife Area.

Open Dates	Access Type	Affected Area	Size in Acres*
Year-round	Any, non-motorized	Glass Hill Unit	1,000
	Viewing	West Marsh Viewpoint	10
	Angling	Peach Road Fishing Pond	10
	Hiking, Viewing	Ladd Marsh Nature Trail	10
None – Closed	Closed to Public Entry	West Marsh Refuge	526
	Closed to Public Entry	Hot Lake Refuge	294
March 1 – Sept 30	1-Mile Auto Tour	Tule Lake Public Access Area	N/A
	Hiking, Viewing		400
Sat., Sun., Wed. & State-observed Holidays during Waterfowl, Quail & Pheasant Hunting Seasons	Hunting (noted species only), Hiking, Viewing	All except Glass Hill Unit and Posted Refuges and Safety Zones	4,100
Big Game Hunting Seasons	Hunting (with specified short range equipment only)		

*Acreages are approximate and may add up to more than the total acreage of LMWA as some areas is included in more than one access management type.

Hunting, Angling and Trapping

Hunting is a major recreational activity on the LMWA and was one of the primary reasons for formation of the wildlife area. Revenues from hunting-related expenditures provide the funding source for LMWA operations and maintenance. Additional funding sources such as grants exist, but they are generally project-specific and time-limited. Hunting use is difficult to quantify because the LMWA has virtually unlimited points of entry and no system in place for hunter check-in and check-out. Hunter use is estimated (**Table 7**) through vehicle counts on hunt days, staff contact with hunters, number of youth deer tags and voluntary check in by big game hunters in the Glass Hill Unit.

Hunting opportunities on LMWA include deer and elk hunting (archery and rifle) on Glass Hill; youth deer hunts (archery and muzzleloader/shotgun); black-bear, cougar and turkey on Glass Hill; pheasant quail, grouse, partridge and waterfowl.

LMWA provides a relatively unique hunting experience for managed waterfowl areas in Oregon. It is currently free of intensive regulations (no reservations, designated blinds or check-in system). Waterfowl hunting opportunity on LMWA is largely dependent upon environmental conditions. Annual precipitation and spring melt of snow pack affect our total available water, while temperature can have a great effect on our open water through evaporation. Water availability can be extremely limited in the fall due to dry summer conditions and late onset of autumn rains. Cold winter temperatures can result in freezing of available water limiting hunting opportunities to the fields.

Angling on LMWA is permitted only at the Peach Road Fishing Pond. Because of its easy access and close proximity to La Grande and surrounding communities, the fishing pond is used extensively by local anglers. A vault-type restroom was installed near the fishing pond in 2008. Although it is open year-round, anglers visit the area primarily in the spring and summer. The Department annually stocks the fishing pond with legal size and larger rainbow trout and surplus hatchery steelhead. The La Grande Fish District has held its Free Fishing Weekend event at the Peach Road Fishing Pond in the past and is expected to do so again in the future.

Table 7. Estimated Annual Hunting and Angling Use Days on Ladd Marsh Wildlife Area.

Activity	Estimated Annual Use Days
Hunting	
Waterfowl	2,065
Upland Bird	1,750
Big Game (deer, elk, bear, cougar)	625
Angling	1,000
Total	5,440

No regulated trapping is permitted on LMWA. However, each year a trapper is hired under contract by the City of La Grande to trap muskrats within the easement of the city treatment facility and associated ponds. This is done to prevent damage to the dikes by burrowing muskrats and to maintain the integrity of the treatment ponds. The contract trapper works under the oversight of the City of La Grande and LMWA personnel. Licensed trappers do occasionally work the road ditches within the LMWA. The road ditches are within the county rights of way and are not regulated by the Department. The animals trapped, primarily muskrat, are likely animals that spend most of their time on the wildlife area.

Wildlife Viewing

For the purposes of this plan, non-hunting, trapping, and angling activities (viewing, hiking, photography, etc.) are collectively referred to as wildlife viewing activities.

Portions of LMWA are open to the public year-round (see Table 6 above) and numerous public roads pass within its boundaries. Wildlife viewing on LMWA is estimated through random vehicle counts in parking areas and along public roads and staff contact with visitors (**Table 8**) and is estimated at over 11,300 visitor use days per year. A Daily access permit has been implemented to get a more defined estimate for non-hunting use and activities. Due to its infancy, struggling compliance, and inability to capture viewing from roadsides it is not an accurate representation at this time.

Wildlife viewing on LMWA has increased over the past ten years as bird watching has grown in popularity nationwide. The sharpest increase has taken place since the 2004 opening of the Tule Lake Public Access Area. This area, open March 1 through July 31, has created access opportunities for birdwatchers to previously unavailable areas of Ladd Marsh during the spring and summer migration and breeding seasons. The Tule Lake Public Access Area is 400 acres in size and includes a one mile auto tour and over five miles of walking trails. The Tule Lake Public Access Area is the focal point of the Ladd Marsh Bird Festival. This annual event, first held in 2006, commemorates International Migratory Bird Day. In 2008, the Bird Festival increased in length and scope to two days, with evening programs, it has since increased further to three days of field trips, and two full days on the Marsh and an evening performance (see **Table 9**).

Table 8. Estimated Average Annual Wildlife Viewing Use Days on the Ladd Marsh Wildlife Area.

Activity Area	Estimated Annual Use Days
Tule Lake Public Access Area	1,050
West Marsh Viewpoint	5,475
Glass Hill	400
Viewing from public roads	4,380
Total	11,305

Educational/Interpretive

Because of its close proximity to La Grande and surrounding communities, LMWA is used by a variety of educational groups including local and distant school districts, universities and civic groups. All age groups benefit from the educational opportunities at LMWA (see **Table 9**). School and other educational groups may visit the area on their own, with a permit from LMWA staff, or they may arrange for guided tours by LMWA personnel. Informational talks and slide shows are presented to a variety of groups upon request and in conjunction with special projects. Use by educational groups is recorded based on requests for permits and observed participation. Staff time required for preparation and participation in each educational activity varies from one or two hours to as many as 20 hours.

Table 9. Educational Group Use of Ladd Marsh Wildlife Area in 2016-2017 by Event type.

Age Group	Number of Participants
K-12 , Collage (17 field trips)	525
Adult/other group tours (3)	220
Monthly Bird Walk	64
Bird Festival	310, 40 volunteers
Total	1159

In addition to general educational use, LMWA offers opportunities to educate public works personnel and civic leaders regarding the system to use treated wastewater on the wildlife area. Every year, LMWA personnel are asked to give tours and/or presentations to public works employees and civic leaders from around the state to describe the system in place for use of treated wastewater from La Grande to fill managed wetlands.

Economic Impact of Public Use

Public use of LMWA generates considerable economic benefit to Union County. This benefit is in the form of expenditures for food, fuel, lodging and equipment at local businesses. Direct expenditures by outdoor recreationists have a ripple effect within the overall economy. According to the U.S. Fish and Wildlife Service *National Survey of Fishing, Hunting and Wildlife Associated Recreation*, in 2001, outdoor recreationists spent \$38.4 billion nationwide which resulted in a total impact to the nation's economy of \$95.8 billion. According to the same survey, hunters and anglers average \$30 per day in expenditures (\$28 for big game, \$35 for migratory birds, and \$26 for angling). Using that average figure and estimated hunting/angling use days, LMWA hunters and anglers each year contribute around \$163,000 directly to the local economy, with an overall economic impact closer to \$392,000.

Direct expenditures by wildlife viewers are more difficult to characterize because much of what participants spend nationwide includes feeders, seed and other items for bird and other wildlife watching at home. Nevertheless, similar to hunting and angling, wildlife viewing on Ladd Marsh generates expenses for food, fuel, lodging and equipment at local businesses. Given that the estimated wildlife viewing use days on LMWA are more than double those for hunting and angling, the total impact to the Union County economy from public use of LMWA may reach one million dollars annually.

Objectives and Strategies

Objectives and Strategies

As previously stated, 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 meet an objective.

Goals, objectives and strategies in the plan were derived following an ecosystem based management philosophy. Of primary importance, most actions undertaken on LMWA are beneficial for wildlife, and public use must be compatible with wildlife resources. The

primary action for benefiting wildlife is managing or preserving the range of habitat types that historically occurred in the Grande Ronde Valley. These habitats were created and maintained by a suite of long and short term ecological processes, most importantly hydrology and fire. Management activities such as water level management (drawdowns and flooding) and vegetation manipulations (farming, grazing, mowing, disking and controlled burns) are tools LMWA personnel use to maintain important ecological processes needed to create healthy habitats. Due to the wide variety of habitat use among the different wildlife species utilizing LMWA, benefits are 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, are quite variable and specific uses are not maximized in all cases.

The following objectives and strategies are based on the three goals described earlier.

They identify the management activities and priorities of the 2018 Ladd Marsh Wildlife Area Management Plan:

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

A portion of the birds belonging to the Pacific Flyway waterfowl population pass through the Intermountain West enroute to wintering areas in California, Central America and South America. Many of these same species along with others make return migrations to breeding areas in Alaska, Canada and arctic Russia. The diversity of food resources in wetlands plays an important role in replenishing or building energy reserves necessary during migration for a variety of species. In some cases energy is being stored in preparation for the physiological demands of breeding season. LMWA is within the Intermountain West Joint Venture area and provides a stopover for migrating waterfowl that need to rebuild energy reserves. Joint Ventures are based on a cooperative approach to conservation by forming broad partnerships consisting of individuals, corporations, conservation organizations, and local, state, provincial, and federal agencies. These groups work together to protect, restore, and enhance wetlands and associated upland habitats in specific geographic regions.

Life history events of migration molt, pair formation, and pre-breeding fat storage are undertaken by waterfowl and a diversity of habitat types can meet the needs of a wide variety of species. Habitat management at LMWA has historically provided this variety and active management is necessary to enhance, maintain and restore those habitats. Permanent, semi-permanent and seasonal wetlands produce large amounts of natural foods in the form of seeds, foliage, tubers, and invertebrates that provide a diverse diet for a variety of waterfowl species.

Canada geese and 13 species of ducks breed on LMWA; it is an important area to conservation of Pacific Flyway populations. Additionally, locally produced waterfowl constitute a major proportion of waterfowl harvested by hunters early in the season. Waterfowl produced at LMWA are harvested throughout the Pacific Flyway.

The diversity of wetland habitats on LMWA meets the entire range of breeding season requirements for a variety of waterfowl species (e.g. Canada geese to ruddy ducks).

Strategies employed by the LMWA staff will support many wetland habitat conservation actions to benefit priority waterfowl species identified in Pacific Flyway management plans.

Strategies employed by the LMWA staff will support many wetland habitat conservation actions to benefit priority shorebird species identified in the OCS, such as black-necked stilt and long-billed curlew.

Over 25 species of other waterbirds or wetland dependent and wetland obligate wildlife including rails, bitterns and other secretive marsh birds, utilize wetland habitats on LMWA. Life cycle demands and needs of breeding season, post breeding dispersal and migration are met for many species in the diverse habitats found on LMWA. 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 spatial and temporal needs of OCS priority species found in this priority habitat of the Blue Mountains Ecoregion. In addition to naming priority habitats and species, the OCS identifies “recommended conservation actions” for each Conservation Opportunity Area. The Grande Ronde Valley is identified as a conservation opportunity area with recommended conservation actions aimed at maintenance, enhancement and/or restoration of aquatic, riparian and wetland habitats. Specifically, the OCS recommends managing “Ladd Marsh Wildlife Area’s wetlands to optimize habitat values for a diversity of breeding and migrating birds”. The above Goal One and its associated objectives are consistent with these recommendations in the OCS

Objective 1.1: Manage approximately 45 acres of palustrine permanently flooded wetland habitats. Emphasis will be on maintaining productive stands of submerged aquatic vegetation such as sago pond weed interspersed with cattail and hardstem bulrush stands.

Rationale: Permanently flooded wetlands on LMWA are maintained primarily by ground water and perennial springs. Water depths remain relatively stable throughout the year. This habitat type is important brood habitat during drought conditions as they are often the only remaining open water on the area. They also provide stable breeding sites for birds including rails, marsh wrens, eared grebes and black-crowned night herons. Aquatic beds have tremendous populations of invertebrates which provide food for an array of wildlife species. Many of the permanently flooded wetlands are maintained by warm springs; therefore they provide waterfowl loafing sites during cold periods. There is also evidence these areas may provide over-winter areas for fish species including steelhead and Chinook salmon.

Strategy 1. Robust emergent vegetation (cattails and hardstem bulrush) will be managed for 25-50% area coverage. Work will include monitoring water levels and robust emergent encroachment.

Strategy 2. Reduce robust emergent stands, where necessary to meet 25-50% area coverage, using Best Management Practices approved by the U.S. Fish and Wildlife Service. Work will include applying approved herbicides.

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 1.2: Manage approximately 110 acres of palustrine intermittently exposed wetlands. This habitat will be managed for a ratio of 3:1, open water to emergent wetlands.

Rationale: These wetlands are similar to permanently flooded wetlands regarding their contribution to the diversity of habitat types at LMWA. However, they differ in that some active management options are available. They can be significantly drawn down if desired to facilitate activities including disking, burning and carp control. They cannot be completely dewatered without pumping except under drought conditions. These areas have characteristics of both permanently flooded and semi-permanent wetlands depending on management and hydroperiod. They have significant areas of aquatic vegetation often surrounded and interspersed with emergent vegetation.

Strategy 1. Regulate water levels which promote and enhance aquatic and emergent vegetation growth and invertebrate populations. Work will include monitoring and adjusting water levels as necessary.

Strategy 2. Utilize moist soil and marsh management methods to enhance habitat diversity, improve open water to vegetation ratios and interspersed to improve brooding and foraging sites for waterfowl.

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 1.3: Manage approximately 1,811 acres of palustrine semi-permanent wetlands with a ratio of no greater than 1:1, robust emergent vegetation to open water.

Rationale: A series of impoundments has been developed at LMWA that substantially increases the land base available for moist soil management. Most of the units have developed desired vegetation communities consisting of a mosaic of native annual species. In order to re invigorate and maintain this mosaic soil disturbance associated with disking or vegetation removal creates germination conditions that favor early successional, seed-producing annual plants that are favored by waterfowl. It also provides substrate for invertebrate production. Plant and waterfowl response when these areas are flooded properly is often considerable. This pattern may persist for several years, however, in the absence of active management or under multiple years of the same management regime, this productive community of annuals changes as plant community succession proceeds towards perennial species or undesirable exotics (e.g., reed canary grass).

One common approach is to rotate a single impoundment through a series of wetland types over a period of years. Rotating among dry, seasonal, semi-permanent and permanent wetland types mimics the natural wet and dry cycle that historically characterized the Grande Ronde Valley and varying the hydroperiod influences plant community composition. However, the rate of plant community change is variable among units and among years of differing environmental conditions. Moist soil management techniques can be applied to the extent water is available for refilling wetland cells. The timing and duration of drawdown generally determines the type and level of vegetation response. These wetlands should have open water with interspersed stands of vegetation to create a mosaic of features within individual habitat management units. Water depths will generally not exceed 24 inches.

Strategy 1. Develop three year implementation strategies that outline specific management actions taking place in each unit as conditions and resources allow. Management actions will include developing flood up and drawdown schedules and identifying specific treatment actions like burning, disking or spraying.

Strategy 2. Manage water levels to enhance plant species and abundance of invertebrate populations for waterfowl foraging. Work will include monitoring and adjusting water levels annually with an emphasis on providing waterfowl spring migration and production habitats.

Strategy 3. Utilize moist soil and marsh management techniques to enhance habitat diversity and productivity through ground disturbance to encourage annual food production. Work will include drawdowns, re-flooding and soil disturbance (burning, mowing, disking, herbicide treatment and plowing).

Strategy 4. 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: Manage approximately 658 acres of palustrine seasonally flooded wetlands (wet meadow) for foraging and nesting areas for waterfowl and other wetland birds.

Rationale: This habitat type occurs at slightly higher elevations than the semi-permanently flooded wetlands. They have either standing water or saturated soils due to spring precipitation and runoff. Water levels gradually recede as evapotranspiration increases in early to mid summer. Seasonally flooded wetlands are important foraging areas for spring migrants including sandhill cranes, greater white-fronted, Canada geese and dabbling ducks. They also support abundant invertebrate populations essential for nesting waterfowl and broods.

Tufted hairgrass and common camas are among the desired native species in this habitat along with a rich diversity of wetland forbs. Reed canarygrass, if not effectively managed, can move into these areas and create a monoculture with little wildlife habitat value.

Strategy 1. Utilize moist soil and marsh management techniques to enhance habitat diversity and productivity through ground disturbance (burning, disking, mowing) to encourage annual food production. Work will include drawdown and soil disturbance (burning, mowing, disking, herbicide treatment and plowing).

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: Manage approximately 113 acres of palustrine intermittently flooded wetlands.

Rationale: Palustrine intermittently flooded wetlands are on the Conley Lake Habitat Unit of LMWA. Conley Lake is a 120 acre playa lake which is filled from ground water and spring runoff. Annual precipitation has to be average or above to fill the lake. Historically the lake has been important for spring migrants. Waterfowl counts as recent as 1997 included greater than 1,000 tundra swans and 3,000 geese (Canada, greater white-fronted) using the area. The lake has not had water in recent years due to continued drought conditions in northeast Oregon. The installation of deep irrigation wells also may have affected ground water. These wells and long term climate changes may reduce the habitat value of the wildlife area for migrating waterbirds.

Strategy 1. Work with NRCS to develop a restoration plan suited to the new baseline conditions of the site. Previous surveys of the plant communities have been done by NRCS so work will include developing the approach to the restoration as well as an appropriate timeline.

Strategy 2. Explore, evaluate and if warranted pursue supplemental water sources to provide consistent wetland values. Work will include investigating the availability of water from existing sources including adjacent irrigation wells and

municipal waste water. Also investigate and evaluate digging and operating a well on the property.

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 1.6: Manage approximately 116 acres of palustrine forested wetlands.

Rationale: Along much of its length Ladd Creek has been diverted, straightened, and channelized. The extent of forested wetlands along the original creek channel is unknown, but they were undoubtedly an important habitat in the Grande Ronde Valley. Forested wetlands provide foraging and nesting habitat for tree-dependent songbirds. Approximately 10.2 miles of Ladd Creek have been restored of which 6.2 have been performed in the last 20 years. Ongoing monitoring of the revegetation process and woody plant establishment is being conducted.

Strategy 1. Monitor woody vegetation along 6.2 miles of Ladd Creek. Work will include monitoring the success for previous woody vegetation planting, planting native trees and shrubs when needed and installing fencing to protect new plantings from herbivory where necessary.

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 1.7: Manage approximately 26 acres of palustrine scrub-shrub wetlands.

Rationale: Historical accounts by early settlers talk about tremendous scrub-shrub habitat, primarily willows, adjacent to the streams in the Grand Ronde Valley. Channelization and land use changes have eliminated this habitat type in much of the valley. This habitat is extremely important for stream health. Shading helps cool streams which is important for anadromous fish. It also provides important off channel habitat for young fish during high water events. Many passerine bird species including common yellowthroat and other warblers use this habitat type for foraging and nesting. Recent stream restoration projects have included planting native shrubs including red-osier dogwood and willows. Natural recruitment has been tremendous in disturbed areas of restored channels.

Strategy 1. Where Ladd Creek flows through management units, LMWA staff will prioritize riparian zone management, mimicking the natural hydroperiod when possible and linking hydroperiod in those units to hydroperiod elsewhere in the stream. Work will include monitoring and adjusting water levels.

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 1.8: Restore, enhance and manage approximately 11 acres of riverine wetlands on LMWA.

Rationale: Ladd Creek has been designated critical steelhead habitat. Channelization, land use and fish barriers created during road construction have eliminated steelhead spawning since the early 1970s. Cooperative projects to remove fish barriers and improve stream habitat on and below LMWA will restore migration, wintering and spawning habitat for several fish species including steelhead.

Strategy 1. Restoration of approximately six acres (6.2 mi.) of riverine wetlands has been conducted, now ongoing monitoring of the restoration and plant establishment will take priority. Work will include plant survival surveys and stream temperature monitoring.

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

Objective 1.9: Maintain and improve critical physical and functional infrastructure affecting wetland management activities.

Rationale: Physical infrastructure is essential for water level management and subsequent habitat management across all wetland habitats. Such infrastructure includes dikes and levees, culverts, flashboard risers, other water control structures and rock spillways. Dikes also provide protection from flooding on adjacent private land. Functional infrastructure is necessary for water delivery for flood and drainage purposes and includes canals, channels and ditches.

Most wetland habitat objective and strategies rely on effective, efficient and timely water level manipulations. This capability is critical and necessary to affect nearly all habitat enhancement and management actions.

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 Intermountain West Joint Venture, Pacific Flyway species population management plans, and other state, local or federal agency implementation plans involving wetland management and protection. Coordination with appropriate agencies and organizations will occur.

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. 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. Monitor wetland water levels and ground water adjacent to private property. Develop projects and manage water levels to control ground water and possible affects on adjacent land.

Objective 1.10: Evaluate the effectiveness of the existing sanctuary for waterfowl and wetland dependent wildlife. Designate 15-35% of the managed wetlands as seasonal sanctuary.

Rationale: A fundamental consideration for management of any wildlife species is to provide food, water, and sanctuary. Wetland dependent wildlife is sensitive to disturbance during critical time periods of breeding, molting and migration. This is particularly important for waterfowl, both “resident” birds and migrating populations, during hunting season. The physical demands of migration and daily movements within staging areas require that wildlife have access to suitable locations for food and rest. 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.

Presently, LMWA designates 850 acres in two areas as posted Wildlife Refuge, of which 520 acres are either permanent or semi-permanent wetlands. This is approximately 30% of the managed wetlands on LMWA. In recent years, the area’s largest sanctuary wetland (308 acres) has nearly or completely dried out by late summer and Ladd Creek flows have been inadequate to flood it during fall. Under those conditions, the area does not function as a sanctuary. The remaining 212 acres of posted refuge wetlands typically hold water throughout the year and function appropriately as sanctuary for waterfowl and other wetland species. Thus seasonally increasing the percentage of refuge to greater than the 35%.

Additionally, the City of La Grande’s primary wastewater treatment facility is situated on land adjacent to the LMWA and consists of approximately 100 acres of water surface available year-round. Because disturbance is minimal around the facility, these ponds function as defacto refuge for waterfowl using LMWA during all seasons. Waterfowl are regularly observed moving between the wetlands and grain fields of LMWA and the treatment ponds.

Strategy 1. Designate selected areas as year-round sanctuary (posted “Refuge”) for protection of wildlife. Work will include posting information signs as well as public notification through educational and informational means.

Strategy 2. Implement seasonal access restrictions as necessary to protect migrating and breeding wetland dependent or obligate wildlife. Work will entail posting information signs at key entry sites as well as restricting motor vehicle or foot travel from early spring through early fall annually.

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

Objective 2.1: Enhance and manage approximately 1,581 acres of grassland habitat to benefit a wide variety of native wildlife and desired game species.

Rationale: Grasslands are the second largest habitat type on LMWA after wetlands and are a strategy habitat in the OCS. Native grass species include basin wild rye, bluebunch wheatgrass and Idaho fescue. LMWA staff has converted several hundred acres of agricultural land to native grasslands. Additional areas have been degraded by historical grazing or the introduction of invasive species including medusahead wild rye and cheatgrass. Future grassland work will include improving the quality of existing stands, restoration of additional areas, and creating blocks ecologically large enough to support grassland dependent species. Grasslands provide nesting habitat for upland game and waterfowl. Upland birds also use residual cover in winter.

Strategy 1. Enhance 200-300 acres of grassland habitat. Work will include removing invasive plant species, preparing a seedbed and planting with several species of native grass and forb species adapted to the site. Creating large habitat blocks to support grassland dependent species will be considered.

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

Objective 2.2: Enhance and manage approximately 307 acres of upland shrub habitat to benefit a wide variety of native wildlife and desired game species.

Rationale: This habitat type provides critical winter foraging areas for elk and white-tailed and mule deer. Depending on winter conditions, 300-700 elk and 100-200 deer may winter in the Ladd Marsh area. Residential development increases the need for quality big game winter habitat. This habitat also provides foraging and nesting habitat for several passerine birds including western (*Sialia mexicana*) and mountain bluebird (*Sialia Mexicana*) and Brewer’s sparrow (*Spizella breweri*).

Strategy 1. Utilize integrated pest management to control invasive plant species, focusing on noxious weeds including sulfur cinquefoil, sweetbriar and medusahead. Work will entail monitoring, searching for, and treating infestations utilizing best management practices and techniques.

Objective 2.3: Enhance and manage approximately 397 acres of agricultural upland habitat to benefit a wide variety of native wildlife and desired game species.

Rationale: Row crops, alfalfa production and grazing have been part of LMWA since its inception. Except wetlands, the entire area was either farmed or grazed at one time. Cereal grains provide high energy foods used by migrating ducks and geese as well as upland birds like pheasant and quail. Currently, approximately 397 acres of grain crops are planted on the wildlife area each year. Alfalfa is managed to improve soil condition and provide late summer and fall forage for elk. Several hundred acres of agricultural land have been restored to wetlands and grasslands.

Strategy 1. Maintain food and cover plantings on 250-300 acres of agricultural habitat. Some acreage will be left fallow each year for weed control and to enhance soil moisture. Work includes farming with tractors and implements to accomplish soil preparation, planting and cultivation of food and cover crops. Irrigation of crops will be utilized in several locations. Continue to use share-cropping to meet objectives.

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

Strategy 3: Evaluate the potential for conversion of a portion of the present agricultural habitat to either grassland or upland shrub habitat to benefit a variety of upland wildlife. Conversion would be considered as a means to break up large blocks of contiguous agricultural habitat with smaller areas of permanent cover.

Objective 2.4: Enhance and manage approximately 760 acres of mixed conifer habitat to benefit a wide variety of native wildlife and desired game species.

Rationale: This habitat type provides year-round habitat for ruffed and dusky grouse, elk, mule and white-tailed deer and many other forest species. Many of the adjacent areas have been logged in recent years. This area provides security for wintering big game.

Strategy 1. Survey and fence the remaining wildlife area boundary to keep neighboring landowners' livestock out of the wildlife area and to maintain grazing as a viable management option. Work will include a survey and fence construction.

Strategy 2. Maintain access roads for management activities and fire suppression. Work will include annual inspection and clearing of downed timber and other debris.

Strategy 3. Monitor seedling regeneration in logged areas and replant if necessary to meet all local and state reforestation laws.

Strategy 4. Utilize integrated pest management to control invasive plant species, focusing on noxious weeds. Work will entail monitoring, searching for, and treating infestations utilizing best management practices and techniques.

Objective 2.5: Enhance and manage approximately 38 acres of deciduous tree habitat to benefit a wide variety of native wildlife and desired game species.

Rationale: The existing deciduous tree habitat on the LMWA is the result of former landowners planting windbreaks (mostly non-native willows) and a local bird club planting a variety of tree species in one specific area. Many of the rows of willows were once along irrigation or drainage ditches but those ditches are no longer functional. This habitat provides food and cover for a wide range of wildlife from breeding neotropical migratory birds to wintering deer and elk.

Strategy 1. Utilize integrated pest management to control invasive plant species, focusing on noxious weeds in the understory of this habitat. Work will entail monitoring, searching for, and treating infestations utilizing best management practices and techniques.

Strategy 2. Identify and plant additional native trees and shrub species to bolster existing rows.

Objective 2.6: Maintain and improve wildlife area facilities, structures and equipment used to conduct habitat management and public use projects.

Rationale: Facilities, structures and equipment are integral to the overall operation of LMWA. Infrastructure and equipment must be maintained in good working order to accomplish habitat and wildlife management projects and to provide public use opportunities. Infrastructure includes the Headquarters Complex, associated residences and buildings. Equipment includes heavy equipment, dump truck, tractors, agricultural implements, vehicles, ATV's, trailers, boats and shop tools.

Strategy 1. Maintain current Headquarters Complex including 11 buildings, four residences, one host site 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, scheduled maintenance of all equipment/vehicles and completing repair and upgrades as necessary.

Strategy 3. Continue irrigation and water management practices to meet wildlife area habitat goals and objectives. Work includes exercising water rights, monthly measurement or estimates and annual reporting of authorized water rights use on LMWA to Oregon Water Resources Department.

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

Objective 2.7: Provide supplemental big game feed to protect upland habitats on Ladd Marsh Wildlife Area and adjacent private lands.

Rationale: Three hundred to seven hundred elk winter on LMWA depending on the severity of winter. Elk and deer can damage the remaining native habitat as well as crops on adjacent private land. Supplemental feed is stored and fed to reduce the damage.

Strategy 1. Monitor winter conditions and elk populations on LMWA. Consult and coordinate feeding with watershed and regional Department staff.

Strategy 2. When designated by the district wildlife staff as necessary, provide supplemental feed for 300-700 elk when required by winter conditions.

Goal 3: To provide a variety of wildlife oriented recreational and educational opportunities to the public which are compatible with Goals 1 and 2.

LMWA staff strives to balance the biological needs of fish and wildlife using the area's habitats with the various recreational and educational desires of the public. In order to meet habitat management objectives, however, decisions must be made to manage public use, either temporally or spatially, to minimize impacts to wildlife. Annual review of the area's hunting program and regulations, designation of refuge areas, access management, maintenance of parking areas, posting signs and developing informational literature are among many of the strategies described below which support and encourage recreational objectives.

Objective 3.1: Provide hunting and angling opportunities in a manner compatible with habitat management objectives.

Rationale: The LMWA is funded almost entirely by hunter dollars through the Federal Aid to Wildlife Restoration Act (Pittman Robertson) (75%) and hunting license receipts (25%). Hunting is a major public activity at LMWA during fall through winter months.

LMWA's public use program provides an array of hunting and angling opportunities. The LMWA hunt program includes seasons for cougar, bear, elk, white-tailed and mule deer, dusky and ruffed grouse, turkey, pheasant, California quail, gray partridge, Wilson's snipe, crow, duck and goose. Youth hunts are available for elk, turkey, upland game and waterfowl. Angling for hatchery rainbow trout is provided at the Peach Road Fishing Pond.

Strategy 1. Continue upland game, waterfowl and big game hunts. Work will include providing recommendations for seasons, program opportunities and procedures to district and headquarters staff on an annual basis.

Strategy 2. Continue angling program at Peach Road Pond. Work will be conducted in coordination with La Grande Fish District personnel and includes stocking rainbow trout and monitoring angler use.

Strategy 3. Maintain LMWA facilities including roads, parking areas and informational kiosks as part of the hunt program.

Strategy 4. Conduct wildlife surveys and monitor wildlife population levels, distribution, and use patterns. Maintain database for comparative analysis. Report results to Department staff and provide information to LMWA users. Work includes periodic counts, data recording and analysis, and providing results to constituents.

Strategy 5. Continue and expand hunter education and informational programs to improve hunter participation and effectiveness. Work includes providing shotgun and hunting skill clinics and field contacts by Department and OSP personnel.

Strategy 6. Continue to provide access and area information to the public through personal communication, web page postings, brochures, maps, signing and hunting regulation booklets.

Strategy 7. Evaluate the potential for improving LMWA's disabled hunter access program.

Strategy 8. Evaluate what hunting and angling opportunities are currently allowed and explore if any other hunting and angling opportunities are feasible.

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

Objective 3.2: Provide wildlife viewing and education/interpretation opportunities compatible with Objective 3.1 and habitat management objectives.

Rationale: Wildlife viewing and education are the fastest growing public activities at LMWA. Prior to 2005, the majority of LMWA was closed to public access during waterfowl spring migration and nesting. The Tule Lake Public Access area was opened to the public in March 2005. This area includes an auto route and several miles of hiking trails through 400 acres of semi-permanent wetlands. It is open from March 1 to July 31st annually. The Glass Hill unit above Foothill Road is open April 1st through January 31st. The overlook above West Marsh and a nature trail near Interstate 84 are open seven days a week, year around. These areas offer the public viewing and other non-consumptive uses in a variety of habitat types.

As wildlife viewing use increases, educational and informational efforts will enhance enjoyment while affording protection for the resource. LMWA is attempting 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. Present and planned visitor facilities have been built primarily with grants and donations. Currently, LMWA is maintained entirely by funds generated from hunters, through Federal Aid and hunting license revenue. In order to expand and meet continued maintenance needs it will be necessary to explore additional funding and support methods to estimate the number and identify LMWA users and the economic benefits will be developed.

Strategy 1. Maintain existing public facilities and investigate potential for new facilities to provide opportunities for wildlife viewers. Work includes maintenance of West Marsh overlook, Tule Lake Public Access Area, kiosks and parking areas and posting signs as well as investigation into feasibility of new facilities including trails, interpretive kiosks and restrooms.

Strategy 2. Continue to provide wildlife area information to the public through web page postings, weekly recreational reports, other media publications, wildlife viewing brochures, visitor guides, maps, and regulations.

Strategy 3. Continue Host/Volunteer program to maintain and enhance the wildlife viewing program and other wildlife area needs.

Strategy 4. Provide guidance and support to educational and other institutions including schools, civic groups, conservation entities and state/federal agencies.

Strategy 5. Manage public uses consistent with the biological needs of wildlife and the wildlife area's hunting program.

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

Plan Implementation

Funding

Since its inception in 1949, funding for operation and maintenance of the LMWA has been accomplished through annual federal grant agreements under the Federal Aid to Wildlife Restoration (WR) 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.

Funding for WR 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.

Over the past five years, funding for the operation and maintenance of the LMWA has averaged approximately \$430,000 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, and construction of new facilities or amenities (educational/orientation kiosks and interpretive signs), and species and habitat monitoring.

Accomplishments

Listed below is a compilation of the accomplishments since the 2008 review of the LMWA Management plan:

Restoration of the remaining 6.2 miles of Ladd Creek. This project was accomplished with ODFW's Fish habitat program and funded by BPA. The creek was originally ditched to help drain the entire area. It now has a natural meander and a supportive riparian area to help keep it stable. Long-term monitoring of the stream channel, riparian vegetation and water temperature are being performed in order to monitor the restoration effort.

A restoration plan has been developed and implementation has begun on the Conley Lake Unit. The Implementation of the plan will take approximately 5 years. At the time of this review, the site has received management practices to help control weeds prior to native grass establishment planned for the fall of 2018.

In an effort to search for outside additional revenue for wildlife areas, a parking permit system was implemented. Funds from parking permits have been used to improve parking areas, replace kiosks, and acquire new interpretive signage. As hunters already contribute to wildlife area funding, they receive a free parking permit with the purchase of a hunting license.

To better track usage and activities on LMWA, a Daily Access permit system was implemented. Some state wildlife areas already had a similar system in place to monitor hunting activities. This system was adopted at Ladd Marsh and also incorporated into our tracking of non hunting use outside of hunting season to track all area use. Although this system is in place, accuracy is based on compliance which takes time.

Starting in 2017, Ladd Marsh is now open to big game hunting east of Foothill Road, three days a week and all federal holidays during authorized hunting seasons to short range hunting equipment only.

Infrastructure improvements include; Permanent Vault toilet at Peach Pond and Glass Hill Parking areas; Viewing Platform located off the drive loop on the Tule Lake access area; Four bay equipment pole barn at the Headquarters office; 1.5 miles of boundary fence on North boundary of Glass Hill unit and an official survey including placing monuments and line post of the remainder of Glass Hill boundary.

The Sandhill Crane project was implemented in 2007 in an effort to ratify existing assumptions about their winter grounds. To date, 30 Cranes have been captured and affixed with leg bands. An additional 5 were captured released with GPS equipped Transmitters (PTT's).

Staffing / Organization

The Department manages 17 major wildlife areas throughout the state. The wildlife areas encompass approximately 200,000 acres and are found in both Department administrative regions. The LMWA is currently staffed by three full time employees and

one seasonal employee. Full time employees consist of the area Manager, a Fish and Wildlife Technician and a Natural Resource Specialist 2. The seasonal position is an Experimental Biological aide (EBA) which is hired specifically for migratory bird banding during the summer. The NRS 2's primary duties include the monitoring and evaluation of Bonneville Power Administration (BPA) funded projects on the wildlife area.

Compliance Requirements

The LMWA Management Plan was developed to comply with all Federal and State laws, Oregon Revised Statutes (ORS), Oregon Administrative Rules (OAR), 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

Partnerships with federal, state and local agencies, universities, tribes, non-profits, individual volunteers and private landowners are an important part of LMWA operations and management. Partnerships occur through project funding assistance, research assistance, private land access or other types of collaboration.

Dramatic changes have occurred at LMWA since 1998. More than four million dollars in land acquisition and habitat developments have improved the area for wildlife and provided additional public recreation. Major funding was provided by the U.S. Department of Agriculture (Wetland Reserve Program), North American Wetland Conservation Act, the U.S. Army Corps of Engineers, Bonneville Power Administration, U.S. Fish and Wildlife Service, Oregon Hunters Association, Ducks Unlimited, Oregon Duck Hunters Association, the Rocky Mountain Elk Foundation, Oregon Watershed Enhancement Board, The Nature Conservancy, Oregon Department of Transportation and the City of La Grande. A number of other state, federal, and local agencies and interest groups provided additional funding and/or in-kind services.

A unique partnership between the Department and the City of La Grande provides additional water for wetland management. This project provides approximately 30 million gallons of reclaimed water for habitat development and management. The project has been so successful that several other municipalities are considering similar projects. This project is discussed in more detail in the Water Resources section, on page 38.

Examples of additional partnerships at work on LMWA include:

- An adjacent landowner who, with the assistance of the Department's Access and Habitat Program, has allowed access for hunters to 1,000 acres of land contiguous with LMWA.
- Several professors from Eastern Oregon University conduct research on LMWA which increases our understanding of the wildlife and habitats of the area.
- Eastern Oregon University professors mentor and advise students conducting research or community service projects on LMWA.
- Two local farmers conduct sharecropping on LMWA whereby one-third of the crop is left standing for wildlife.
- Numerous local teachers utilize LMWA as an outdoor class room via entry permits and tours or programs presented by LMWA staff.

- The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) utilize LMWA to collect traditional plants such as camas and bulrush for education and ceremonial use. The CTUIR also assist with harvesting of native seeds on LMWA through the loan of equipment designed for the purpose.
- A corps of local birders conducts bird surveys year-round, adding to our understanding of the seasonal use of LMWA habitats by resident and migrating birds.
- The annual Ladd Marsh Bird Festival, held the second weekend in May, is a cooperative event with The Friends of Ladd Marsh, Eastern Oregon University Biology Club, USFWS and Union County Tourism. Several local businesses also provide material support.

These partners play an important role in helping the Department achieve its mission and attain LMWA 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 management of LMWA, given its proximity to La Grande. The Department welcomes and encourages more public participation in the administration of the wildlife area.

Adaptive Management

This plan provides for adaptive management of LMWA. 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 Wildlife 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 goals and objectives described in this plan whenever possible. Habitat management activities will be monitored where possible 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 LMWA 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. Goals and objectives described in this plan will not change until they are re-evaluated as part of the formal plan revision process. However, strategies may be revised to better address changing circumstances or due to increased knowledge of the resources on LMWA. 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 Ladd Marsh Wildlife Area**

Year	Acres	Action	Cooperator
1949	120	Acquired from	C. Grandy
1949	80	Acquired from	H. Counsell
1953	21.3	Acquired from	H. Counsell
1958	207.08	Acquired from	H. Counsell
1958	209.12	Acquired from	M. Peebler
1959	26	Acquired from	C. Grandy
1959	800	Acquired from	J&J Boothman
1961	65	Adjustment/Exchange	R. Robinson
1962	158.5	Acquired from	R. Brogoitti
1964	347.1	Acquired from	F. Counsell
1964	120	Acquired from	F. Counsell
1965	40	Acquired from	R. Smutz
1965	128	Acquired from	R. Smutz
1965	107	Adjustment/Exchange	G. Simonis
1965	160.37	Acquired from	W. Powell
1965	33.1	Acquired from	N. Evans
1969	44.31	Acquired from	J. March
1971	163.4	Acquired from	C. Hill
1987	55.35	Acquired from	M. Crossland
1987	353	Acquired from	OR. Water Resources
1991	247.32	Acquired from	J. Rinke
1996	132.68	Adjustment/Exchange	City of La Grande
1996	102.4	Adjustment/Agreement	City of La Grande
2000	375.45	Acquired from	The Nature Conservancy
2000	160.86	Acquired from	The Nature Conservancy
2000	305.76	Acquired from	The Nature Conservancy
2000	848.98	Adjustment/Agreement	Rocky Mountain Elk Foundation
2000	470.87	Adjustment/Agreement	City of La Grande
2004	135.87	Acquired from	The Nature Conservancy
Total	6018.82		

**Appendix B. Plant Species Known to Occur
on Ladd Marsh Wildlife Area**

Scientific Name	Common Name
ACERACEAE	
Box elder	<i>Acer negundo</i> L.
Rocky Mountain maple	<i>Acer glabrum</i>
ALISMATACEAE	
Northern waterplantain	<i>Alisma triviale</i> Pursh.
Wapato, Arrowhead	<i>Sagittaria cuneata</i> Sheldon
AMARANTHACEAE	
Prostrate amaranth	<i>Amaranthus blitoides</i> S. Watson
APIACEAE	
Chervil, burr chervil	<i>Anthriscus caucalis</i> M. Bieb.
Western water hemlock	<i>Cicuta douglasii</i> (DC) J.M. Coult. & Rose
Poison hemlock	<i>Conium maculatum</i> L.
Cow parsnip	<i>Heracleum lanatum</i>
Gray's lomatium	<i>Lomatium grayi</i>
Narrow-leaved lomatium	<i>Lomatium bicolor</i> var. <i>leptocarpum</i>
Big-fruited lomatium	<i>Lomatium macrocarpum</i>
Nineleaf biscuitroot	<i>Lomatium triternatum</i> (Pursh) J.M. Coult. & Rose
Unk	<i>Ligusticum</i> spp
Unk	<i>Osmorhiza</i> spp
APOCYNACEAE	
Spreading dogbane	<i>Apocynum androsaemifolium</i>
ASCLEPIADACEAE	
Narrow-leaved milkweed	<i>Asclepias fascicularis</i>
Showy milkweed	<i>Asclepias speciosa</i>
ASTERACEAE	
Yarrow	<i>Achillea millefolium</i>
Rosy pussy-toes	<i>Antennaria microphylla</i> Rydb.
Stinking mayweed	<i>Anthemis cotula</i>
Common burdock	<i>Arctium minus</i> Bernh.
Twin arnica	<i>Arnica sororia</i>
Biennial wormwood	<i>Artemisia biennis</i> Willd. var. <i>biennis</i>
Prairie sage	<i>Artemisia ludoviciana</i> var. <i>ludoviciana</i>
Long-leaved aster	<i>Aster chilensis</i> ssp. <i>Adscendens</i>

Alkali aster	<i>Aster frondosus</i>
Hairy balsamroot	<i>Balsamorhiza hirsuta</i>
Arrowleaf balsamroot	<i>Balsamorhiza sagittata</i>
Nodding beggartick	<i>Bidens cernua</i> L.
Tall beggar's-tick	<i>Bidens vulgata</i>
Blepharipappus	<i>Blepharipappus scaber</i>
Bachelor buttons	<i>Centaurea cyanus</i>
Diffuse knapweed	<i>Centaurea diffusa</i> Lam.
Spotted knapweed	<i>Centaurea stoebe</i> L. ssp. <i>Micranthos</i> (Gugler) Hayek
Rabbitbrush	<i>Chrysothamnus nauseosus</i>
Chicory	<i>Cichorium intybus</i>
Canada thistle	<i>Cirsium arvense</i>
Prairie thistle	<i>Cirsium canescens</i>
Blanket-flower	<i>Gaillardia aristata</i>
Lowland cudweed	<i>Gnaphalium palustre</i>
Low gumweed	<i>Grindelia nana</i>
Rocky Mountain helianthella	<i>Helianthella uniflora</i> (Nutt.) Torr. & A. Gray
Common sunflower	<i>Helianthus annuus</i>
Prickly lettuce	<i>Lactuca serriola</i> L.
Slender tarweed	<i>Madia gracilis</i> (sm.) D.D. Keck
Pineapple weed	<i>Matricaria matricarioides</i>
Scotch thistle	<i>Onopordum acanthium</i>
Sweet-marsh butterweed	<i>Senecio foetidus</i>
Western groundsel	<i>Senecio integerrimus</i>
Common sow-thistle	<i>Sonchus oleraceus</i>
Common dandelion	<i>Taraxacum officinale</i>
Yellow salsify	<i>Tragopogon dubius</i>
Common salsify	<i>Tragopogon porrifolius</i>
BETULACEAE	
Sitka alder	<i>Alnus sinuata</i>
Water birch	<i>Betula occidentalis</i>
BORAGINACEAE	
Rigid fiddleneck	<i>Amsinckia retrorsa</i> (Lehm.) A. Nelson & J.F. Macbr. var. <i>meziesii</i>
Common bugloss	<i>Anchusa officinalis</i> L.
Catchweed	<i>Asperugo procumbens</i>
Common hounds-tongue	<i>Cynoglossum officinale</i>
Corn gromwell	<i>Lithospermum arvense</i>
Western gromwell	<i>Lithospermum ruderales</i>
Blue scorpion-grass	<i>Myosotis micrantha</i>
Meadow popcorn-flower	<i>Plagiobothrys scouleri</i> (Hook. & Arn.) I.M. Johnston

BRASSICACEAE	
Pale alyssum	<i>Alyssum alyssoides</i>
Black mustard	<i>Brassica nigra</i>
Little pod falseflax	<i>Camelina microcarpa</i>
White top	<i>Cardaria draba</i>
Western tansymustard	<i>Descurainia pinnata</i>
Richardson's tansymustard	<i>Descurainia richardsonii</i>
Spring draba	<i>Draba verna</i>
Euclidium	<i>Euclidium syriacum</i>
Field pepperweed	<i>Lepidium campestre</i>
Perennial pepperweed	<i>Lepidium latifolium</i>
Clasping pepperweed	<i>Lepidium perfoliatum</i>
Rocky Mountain yellowcress	<i>Rorippa curvipes</i> Greene var. <i>truncata</i> (Jeps.) Rollins
Water-cress	<i>Rorippa nasturtium-aquaticum</i>
Tumbleweed	<i>Sisymbrium altissimum</i>
Field pennycress	<i>Thlaspi arvense</i> L.
CALLITRICHACEAE	
Spring water-starwort	<i>Callitriche verna</i>
Different leaved water-starwort	<i>Callitriche heterophylla</i>
CAMPANULACEAE	
Showy downingia	<i>Downingia elegans</i>
CAPRIFOLIACEAE	
Twin flower	<i>Linnaea borealis</i> L.
Honeysuckle	<i>Lonicera tatarica</i>
Blue elderberry	<i>Sambucus nigra</i> L. ssp. <i>cerulea</i> (Raf.) R. Bolli
Common snowberry	<i>Symphoricarpos albus</i>
CARYOPHYLLACEAE	
Thyme-leaf sandwort	<i>Arenaria serpyllifolia</i>
Dry chickweed	<i>Cerastium siculum</i>
Common chickweed	<i>Cerastium vulgatum</i>
Grass pink	<i>Dianthus armeria</i>
Jagged chickweed	<i>Holosteum umbellatum</i>
Douglas' silene	<i>Silene douglasii</i> Hook.
CHENOPODIACEAE	
Fourwing saltbush	<i>Atriplex canescens</i>
Fat-hen orache	<i>Atriplex patula</i> var. <i>hastata</i>
Wedgescale orache	<i>Atriplex truncata</i>

Lambsquarter	<i>Chenopodium album</i> L.
Coast-blight goosefoot	<i>Chenopodium rubrum</i> L.
Burning-bush	<i>Kochia scoparia</i>
Russian thistle	<i>Salsola kali</i>
Greasewood	<i>Sarcobatus vermiculatus</i>
CONVOLVULACEAE	
Bindweed	<i>Convolvulus arvensis</i>
Morning glory	<i>Calystegia sepium</i>
CORNACEAE	
Red-osier dogwood	<i>Cornus stolonifera</i>
CRASSULACEAE	
Lance-leaved sedum	<i>Sedum lanceolatum</i> Torr.
CUPRESSACEAE	
Eastern redcedar	<i>Juniperus virginiana</i>
CYPERACEAE	
Columbia sedge	<i>Carex aperta</i>
Awned sedge	<i>Carex atherodes</i>
Inland sedge	<i>Carex interior</i>
Small-wing sedge	<i>Carex microptera</i> Mack.
Nebraska sedge	<i>Carex nebrascensis</i>
Wooly sedge	<i>Carex pellita</i>
Dry sedge	<i>Carex siccata</i>
Short-beaked sedge	<i>Carex simulata</i>
Sawbeak sedge	<i>Carex stipata</i>
Needle spikerush	<i>Eleocharis acicularis</i> (L.) Roem. & Schult.
Ovoid spikerush	<i>Eleocharis ovata</i>
Common spikerush	<i>Eleocharis palustris</i>
Hardstem bulrush	<i>Schoenoplectus acutus</i> (Muhl.ex Bigelow) A. Löve & D. Löve
Saltmarsh bulrush	<i>Schoenoplectus maritimus</i> (L.) Lye
Small-fruited bulrush	<i>Scirpus microcarpus</i>
DIPSACACEAE	
Teasel	<i>Dipsacus sylvestris</i>
ELAEAGNACEAE	
Russian olive	<i>Elaeagnus angustifolia</i>
Russet buffaloberry	<i>Shepherdia canadensis</i> (L.) Nutt.

EQUISETACEAE	
Common horsetail	<i>Equisetum arvense</i>
Smooth scouring rush	<i>Equisetum laevigatum</i>
ERICACEAE	
Unk	<i>Pyrola spp</i>
Unk	<i>Vaccinium spp</i>
EUPHORBIACEAE	
Mole plant	<i>Euphorbia lathyris</i>
Leafy spurge	<i>Euphorbia esula</i>
FABACEAE	
Blue Mountain milkvetch	<i>Astragalus reventus</i>
Siberian pea	<i>Caragana arborescens</i>
Few-flowered pea	<i>Lathyrus pauciflorus</i>
Bird'-foot trefoil	<i>Lotus corniculatus</i>
Velvet lupine	<i>Lupinus leucophyllus</i>
Sulfur lupine	<i>Lupinus sulphureus var. sulphureus</i>
Wyeth's lupine	<i>Lupinus wyethii</i> S.Watson
Black medic	<i>Medicago lupulina</i>
Alfalfa	<i>Medicago sativa</i>
Common yellow sweet-clover	<i>Melilotus officinalis</i>
Black locust	<i>Robinia pseudo-acacia</i>
Golden pea	<i>Thermopsis montana</i> Nutt.
Douglas' clover	<i>Trifolium douglasii</i>
Strawberry clover	<i>Trifolium fragiferum</i>
Alsike clover	<i>Trifolium hybridum</i>
Long-stalked clover	<i>Trifolium longipes</i>
Plumed clover	<i>Trifolium plumosum var. plumosum</i> Douglas ex Hook.
Red clover	<i>Trifolium pratense</i>
Springbank clover	<i>Trifolium wormskjoldii</i>
American vetch	<i>Vicia americana</i>
Bird vetch	<i>Vicia cracca</i> L.
Hairy vetch	<i>Vicia villosa</i> Roth
GENTIANACEAE	
Whitestem frasera	<i>Frasera albicaulis</i> Douglas e. Griseb
GERANIACEAE	
Filaree	<i>Erodium cicutarium</i> (L.) L'Her. Ex. Aiton
Sticky-leaf geranium	<i>Geranium viscosissimum</i> Fisch. & C.A. Mey ex. C.A. Mey

GROSSULARIACEAE	
Golden currant	<i>Ribes aureum</i>
HIPPURIDACEAE	
Common mare's tail	<i>Hippuris vulgaris</i>
HYDRANGEACEAE	
Mock orange	<i>Philadelphus lewisii</i>
HYDROPHYLLACEAE	
Varileaf phacelia	<i>Phacelia heterophylla</i> Pursch.
HYPERICACEAE	
Common St. John's-wort	<i>Hypericum perforatum</i>
IRIDACEAE	
Blue flag, wild iris	<i>Iris missouriensis</i>
Blue-eyed grass	<i>Sisyrinchium angustifolium</i>
St John-grass-widows	<i>Sisyrinchium inflatum</i>
JUNCACEAE	
Baltic rush	<i>Juncus balticus</i>
Dagger-leaf rush	<i>Juncus ensifolius</i>
Toad rush	<i>Juncus bufonius</i> L.
Slender rush	<i>Juncus tenuis</i> Willd.
JUNCAGINACEAE	
Arrow-grass	<i>Triglochin maritimum</i>
LAMIACEAE	
Common henbit	<i>Lamium amplexicaule</i>
Horehound	<i>Marrubium vulgare</i>
Narrow-leaved skullcap	<i>Scutellaria angustifolia</i>
Self-heal	<i>Prunella vulgaris</i> L.
LEMNACEAE	
Common duckweed	<i>Lemna minor</i> L.
Great duckweed	<i>Spirodela polyrrhiza</i> (L.) Schleid.
LENTIBULARIACEAE	
Common bladderwort	<i>Utricularia macrorhiza</i>
LILIACEAE	

Douglas' brodiaea	<i>Brodiaea douglasii</i>
Green-banded mariposa lily	<i>Calochortus macrocarpus</i> Douglas
Common camas	<i>Camassia quamash</i>
Star-flowered Solomon's seal	<i>Smilacina stellata</i>
Corn lily	<i>Veratrum californicum</i>
Death camas	<i>Zigadenus venenosus</i>
LYTHRACEAE	
Ammannia	<i>Ammannia coccinea</i>
Hyssop loosestrife	<i>Lythrum hyssopifolia</i> L.
Purple loosestrife	<i>Lythrum salicaria</i>
MALVACEAE	
Dwarf mallow	<i>Malva neglecta</i>
Oregon checker mallow	<i>Sidalcea oregana</i> (Nutt. Ex Torr. & A. Gray) A. Gray
MARSILEACEAE	
Clover-fern	<i>Marsilea vestita</i>
NYMPHAEACEAE	
Fragrant water-lily	<i>Nymphaea odorata</i>
ONAGRACEAE	
Denseflower willowherb	<i>Epilobium densiflorum</i> (Lindl.) Hoch & P.H. Raven
Swamp willow-herb	<i>Epilobium palustre</i>
Watson's willow-herb	<i>Epilobium watsonii</i>
Fireweed	<i>Chamerion angustifolium</i> L.
Common clarkia	<i>Clarkia rhomboidea</i>
PINACEAE	
Ponderosa pine	<i>Pinus ponderosa</i>
Grand fir	<i>Abies grandis</i>
Western larch	<i>Larix occidentalis</i>
Douglas-fir	<i>Pseudotsuga menziesii</i>
PLANTAGINACEAE	
Common plantain	<i>Plantago major</i>
POACEAE	
Jointed goatgrass	<i>Aegilops cylindrica</i> Host
Creeping bentgrass	<i>Agrostis stolonifera</i> L.
Meadow foxtail	<i>Alopecurus pratensis</i>

Tall oatgrass	<i>Arrhenatherum elatius</i>
Wild oat	<i>Avena fatua</i>
Sloughgrass	<i>Beckmannia syzigachne</i>
Rattlegrass	<i>Bromus briziformis</i>
Mountain brome	<i>Bromus carinatus</i> Hook. & Arn.
Meadow brome	<i>Bormus racemosus</i> L.
Meadow brome	<i>Bromus racemosus</i>
Smooth brome	<i>Bromus inermis</i>
Japanese brome	<i>Bromus japonicus</i>
Barren brome	<i>Bromus sterilis</i>
Cheatgrass	<i>Bromus tectorum</i>
Unk	<i>Calamagrostis spp</i>
Foxtail pricklegrass	<i>Crypsis alopecuroides</i> (Piller& Mitterp.) Schrad.
Orchard grass	<i>Dactylis glomerata</i>
One-spike oatgrass	<i>Danthonia unispicata</i> (Thurb.) Munro ex Macoun
Tufted hairgrass	<i>Deschampsia caespitosa</i>
Annual hairgrass	<i>Deschampsia danthonioides</i> (Trin.) Munro
Slender hairgrass	<i>Deschampsia elongata</i> (hook.) Munro
Large barnyard grass	<i>Echinochloa crus-galli</i>
Blue wildrye	<i>Elymus glaucus</i> Buckley
Quackgrass	<i>Elymus repens</i>
Squirreltail	<i>Elymus elymoides</i>
Idaho fescue	<i>Festuca idahoensis</i>
American mannagrass	<i>Glyceria grandis</i> S. Watson
Foxtail barley	<i>Hordeum jubatum</i>
Giant wildrye	<i>Elymus cinereus</i> (Scribn. & Merr.) A. Love
Junegrass	<i>Loelera macrantha</i> (Ledeb.) Schult.
Common witchgrass	<i>Panicum capillare</i>
Reed canarygrass	<i>Phalaris arundinacea</i> L.
Common timothy	<i>Phleum pratense</i>
Common reed	<i>Phragmites australis</i>
Bulbous bluegrass	<i>Poa bulbosa</i>
Canada bluegrass	<i>Poa compressa</i> L.
Meadowgrass	<i>Poa palustris</i>
Kentucky bluegrass	<i>Poa pratensis</i> L.
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i> (Pursch) A. Love
Nuttall's alkaligrass	<i>Puccinellia nuttalliana</i> (Schult.) Hitchc.
Annual beardgrass	<i>Polypogon monspeliensis</i>
Rye	<i>Secale cereale</i>
Alkali cordgrass	<i>Spartina gracilis</i> Trin.
Medusahead	<i>Taeniatherum caput-medusae</i> (L.) Nevski
Intermediate wheatgrass	<i>Thinopyrum intermedium</i> ssp <i>barbulatum</i>
Ventenata	<i>Ventenata dubia</i> (Leers) Coss.

POLEMONIACEAE	
Large-flowered collomia	<i>Collomia grandiflora</i>
Microsteris	<i>Microsteris gracilis</i>
Needleleaf navarretia	<i>Navarretia intertexta</i> (Benth.) Hook.
Tufted phlox	<i>Phlox caespitosa</i>
Annual polemonium	<i>Polemonium micranthum</i>
POLYGONACEAE	
Water smartweed	<i>Polygonum amphibium</i> L.
Prostrate knotweed	<i>Polygonum aviculare</i>
Bistort	<i>Polygonum bistortoides</i>
Black bindweed	<i>Polygonum convolvulus</i> L. var. <i>convolvulus</i>
Erect knotweed	<i>Polygonum erectum</i> L.
Heartweed	<i>Polygonum persicaria</i> L.
Bushy knotweed	<i>Polygonum ramosissimum</i>
Sour weed	<i>Rumex acetosella</i>
Curly dock	<i>Rumex crispus</i>
Seaside dock	<i>Rumex maritimus</i>
Mexican dock	<i>Rumex salicifolius</i> Weinm. var. <i>mexicanus</i> (Meisn.) C.L. Hitchc
POLYPODIACEAE	
Bracken fern	<i>Pteridium aquilinum</i>
unknown	<i>Cystopteris</i> ssp
PORTULACACEAE	
Water montia	<i>Montia chamissoi</i>
Narrow-leaved montia	<i>Montia linearis</i>
Miner's lettuce	<i>Claytonia perfoliata</i>
POTAMOGETONACEAE	
Sago pondweed	<i>Potamogeton pectinata</i>
PRIMULACEAE	
Few-fowered shooting star	<i>Dodecatheon pulchellum</i>
Western clematis	<i>Clematis ligusticifolia</i>
RANUNCULACEAE	
Western columbine	<i>Aquilegia formosa</i> Fisch. Ex DC
Hornseed buttercup	<i>Ceratocephala testiculata</i>
Dwarf larkspur	<i>Delphinium depauperatum</i>
Meadow buttercup	<i>Ranunculus acris</i>

Water-plantain buttercup	<i>Ranunculus alismifolius</i>
White waterbuttercup	<i>Ranunculus aquatilis</i> L.
Macoun's buttercup	<i>Ranunculus macounii</i>
Woodland buttercup	<i>Ranunculus uncinatus</i> D. Don ex G. Don
Western meadow-rue	<i>Thalictrum occidentale</i> A. Gray
RHAMNACEAE	
Redstem ceanothus	<i>Ceanothus sanguineus</i> Pursh
Snowbrush ceanothus	<i>Ceanothus velutinus</i>
ROSACEAE	
Saskatoon serviceberry	<i>Amelanchier alnifolia</i> (Nutt.) Nutt. Ex M. Roem.
Black hawthorn	<i>Crataegus douglasii</i>
Woods' strawberry	<i>Fragaria vesca</i> L.
Oceanspray	<i>Holodiscus discolor</i> (Pursh) Maxim.
Mallow ninebark	<i>Physocarpus mavalceus</i> (Greene) Kuntze
Tall cinquefoil	<i>Potentilla arguta</i> Pursh
Slender cinquefoil	<i>Potentilla gracilis</i> var. <i>flabelliformis</i>
Sulfur cinquefoil	<i>Potentilla recta</i>
Wild plum	<i>Prunus americana</i>
Bitter cherry	<i>Prunus emarginata</i>
Common chokecherry	<i>Prunus virginiana</i>
Antelope bitterbrush	<i>Purshia tridentata</i>
Cultivated apple	<i>Pyrus malus</i>
Sweetbrier	<i>Rosa eglanteria</i>
Bald-hip rose	<i>Rosa gymnocarpa</i> Nutt.
Nootka rose	<i>Rosa nutkana</i> var. <i>hispida</i>
Wood's rose	<i>Rosa woodsii</i>
Thimbleberry	<i>Rubus parviflorus</i> Nutt.
Small burnet	<i>Sanguisorba minor</i> Scop.
Annual burnet	<i>Sanguisorba occidentalis</i>
Mountain ash	<i>Sorbus</i> spp
Shiny-leaf spiraea	<i>Spiraea betulifolia</i> Pall.
RUBIACEAE	
Cleavers	<i>Galium aparine</i>
Northern bedstraw	<i>Galium boreale</i> L.
SALICACEAE	
Black cottonwood	<i>Populus balsamifera</i> ssp <i>trichocarpa</i>
Quaking aspen	<i>Populus tremuloides</i>
Golden willow	<i>Salix alba</i>
Peachleaf willow	<i>Salix amygdaloides</i>

Coyote willow	<i>Salix melanopsis</i>
Arroyo willow	<i>Salix lasiolepis</i>
Rigid willow	<i>Salix lutea</i>
Scouler's willow	<i>Salix scouleriana</i>
Pacific willow	<i>Salix lucida ssp lasiandra</i>
SAXIFRAGACEAE	
Small-flowered woodlandstar	<i>Lithophragma parviflorum</i>
Roundleaf alumroot	<i>Heuchera cylindrica</i> Douglas ex Hook.
Miterwort	<i>Mitella spp</i>
SCROPHULARIACEAE	
Cusick's paintbrush	<i>Castilleja cusickii</i>
Giant red Indian paintbrush	<i>Castilleja miniata</i> Douglas ex Hook.
Blue-eyed Mary	<i>Collinsia parviflora</i>
Clammy hedgehyssop	<i>Gratiola neglecta</i> Torr.
Dalmatian toadflax	<i>Linaria dalmatica</i>
Yellow monkey-flower	<i>Mimulus guttatus</i>
Hot rock penstemon	<i>Penstemon deustus</i> Douglas ex Lindl.
Showy penstemon	<i>Penstemon speciosus</i>
Penstemon	<i>Penstemon spp</i>
Woolly mullein	<i>Verbascum thapsus</i>
American speedwell	<i>Veronica americana</i>
Water speedwell	<i>Veronica anagallis-aquatica</i>
Purslane speedwell	<i>Veronica peregrina</i> L.
SOLANACEAE	
Climbing nightshade	<i>Solanum dulcamara</i>
Matrimony vine	<i>Lycium barbarum</i> L.
SPARGANIACEAE	
Large bur-reed	<i>Sparganium eyrycarpum</i> Engelm. ex Gray
TYPHACEAE	
Common cattail	<i>Typha latifolia</i> L.
ULMACEAE	
Siberian elm	<i>Ulmus pumila</i>
VALERIANACEAE	
White plectritis	<i>Plectritis macrocera</i>
European corn salad	<i>Valerianella locusta</i> (L.) Lat.

ZYGOPHYLLACEAE	
Puncturevine	<i>Tribulus terrestris</i>

Appendix C. Wildlife Species Known to Occur on Ladd Marsh Wildlife Area

Occurrence: C = Common; U = Uncommon; O = Occasional; R = Rare; X = Status Unclear (only 1 or 2 records for the area).

Bird Species Common Name	Scientific Name	Spring	Summer	Fall	Winter
Greater White-fronted goose	<i>Anser albifrons</i>	C		O	
Snow goose	<i>Chen caerulescens</i>	O		U	
Ross's goose	<i>Chen rossii</i>	R			
Cackling goose	<i>Branta hutchinsii</i>	R			R
Canada goose	<i>Branta canadensis</i>	C	C	C	C
Trumpeter swan	<i>Cygnus buccinator</i>	R		R	R
Tundra swan	<i>Cygnus columbianus</i>	C		C	U
Wood duck	<i>Aix sponsa</i>	U	U	O	R
Gadwall	<i>Anas strepera</i>	C	C	C	O
Eurasian wigeon	<i>Anas penelope</i>	R			
American wigeon	<i>Anas americana</i>	C	U	C	O
Mallard	<i>Anas platyrhynchos</i>	C	C	C	C
Blue-winged teal	<i>Anas discors</i>	C	C	C	
Cinnamon teal	<i>Anas cyanoptera</i>	C	C	C	
Northern shoveler	<i>Anas clypeata</i>	C	C	C	R
Northern pintail	<i>Anas acuta</i>	C	U	C	R
Green-winged teal	<i>Anas crecca</i>	C	C	C	
Canvasback	<i>Aythya valisineria</i>	U	U	U	R
Redhead	<i>Aythya americana</i>	C	C	C	O
Ring-necked duck	<i>Aythya collaris</i>	C	O	U	R
Lesser scaup	<i>Aythya affinis</i>	U	O	U	R
Surf scoter	<i>Melanitta perspicillata</i>	X			R
White-winged scoter	<i>Melanitta fusca</i>				R
Long-tailed duck	<i>Clangula hyemalis</i>				X
Bufflehead	<i>Bucephala albeola</i>	C		C	U
Common goldeneye	<i>Bucephala clangula</i>	C	R	C	C
Barrow's goldeneye	<i>Bucephala islandica</i>	O		O	O
Hooded merganser	<i>Lophodytes cucullatus</i>	O	O	O	O
Common merganser	<i>Merus merganser</i>	U	U	U	U
Ruddy duck	<i>Oxyura jamaicensis</i>	C	C	U	O
Gray partridge	<i>Perdix perdix</i>	U	U	U	U
Ring-necked pheasant	<i>Phasianus colchicus</i>	C	C	C	C
Ruffed grouse	<i>Bonasa umbellus</i>	U	U	U	U
Dusky grouse	<i>Dendragopus obscurus</i>	U	U	U	U
Wild turkey	<i>Meleagris gallopavo</i>	O	O	O	O
California quail	<i>Callipepla californica</i>	C	C	C	C
Common loon	<i>Gavia immer</i>	R		R	
Pied-billed grebe	<i>Podilymbus podiceps</i>	U	U	U	R
Horned grebe	<i>Podiceps auritus</i>	O	R	O	R
Red-necked grebe	<i>Podiceps grisegena</i>	R		R	
Eared grebe	<i>Podiceps nigricollis</i>	U	U	O	
Western grebe	<i>Aechmophorus occidentalis</i>	R		R	
Clark's grebe	<i>Aechmophorus clarkii</i>	R		R	

Bird Species Common Name	Scientific Name	Spring	Summer	Fall	Winter
American white pelican	<i>Pelecanus erythrorhynchos</i>	O	O		
Double-crested cormorant	<i>Phalacrocorax auritus</i>	O	U	O	
American bittern	<i>Botaurus lentiginosus</i>	U	U	U	
Great blue heron	<i>Ardea herodias</i>	C	C	C	C
Great egret	<i>Ardea alba</i>	R	R	R	
Snowy egret	<i>Egretta thula</i>	R		R	
Cattle egret	<i>Bubulcus ibis</i>	X			
Black-crowned night heron	<i>Nycticorax nycticorax</i>	U	U	U	
White-faced Ibis	<i>Plegadis chihi</i>	R	R	R	
Turkey vulture	<i>Cathartes aura</i>	O	O	O	
Osprey	<i>Pandion haliaetus</i>	U	U	U	
Bald eagle	<i>Haliaeetus leucocephalus</i>	C	R	O	C
Northern harrier	<i>Circus cyaneus</i>	C	C	C	C
Sharp-shinned hawk	<i>Accipiter striatus</i>	U	O	U	U
Cooper's hawk	<i>Accipiter cooperii</i>	U	O	U	U
Northern goshawk	<i>Accipiter gentilis</i>	O	O	O	O
Swainson's hawk	<i>Buteo swainsoni</i>	C	C	C	
Red-tailed hawk	<i>Buteo jamaicensis</i>	C	C	C	C
Ferruginous hawk	<i>Buteo regalis</i>	R		R	
Rough-legged hawk	<i>Buteo lagopus</i>	C			C
Golden eagle	<i>Aquila chrysaetos</i>	U	O	U	U
American kestrel	<i>Falco sparverius</i>	C	C	C	U
Merlin	<i>Falco columbarius</i>	O	O	O	U
Peregrine falcon	<i>Falco peregrinus</i>	R	R		
Prairie falcon	<i>Falco mexicanus</i>	O	O	O	U
Virginia rail	<i>Rallus limicola</i>	U	U	U	R
Sora	<i>Porzana carolina</i>	U	U	U	
American coot	<i>Fulica americana</i>	C	C	C	O
Sandhill crane	<i>Grus canadensis</i>	C	C	O	
Black-bellied plover	<i>Pluvialis squatarola</i>	R			
Pacific golden-plover	<i>Pluvialis fulva</i>	R			
Semipalmated plover	<i>Charadrius semipalmatus</i>	U		O	
Killdeer	<i>Charadrius vociferus</i>	C	C	C	U
Black-necked stilt	<i>Himantopus mexicanus</i>	C	C	U	
American avocet	<i>Recurvirostra americana</i>	C	C	U	
Greater yellowlegs	<i>Tringa melanoleuca</i>	U	U	U	
Lesser yellowlegs	<i>Tringa flavipes</i>	U	U	U	
Solitary sandpiper	<i>Tringa solitaria</i>	O		O	
Willet	<i>Catoptrophorus semipalmatus</i>	R		R	
Spotted sandpiper	<i>Actitis macularia</i>	C	C	C	
Long-billed curlew	<i>Numenius americanus</i>	R	R	R	
Marbled godwit	<i>Limosa fedoa</i>	R		R	
Ruddy turnstone	<i>Arenaria interpres</i>	R		R	
Sanderling	<i>Calidris alba</i>	R		R	
Semipalmated sandpiper	<i>Calidris pusilla</i>			R	
Western sandpiper	<i>Calidris mauri</i>	C		C	

Bird Species Common Name	Scientific Name	Spring	Summer	Fall	Winter
Least sandpiper	<i>Calidris minutilla</i>	C		C	
Baird's sandpiper	<i>Calidris bairdii</i>	O		U	
Pectoral sandpiper	<i>Calidris melanotos</i>	O		U	
Dunlin	<i>Calidris alpina</i>	R		R	
Stilt sandpiper	<i>Calidris himantopus</i>			R	
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>	O		O	
Wilson's snipe	<i>Gallinago delicata</i>	C	C	C	O
Wilson's phalarope	<i>Phalaropus tricolor</i>	U	U	U	
Red-necked phalarope	<i>Phalaropus lobatus</i>	R	R	R	
Franklin's gull	<i>Larus pipixcan</i>	R			
Bonaparte's gull	<i>Larus philadelphia</i>	R		R	
Ring-billed gull	<i>Larus delawarensis</i>	C	C	U	U
California gull	<i>Larus californicus</i>	C	C	O	R
Herring gull	<i>Larus argentatus</i>	O		O	
Sabine's gull	<i>Xema sabini</i>	R		R	
Caspian tern	<i>Sterna caspia</i>	O	R		
Forster's tern	<i>Sterna forsteri</i>	R		R	
Black tern	<i>Chlidonias niger</i>	O	O	O	
Rock pigeon	<i>Columba livia</i>	C	C	C	C
Eurasian collared-dove	<i>Streptopelia decaocto</i>	X			
Mourning dove	<i>Zenaida macroura</i>	C	C	C	O
Barn owl	<i>Tyto alba</i>	C	C	C	C
Western screech owl	<i>Otus kennicottii</i>	U	U	U	
Great horned owl	<i>Bubo virginianus</i>	C	C	C	C
Snowy owl	<i>Nyctea scandiaca</i>				X
Northern pygmy owl	<i>Glaucidium gnoma</i>	O	O	O	O
Burrowing owl	<i>Athene cunicularia</i>	O	O	U	
Great gray owl	<i>Strix nebulosa</i>	U	U	U	U
Long-eared owl	<i>Asio otus</i>	O	O	O	O
Short-eared owl	<i>Asio flammeus</i>	U	U	U	U
Northern saw-whet owl	<i>Aegolius acadicus</i>	O	O	O	O
Common nighthawk	<i>Chordeiles minor</i>	C	C	C	
Vaux's swift	<i>Chaetura vauxi</i>	C	C	U	
Black-chinned hummingbird	<i>Archilochus alexandri</i>	U	U	U	
Anna's hummingbird	<i>Calypte anna</i>	R	R	R	
Calliope hummingbird	<i>Stellula calliope</i>	U	U	U	R
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>	X			
Rufous hummingbird	<i>Selasphorus rufus</i>	O	O	O	
Belted kingfisher	<i>Ceryle alcyon</i>	C	C	C	U
Lewis' woodpecker	<i>Melanerpes lewis</i>	O	O	O	
Downy woodpecker	<i>Picoides pubescens</i>	C	C	C	
Hairy woodpecker	<i>Picoides villosus</i>	C	C	C	C
White-headed woodpecker	<i>Picoides albolarvatus</i>	O	O	O	O
Three-toed woodpecker	<i>Picoides tridactylus</i>	O	O	O	O
Black-backed woodpecker	<i>Picoides arcticus</i>	O	O	O	O
Northern flicker	<i>Colaptes auratus</i>	C	C	C	C
Pileated woodpecker	<i>Dryocopus pileatus</i>	C	C	C	C

Bird Species Common Name	Scientific Name	Spring	Summer	Fall	Winter
Olive-sided flycatcher	<i>Contopus cooperi</i>	U	U	U	
Western wood-pewee	<i>Contopus sordidulus</i>	C	C	C	
Willow flycatcher	<i>Empidonax trailii</i>	C	C	C	
Hammond's flycatcher	<i>Empidonax hammondii</i>	U	U	U	
Dusky flycatcher	<i>Empidonax oberholseri</i>	U	U	U	
Pacific-slope flycatcher	<i>Empidonax difficilis</i>	U	U	U	
Say's phoebe	<i>Sayornis saya</i>	U	U	U	
Western kingbird	<i>Tyrannus verticalis</i>	C	C	C	
Eastern kingbird	<i>Tyrannus tyrannus</i>	C	C	C	
Loggerhead shrike	<i>Lanius ludovicianus</i>	O	O	O	O
Northern shrike	<i>Lanius excubitor</i>	U		O	U
Cassin's vireo	<i>Vireo cassinii</i>	O	O		
Warbling vireo	<i>Vireo gilvus</i>	C	C	C	
Gray jay	<i>Perisoreus canadensis</i>	U	C	C	U
Steller's jay	<i>Cyanocitta stelleri</i>	C	C	C	C
Blue jay	<i>Cyanocitta cristata</i>				R
Western scrub-jay	<i>Aphelocoma californica</i>			R	
Clark's nutcracker	<i>Nucifraga columbiana</i>	O	O	O	O
Black-billed magpie	<i>Pica hudsonia</i>	C	C	C	C
American crow	<i>Corvus brachyrhynchos</i>	C	C	U	O
Common raven	<i>Corvus corax</i>	C	C	C	C
Horned lark	<i>Eremophila alpestris</i>	C	C	C	C
Tree swallow	<i>Tachycineta bicolor</i>	C	C	C	
Violet-green swallow	<i>Tachycineta thalassina</i>	C	C	C	
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	C	C	C	
Bank swallow	<i>Riparia riparia</i>	C	C	C	
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	C	C	C	
Barn swallow	<i>Hirundo rustica</i>	C	C	C	
Black-capped chickadee	<i>Poecile atricapilla</i>	C	C	C	C
Mountain chickadee	<i>Poecile gambeli</i>	C	C	C	C
Bushtit	<i>Psaltriparus minimus</i>	R	R	R	R
Red-breasted nuthatch	<i>Sitta canadensis</i>	U	U	U	U
White-breasted nuthatch	<i>Sitta carolinensis</i>	U	U	U	U
Pygmy nuthatch	<i>Sitta pygmaea</i>	O	O	O	O
Brown creeper	<i>Certhia americana</i>	U	O	U	O
Rock wren	<i>Salpinctes obsoletus</i>	U	U		
Bewick's wren	<i>Thryomanes bewickii</i>	U	U	O	
House wren	<i>Troglodytes aedon</i>	C	C	C	
Winter wren	<i>Troglodytes troglodytes</i>	O	O	O	O
Marsh wren	<i>Cistothorus palustris</i>	C	C	C	O
Golden-crowned kinglet	<i>Regulus satrapa</i>	U	U	U	U
Ruby-crowned kinglet	<i>Regulus calendula</i>	C	C	C	U
Western bluebird	<i>Sialia mexicana</i>	C	C	U	R
Mountain bluebird	<i>Sialia currucoides</i>	C	C	U	R
Townsend's solitaire	<i>Myadestes townsendi</i>	C	U	U	C
Hermit thrush	<i>Catharus guttatus</i>	C	U	C	R

Bird Species Common Name	Scientific Name	Spring	Summer	Fall	Winter
American robin	<i>Turdus migratorius</i>	C	C	C	U
Varied thrush	<i>Ixoreus naevius</i>	U	U	U	U
Gray catbird	<i>Dumetella carolinensis</i>	R	R	R	
European starling	<i>Sturnis vulgaris</i>	C	C	C	C
American pipit	<i>Anthus rubescens</i>	R		R	
Bohemian waxwing	<i>Bombycilla garrulus</i>	O		O	C
Cedar waxwing	<i>Bombycilla cedrorum</i>	C	C	C	C
Orange-crowned warbler	<i>Vermivora celata</i>	U	U	U	
Nashville warbler	<i>Vermivora ruficapilla</i>	O	O	O	
Yellow warbler	<i>Dendroica petechia</i>	C	C	C	
Yellow-rumped warbler	<i>Dendroica coronata</i>	C	C	C	R
Townsend's warbler	<i>Dendroica townsendi</i>	C	C	C	
MacGillivray's warbler	<i>Oporornis tolmiei</i>	U	U	U	
Common yellowthroat	<i>Geothlypis trichas</i>	C	C	C	
Wilson's warbler	<i>Wilsonia pusilla</i>	U	U	U	
Yellow-breasted chat	<i>Icteria virens</i>	O	O	O	
Western tanager	<i>Piranga ludoviciana</i>	C	C	C	
Spotted towhee	<i>Pipilo maculatus</i>	C	C	C	R
American tree sparrow	<i>Spizella arborea</i>				O
Chipping sparrow	<i>Spizella passerina</i>	C	C	C	U
Brewer's sparrow	<i>Spizella breweri</i>	U			
Vesper sparrow	<i>Poocetes gramineus</i>	U	U	U	
Lark sparrow	<i>Chondestes grammacus</i>	U	O	U	
Sage sparrow	<i>Amphispiza belli</i>	X			
Savannah sparrow	<i>Passerculus sandwichensis</i>	C	C	C	
Grasshopper sparrow	<i>Ammodramus savannarum</i>	R	R		
Song sparrow	<i>Melospiza melodia</i>	C	C	C	C
Lincoln's sparrow	<i>Melospiza lincolni</i>	O	U	O	R
Swamp sparrow	<i>Melospiza georgiana</i>	R			R
Harris's sparrow	<i>Zonotrichia querula</i>				R
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	C		C	U
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>				X
Dark-eyed junco	<i>Junco hyemalis</i>	C	C	C	C
Snow bunting	<i>Plectrophenax nivalis</i>				O
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>	U	U	U	
Lazuli bunting	<i>Passerina amoena</i>	C	C	C	
Bobolink	<i>Dolichonix oryzivorus</i>	R	R	R	
Red-winged blackbird	<i>Agelaius phoeniceus</i>	C	C	C	U
Western meadowlark	<i>Sturnella neglecta</i>	C	C	C	U
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	C	C	C	
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	C	C	C	U
Brown-headed cowbird	<i>Molothrus ater</i>	C	C	C	O
Bullock's oriole	<i>Icterus galbula</i>	C	C	C	
Gray-crowned rosy-finch	<i>Leucosticte tephrocotis</i>	U	U	U	O
Pine grosbeak	<i>Pinicola enucleator</i>	R			R

Bird Species Common Name	Scientific Name	Spring	Summer	Fall	Winter
Purple finch	<i>Carpodacus purpureus</i>	R		R	R
Cassin's finch	<i>Carpodacus cassinii</i>	C	C	U	C
House finch	<i>Carpodacus mexicanus</i>	C	C	C	C
Red crossbill	<i>Loxia curvirostra</i>	U	U	U	U
Common redpoll	<i>Carduelis flammea</i>				X
Pine siskin	<i>Carduelis pinus</i>	C	C	C	C
Lesser goldfinch	<i>Carduelis psaltria</i>	O	O	O	O
American goldfinch	<i>Carduelis tristis</i>	C	C	C	C
Evening grosbeak	<i>Coccothraustes vespertinus</i>	U	U	C	U
House sparrow	<i>Passer domesticus</i>	C	C	C	C

Occurrence (in appropriate habitat): C = Common; U = Uncommon; O = Occasional; R = Rare; X = Status Unclear (only 1 or 2 records for the area).

Mammal Species Common Name	Scientific Name	Occurrence
Insectivora		
Vagrant shrew	<i>Sorex vagrans</i>	X
Preble's shrew	<i>Sorex preblei</i>	X
Coast mole	<i>Scapanus orarius</i>	X
Chiroptera		
Fringed myotis	<i>Myotis thysanodes</i>	X
Yuma myotis	<i>Myotis yumanensis</i>	U
Little brown bat	<i>Myotis lucifugus</i>	U
Long-legged bat	<i>Myotis volans</i>	X
Big brown bat	<i>Eptesicus fuscus</i>	U
Lagomorpha		
Mountain cottontail	<i>Sylvilagus nuttallii</i>	U
Rodentia		
Yellow-pine chipmunk	<i>Neotamias amoenus</i>	C
Yellow-bellied marmot	<i>Marmota flaviventris</i>	U
Belding's ground squirrel	<i>Spermophilus beldingi</i>	U
Columbian ground squirrel	<i>Spermophilus columbianus</i>	C
Eastern fox squirrel	<i>Sciurus niger</i>	O
Red squirrel	<i>Tamiasciurus hudsonicus</i>	U
Northern pocket gopher	<i>Thomomys talpoides</i>	C
American beaver	<i>Castor canadensis</i>	O
Deer mouse	<i>Peromyscus maniculatus</i>	C
Western harvest mouse	<i>Reithrodontomys megalotis</i>	C
Norway rat	<i>Rattus norvegicus</i>	O
House mouse	<i>Mus musculus</i>	U

Long-tailed vole	<i>Microtus longicaudus</i>	C
Montane vole	<i>Microtus montanus</i>	C
Western jumping mouse	<i>Zapus princeps</i>	C
Muskrat	<i>Ondatra zibethicus</i>	C
Porcupine	<i>Erithizon dorsatum</i>	U
Carnivora		
Coyote	<i>Canis latrans</i>	C
American black bear	<i>Ursus americanus</i>	O
Raccoon	<i>Procyon lotor</i>	U
Long-tailed weasel	<i>Mustela frenata</i>	U
Mink	<i>Mustela vison</i>	U
Badger	<i>Taxidea taxus</i>	O
River otter	<i>Lontra canadensis</i>	U
Striped skunk	<i>Mephitis mephitis</i>	C
Cougar	<i>Puma concolor</i>	O
Bobcat	<i>Lynx rufus</i>	O
Artiodactyla		
Rocky Mountain elk	<i>Cervus canadensis</i>	C
Mule deer	<i>Odocoileus hemionus</i>	C
White-tailed deer	<i>Odocoileus virginianus</i>	C
Pronghorn	<i>Antilocapra americana</i>	U

Occurrence (in appropriate habitat): C = Common; U = Uncommon; O = Occasional; R = Rare; X = Status Unclear (only 1 or 2 records for the area).

Amphibian Species Common Name	Scientific Name	Occurance
Long-toed salamander	<i>Ambystoma macrodactylum</i>	C
Bullfrog	<i>Rana catesbeiana</i>	C
Columbia spotted frog	<i>Rana luteiventris</i>	R
Pacific chorus frog	<i>Pseudacris regilla</i>	C
Great basin spadefoot	<i>Spea intermontana</i>	U
Reptile Species Common Name		
Western painted turtle	<i>Chrysemys picta belli</i>	U
Common garter snake	<i>Thamnophis sirtalis</i>	C
Western terrestrial garter snake	<i>Thamnophis elegans</i>	C
Gopher snake	<i>Pituophis catenifer</i>	O
Western rattlesnake	<i>Crotalus oreganus</i>	R
Racer	<i>Coluber constrictor</i>	O
Rubber boa	<i>Charina bottae</i>	O
Western fence lizard	<i>Sceloporus occidentalis</i>	O
Western skink	<i>Eumeces skiltonianus</i>	O

Invertebrates present on Ladd Marsh Wildlife Area

Common Name	<i>Scientific Name</i>
Odonata	
Coenagrionidae	
Pacific forktail	<i>Ischnura cervula</i>
Boreal bluet	<i>Enallagma boreale</i>
Western red damsel	<i>Amphiagrion abbreviatum</i>
Lestidae	
Northern spreadwing	<i>Lestes disjunctus</i>
Emerald spreadwing	<i>Lestes dryas</i>
Lyre-tipped spreadwing	<i>Lestes unguiculatus</i>
Aeschnidae	
Lance-tipped darner	<i>Aeshna constricta</i>
Paddle-tailed darner	<i>Aeshna palmata</i>
Lord of June	<i>Anax junius</i>
Blue-eyed darner	<i>Rhionaeschna multicolor</i>
Libellulidae	
Western pondhawk	<i>Erythemis collocata</i>
Eight-spotted skimmer	<i>Libellula forensis</i>
Twelve-spotted skimmer	<i>Libellula pulchella</i>
Four-spotted skimmer	<i>Libellula quadrimaculata</i>
Common whitetail	<i>Platythemis lydia</i>
Variiegated meadowhawk	<i>Sympetrum corruptum</i>
Saffron-winged meadowhawk	<i>Sympetrum costiferum</i>
Western meadowhawk	<i>Sympetrum occidentale</i>
Striped meadowhawk	<i>Sympetrum pallipes</i>
Black saddlebags	<i>Tamea lacerata</i>
Orthoptera	
Acrididae	
Carolina grasshopper	<i>Dissosteira carolina</i>
Pronotal range grasshopper	<i>Cratypedes neglecta</i>
Tettigoniidae	
Fork-tailed bush katydid	<i>Scudderia furcata</i>
Dictyoptera	
Mantidae	
Praying mantis	<i>Stagomantis spp</i>

Hemiptera	
Rhopalidae	
Western box elder bug	<i>Boisea rubrolineatus</i>
Backswimmer	<i>Buenoa or Notonecta spp</i>
Water boatman	<i>Hesperocorixa vulgaris</i>
Plant bug (?)	<i>Family Miridae?</i>
Cicada	<i>Okanagana spp (occidentalis?)</i>
Coleoptera	
Cerambycidae	
California prionus	<i>Prionus californicus</i>
Chrysomelidae	
Cobalt leaf beetle	<i>Chrysochus cobaltinus</i>
Milkweed longhorn beetle	<i>Tetraopes basalis</i>
Coccinellidae	
7-Spotted ladybird beetle	<i>Coccinella septempunctata</i>
Ladybird beetle	<i>Hippodamia sinuata</i>
Curculionidae	
Canada thistle stem weevil	<i>Ceutorhynchus litura</i>
Knapweed seed head weevil	<i>Bangasternus fausti</i>
Seed head weevil	<i>Larinus plainus</i>
Knapweed seed head weevil	<i>Larinus minutus</i>
Scarlet malachite beetle	<i>Malachius aeneus</i>
Rose weevil	<i>Rhynchites bicolor</i>
Burprestidae	
Knapweed root borer	<i>Sphenoptera jugoslavica</i>
Meloidae	
Blister beetle	<i>Nemognatha lurida</i>
Scarabaeidae	
Ten-lined june beetle	<i>Polyphylla decemlineata</i>
Diptera	
Tephritidae	

Canada thistle stem gall fly	<i>Urophora cardui</i>
Knapweed seed head fly	<i>Urophora affinis</i>
Knapweed seed head fly	<i>Urophora quadrifasciata</i>
Culicidae	
Western encephalitis mosquito	<i>Culex tarsalis</i>
Northern house mosquito	<i>Culex pipiens</i>
Pale marsh mosquito	<i>Ochlerotatus dorsalis</i>
Wetlands mosquito	<i>Ochlerotatus melanimon</i>
Inland floodwater mosquito	<i>Aedes vexans</i>
Salt and pepper mosquito	<i>Coquillettidia perturbans</i>
Winter mosquito	<i>Culiseta inornata</i>
Mosquito	<i>Anopheles freeborni</i>
Chironomidae	
Unknown midge	
Tachynidae	
Parasitic fly	<i>Archytas lateralis</i>
Lepidoptera	
Drepanidae	
Alberta lutestring	<i>Ceranemota albertae</i>
Crambidae	
Agriphila straminella	<i>Agriphila straminella</i>
Cranberry girdler	<i>Chrysoteuchia topiarius</i>
Euchromius ocellus	<i>Euchromius ocellus</i>
California grass-veneer moth	<i>Euchromius californicalis</i>
Eudonia commortalis	<i>Eudonia commortalis</i>
Eudonia rectilinea	<i>Eudonia rectilinea</i>
Evergestis subterminalis	<i>Evergestis subterminalis</i>
Mint root borer	<i>Fumibotys fumalis</i>
Hahncappsia pergivalis	<i>Hahncappsia pergivalis</i>
Alfalfa webworm moth	<i>Loxostege cereralis</i>
Yellow-veined moth	<i>Microtheoris ophionalis</i>
Titian peale's pyralid moth	<i>Perispasta caeculalis</i>
Pyrausta fodinalis	<i>Pyrausta fodinalis</i>
Dusky saucrobotys	<i>Saucrobotys fumoferalis</i>
Dimorphic sitochroa moth	<i>Sitochroa chortalis</i>
Pyralidae	

Destructive pruneworm moth	<i>Acrobasis tricolorella</i>
Fir coneworm	<i>Dioryctria aietivorella</i>
Ephesiodes gilvescentella	<i>Ephesiodes gilvescentella</i>
Sugarbeet crown borer moth	<i>Hulstia undulatella</i>
Peoria tetradella	<i>Peoria tetradella</i>
Toripalpus trabalis	<i>Toripalpus trabalis</i>
Prodoxidae	
Lampronia sublustris	<i>Lampronia sublustris</i>
Pterophoridae	
Morning-glory plume moth	<i>Emmalina monodactyla</i>
Elachistidae	
Ethmia marmorea	<i>Ethmia marmorea</i>
Gelechioidea	
Agonopterix argillacea	<i>Agonopterix argillacea</i>
Geometridae	
Common gray moth	<i>Anavitrinella pampinaria</i>
Black-banded carpet moth	<i>Antepirrhoe semiatrata</i>
Treble-bar moth	<i>Aplocera plagiata</i>
Yellow-dusted cream	<i>Cabera erythmeria</i>
Red girdle moth	<i>Caripeta aequaliaria</i>
Chlorochlamys triangularis	<i>Chlorochlamys triangularis</i>
Digrammia curvata	<i>Digrammia curvata</i>
Dark-bordered granite moth	<i>Digrammia neptaria</i>
Drepanulatrix foeminaria	<i>Drepanulatrix foeminaria</i>
Spurred wave moth	<i>Drepanulatrix unicalcararia</i>
Dark marbled carpet moth	<i>Dysstroma citrata</i>
Maple spanworm	<i>Ennomos magnaria</i>
Erannis vancouverensis	<i>Erannis vancouverensis</i>
Johnson's euchaena	<i>Euchaena johnsonaria</i>
Euchaena mollisaria	<i>Euchaena mollisaria</i>
Mottled euchaena	<i>Euchaena tigrinaria</i>
Eudrepanulatrix rectifascia	<i>Eudrepanulatrix rectifascia</i>
Brown-bordered geometer moth	<i>Eumacaria madopata</i>
Sharp-angled carpet moth	<i>Euphyia intermediata</i>
Larch pug moth	<i>Eupithecia annulata</i>
Common eupithecia	<i>Eupithecia miserulata</i>
Eupithecia nevadata	<i>Eupithecia nevadata</i>
Eupithecia misturata	<i>Eupithecia misturata</i>

Eupithecia spp	<i>Eupithecia spp</i>
Glena nigricaria	<i>Glena nigricaria</i>
Sulphur moth	<i>Hesperumia sulphuraria</i>
Single-dotted wave moth	<i>Idaea dimidiata</i>
Iridopsis emasculatum	<i>Iridopsis emasculatum</i>
dark-ribboned wave moth	<i>Laeptostales rubromarginaria</i>
Bluish spring moth	<i>Lomographa semiclarata</i>
Lopophora magnoliatoidata	<i>Lopophora magnoliatoidata</i>
Columbian emerald moth	<i>Nemoria darwiniata</i>
Perizoma costiguttata	<i>Perizoma costiguttata</i>
Pero mizon	<i>Pero mizon</i>
Morrison's pero	<i>Pero morrisonaria</i>
Pero occidentalis	<i>Pero occidentalis</i>
Phigalia plumogeraria	<i>Phigalia plumogeraria</i>
White-banded black moth	<i>Rheumaptera subhastata</i>
Sabulodes edwardsata	<i>Sabulodes edwardsata</i>
Soft-line wave moth	<i>Scopula inductata</i>
Simple wave moth	<i>Scopula junctaria</i>
Scopula luteolata	<i>Scopula luteolata</i>
Bordered fawn moth	<i>Sericosema juturnaria</i>
Speranza brunneata (uncertain ID)	<i>Speranza brunneata</i>
Wavy-lined emerald moth	<i>Synchlora aerata</i>
Slant-lines	<i>Tetracis cervinaria</i>
October thorn	<i>Tetracis jubararia</i>
Venusia obsoleta	<i>Venusia obsoleta</i>
Venusia pearsalli	<i>Venusia pearsalli</i>
Xanthorhoe defensaria	<i>Xanthorhoe defensaria</i>
Zenophleps lignicolorata	<i>Zenophleps lignicolorata</i>
Lasiocampidae	
Western tent caterpillar	<i>Malacosoma californica</i>
Forest tent caterpillar	<i>Malacosoma disstria</i>
Erebidae	
Garden tiger moth	<i>Arctia caja utahensis</i>
Forage looper	<i>Caenurgina erechtea</i>
Yellow-collared scape moth	<i>Cisseps fulvicollis</i>
Oregon cynia	<i>Cycnia oregonensis</i>
Drasteria ochracea	<i>Drasteria ochracea</i>
Saltmarsh caterpillar moth	<i>Estigmene acrea</i>
Police car moth	<i>Gnophaela vermiculata</i>
Ornate tiger moth	<i>Grammia ornata</i>

Fall webworm moth	<i>Hyphantria cunea</i>
Satin moth	<i>Leucoma salicis</i>
Yellow-spotted tiger moth	<i>Lophocampa maculata</i>
St Lawrence tiger moth	<i>Platarctia parthenos</i>
Ranchman's tiger moth	<i>Platyprepia virginalis</i>
Cossidae	
Aspen carpenterworm	<i>Acossus populi</i>
Noctuidae (Owlet Moths)	
Abagrotis scopeops	<i>Abagrotis scopeops</i>
Acronicta perditia	<i>Acronicta perditia</i>
Celery looper	<i>Anagrapha falciferella</i>
Annaphila diva	<i>Annaphila diva</i>
Apamea antennata	<i>Apamea antennata</i>
Yellow-headed cutworm	<i>Apamea amputratrix</i>
Glassy cutworm	<i>Apamea devastator</i>
Snowy-veined apamea moth	<i>Apamea niveivenosa</i>
Western apamea	<i>Apamea occidens</i>
Large looper moth	<i>Autographa ampla</i>
Alfalfa looper	<i>Autographa californica</i>
Cattail borer	<i>Bellura obliqua</i>
Forage looper	<i>Caenurgina erechtea</i>
Oblong sedge borer	<i>Capsula oblonga</i>
Underwing moth	<i>Catocala spp</i>
Intermediate hooded owlet	<i>Cucullia intermedia</i>
Egira curialis	<i>Egira curialis</i>
Egira crucialis	<i>Egira crucialis</i>
Brown woodling	<i>Egira perlubens</i>
Army cutworm	<i>Euxoa auxillaris</i>
Clear dart	<i>Euxoa declarata</i>
Fawn brown dart	<i>Euxoa lpeuritica</i>
Euxoa olivia	<i>Euxoa olivia</i>
Dingy cutworm moth	<i>Feltia jaculifera</i>
Fishia discors	<i>Fishia discors</i>
Small ranunculus	<i>Hecatera dysodea</i>
Spotted straw	<i>Heliothis phloxiphaga</i>
Lacinipolia lorea	<i>Lacinipolia lorea</i>
Lacinipolia olivacea	<i>Lacinipolia olivacea</i>
Double-lobed lateroligia	<i>Lateroligia ophiogramma</i>
Leparctia californiae	<i>Leparctia californiae</i>
Dark-lined wainscot	<i>Leucania commoides</i>
Wainscot moth	<i>Leucania farcta</i>

Lithophane georgii	<i>Lithophane georgii</i>
Lithophane pertorrida	<i>Lithophane pertorrida</i>
Large yellow underwing	<i>Noctua pronuba</i>
Oligia rampartensis	<i>Oligia rampartensis</i>
Speckled green fruitworm moth	<i>Orthosia hibisci</i>
Parabagrotis exsertistigma	<i>Parabagrotis exsertistigma</i>
Variiegated cutworm moth	<i>Peridroma saucia</i>
Pleromelloida bonuscula	<i>Pleromelloida bonuscula</i>
Pleromelloida conserta	<i>Pleromelloida conserta</i>
Polia moth	<i>Polia piniae</i>
Polia purpurissata	<i>Polia purpurissata</i>
Purple-line sawfly moth	<i>Pyrrhia experimens</i>
The brother	<i>Raphia frater</i>
Dock rustic	<i>Resapamea passer</i>
Herald moth	<i>Scoliopteryx libatrix</i>
Setagrotis pallidicollis	<i>Setagrotis pallidicollis</i>
Cattail caterpillar moth	<i>Simyra insularis</i>
Clandestine dart moth	<i>Spaelotis clandestina</i>
Armyworm	<i>Spodoptera praefica</i>
Stretchia muricina	<i>Stretchia muricina</i>
Synagrapta orophila	<i>Synagrapta orophila</i>
Grote's satyr	<i>Ufeus satyricus</i>
Setaceous hebrew character	<i>Xestia c-nigrum</i>
Rosy dart	<i>Xestia oblata</i>
American swordgrass moth	<i>Xylena nupera</i>
Gray swordgrass moth	<i>Xylena cineritia</i>
Oblique brocade	<i>Xylomoia indirecta</i>
V-lined quaker moth	<i>Zosteropoda hirtipes</i>
Notodontidae	
Poplar kitten	<i>Furcula scolopendrina</i> Boisduval
Common gluphisia	<i>Gluphisia septentrionis</i>
Schizura unicornis	<i>Schizura unicornis</i>
Pyralidae	
Fir coneworm	<i>Dioryctria abietivorella</i>
Toripalpus trabalis	<i>Toripalpus trabalis</i>
Sphingidae	
Western snowberry clearwing moth	<i>Hemaris thetis</i> Boisduval
White-lined sphinx moth	<i>Hyles lineata</i>
Blinded sphinx moth	<i>Paonias excaecata</i>

One-eyed sphinx moth	<i>Smerinthus cerisyi</i>
Wild cherry sphinx moth	<i>Sphinx drupiferarum</i>
Vashti sphinx moth	<i>Sphinx vashti</i>
Modest sphinx moth	<i>Pachysphinx modesta</i>
Saturniidae	
Polyphemus moth	<i>Antheraea polyphemus</i>
Tortricidae	
Fruit-tree leafroller moth	<i>Archips argyrospila</i>
Argyrotaenia dorsalana	<i>Argyrotaenia dorsalana</i>
Oblique-banded leaf roller moth	<i>Choristoneura rosaceana</i>
White triangle tortrix	<i>Clepsis persicana</i>
Olethreutes deprecatorius	<i>Olethreutes deprecatorius</i>
Olethreutes galaxana	<i>Olethreutes galaxana</i>
Pelochrista agricolana	<i>Pelochrista agricolana</i>
Pelochrista scintillana	<i>Pelochrista scintillana</i>
Sparganothis senecionana	<i>Sparganothis senecionana</i>
Eye-spotted bud moth	<i>Spilonota ocellana</i>
Xenotemna pallorana	<i>Xenotemna pallorana</i>
Uranidae	
Gray scoopwing	<i>Callizzia amorata</i>
Papilionoidea	
Hesperiidea	
Woodland skipper	<i>Ochlodes sylvanoides</i>
Dreamy duskywing	<i>Erynnis icelus</i>
Persius duskywing	<i>Erynnis persius</i>
Common checkered skipper	<i>Pyrgus communis</i>
Two-banded checkered skipper	<i>Pyrgus ruralis</i> Boisduval
Juba skipper	<i>Hesperia juba</i>
Common roadside skipper	<i>Amblyscirtes vialis</i>
Western branded skipper	<i>Hesperia colorado</i>
Papilionidea	
Anise swallowtail	<i>Papilio zelicaon</i>
Pale swallowtail	<i>Papilio eurymedon</i>
Western tiger swallowtail	<i>Papilio rutulus rutulus</i>
Two-tailed tiger swallowtail	<i>Papilio multicaudatus</i>
Mountain parnassian	<i>Parnassius smintheus</i>
Pieridae	

Western white	<i>Pontia occidentalis</i>
Becker's white	<i>Pontia beckerii</i> (WH Edwards)
Cabbage white	<i>Pieris rapae</i>
Large marble	<i>Euchloe ausonides</i>
Sara's orangetip	<i>Anthocharissara</i>
Clouded sulphur	<i>Colias philodice</i>
Western sulphur	<i>Colias occidentalis</i>
Lycaenidae - coppers, blues, elfins	
Purplish copper	<i>Lycaena helloides</i>
Blue copper	<i>Lycaena hteronea</i>
Lustrous copper	<i>Lycaena cuprea</i>
Edith's copper	<i>Lycaena editha</i> Mead
Mariposa copper	
Brown elfin	<i>Callophrys augustinus</i>
Western pine elfin	<i>Callophrys eryphon</i>
Thicket hairstreak	<i>Callophrys spinetorum</i>
Moss' elfin	<i>Callophrys mossii</i> (Hy. Edwards)
Echo azure	<i>Celastrina argiolus</i>
Lucia blue	<i>Celastrina lucia</i> (R. Kirby)
Cascadia blue	None Assigned
Western pygmy blue	<i>Brephidium exilis</i>
Western tailed blue	<i>Everes amyntula</i> (Boisduval)
Arrowhead blue	<i>Glaucopsyche piasus</i> (Boisduval)
Greenish blue	<i>Plebejus saepiolus</i>
Melissa's blue	<i>Lycaeides melissa</i> (W.H.Edwards)
Boisduval's blue	<i>Icaricia icarioides</i> (Boisduval)
Acmon blue	<i>Icaricia acmon</i> (Boisduval)
Silvery blue	<i>Glaucopsyche lygdamus</i>
Nymphalidae	
Great fpangled fritillary	<i>Speyeria cybele</i> (Fabricius)
Atlantis fritillary	<i>Speyeria atlantis</i> (W.H. Edwards)
Hydaspe fritillary	<i>Speyeria hydaspe</i> (Boisduval)
Zerene fritillary	<i>Speyeria zerene</i> (Boisduval)
Field crescent	<i>Phyciodes pulchellus</i>
Northern checkerspot	<i>Chlosyne palla</i>
Mylitta crescent	<i>Phyciodes mylitta</i>
Chalcedona checkerspot	<i>Euphydryas chalcedona</i>
Anicia checkerspot	<i>Euphydryas anicia</i>

Edith's checkerspot	<i>Euphydryas editha</i>
Hoary comma	<i>Polygonia gracilis</i>
California tortoiseshell	<i>Nymphalis californica</i>
Mourning cloak	<i>Nymphalis antiopa</i>
Milbert's tortoiseshell	<i>Nymphalis milberti</i>
Lorquin's admiral	<i>Limenitis lorquini</i>
Painted lady	<i>Vanessa cardui</i>
Common wood nymph	<i>Cercyonis pegala</i>
Ochre ringlet	<i>Coenonympha tullia (Müller)</i>
Butler's alpine	<i>Erebia epipsodea</i>
Monarch	<i>Danaus plexippus</i>
Hymenoptera	
Apidae	
Honeybee	<i>Apis mellifera</i>
White-shouldered bumble bee	<i>Bombus appositus</i>
Two form bumble bee	<i>Bombus bifarius</i>
Yellow head bumble bee	<i>Bombus flavifrons</i>
Brown-belted bumble bee	<i>Bombus griseocollis</i>
Hunt's bumble bee	<i>Bombus huntii</i>
Indiscriminate cuckoo bumble bee	<i>Bombus insularis</i>
Black-tail bumble bee	<i>Bombus melanopygus</i>
Mixed bumble bee	<i>Bombus mixtus</i>
Nevada bumble bee	<i>Bombus nevadensis</i>
Western bumble bee	<i>Bombus occidentalis</i>
Red-belted bumble bee	<i>Bombus rufocinctus</i>
Forest bumble bee	<i>Bombus sylvicola</i>
Half-black bumble bee	<i>Bombus vagans</i>
Vosnesensky bumble bee	<i>Bombus vosnesenskii</i>
Cynipidae	
Mossy rose gall	<i>Diplolepis rosae</i>

**Appendix D. State and Local Irrigation District
Water Rights on Ladd Marsh Wildlife Area**

Permit No.	Priority Date	Source	Rate	Area of Use
S27849	1961	Ladd Creek	3.60 cfs	Raceway
S30208	1964	Treatment Outflow	4.94 cfs	Freeway Ponds and Irrigation
S27846	1962	Ladd Creek	2.5 cfs	Crossland and Brogoitti
S27847	1962	Gekeler Slough	5.0 cfs	Crossland and Brogoitti
S28545	1962	Treatment Outflow	4.94 cfs	Crossland and Brogoitti
S32707	1967	W. Ladd Creek	1.5 cfs	Refuge
S13412	1938	Springs	0.109 cfs	Peebler Pond
D36613	1885	M. Ladd Creek	3.0 af	Simonis
D36612	1876	W. Ladd Creek	0.04 cfs	Peebler Tract
S13412	1938	W. Ladd Creek	0.016 cfs	Counsell Tract
D40403	1876	W. Ladd Creek	0.16 cfs	Refuge
D40404	1885	E. Ladd Creek	0.10 cfs	Bench (Pierce Tract)
D50403	1868	Catherine Creek	900 af	Waterboard Ponds
S37417	1973	Gekeler Slough	3.00 cfs	Renke
S28793	1963	M. Ladd Creek	0.53 cfs	Hill Tract
D6245	1875	W. Ladd Creek	0.725 cfs	March and Counsell Tract
D6518	1883	W. Ladd Creek	5.15 cfs	Bench (Pierce Tract)
D6213	1906	M. Ladd Creek	1.0 cfs	Powell Tract
D6444	1872	E. Ladd Creek	1.575 cfs	Powell Tract
D6476	1878	M. Ladd Creek	0.10 cfs	Simonis Tract
R11512	1988	Hot Lake, Catherine Cr.	70 af	Waterboard Ponds
S51560	1961	Unnamed Stream	2.5 cfs	Waterboard Ponds
R12685	1998	W. Ladd Creek	85 af	Raceway
R12686	1998	W. Ladd Creek	115 af	Raceway
R12687	1998	W. Ladd Creek	140 af	Raceway
R12688	1998	W. Ladd Creek	45 af	Raceway
R12689	1998	W. Ladd Creek	50 af	Raceway
R12965	2000	Unnamed Spring	9 af	Waterboard (Fishing Pond)
R74873	1964	Ladd Creek	4.04 af	Refuge
R74874	1962	W. Ladd Creek	50.09 af	Powell Tract
D50403	1870	Catherine Creek	360 af	Simonis Tract
D50403	1878	Hot Lake Sp.	150 af	Simonis Tract
D16732	1946	Catherine Creek	2.42 cfs	Simonis
D50403	1870	Catherine Creek	720 af	City Property

Appendix E. Easements and Access Agreements on Ladd Marsh Wildlife Area

Easements:

Perpetual: To Pacific Telephone and Telegraph on 5/9/41, easement for poles and right of ingress and egress, across N½NW ¼ Sec. 35, T3S, R38E. (C. Grandy Tract)

Perpetual: To Pacific Northwest Pipeline Corp. on 7/13/55, right-of-way for pipeline construction and maintenance across N½NW¼ Sec. 2, T4S, R38E. (F. Council Tract)

Perpetual: To California-Pacific Utilities Co. on 4/13/48, powerline right-of-way (8"wide) across the SW¼NW¼ Sec. 2, and NE¼ Sec. 3, T4S., R38E. (F. Council Tract)

Perpetual: To Salt Lake Pipeline Co. on 4/20/50, pipeline right-of-way across NE¼SW¼Sec. 2, and NE¼ Sec. 3, T4S, R38E, (F.Council Tract)

Perpetual: To Pacific Northwest Pipeline Corp. on 12/6/55, pipeline right-of-way for construction and maintenance across NE¼SW¼Sec 2, and NE¼Sec. 3, T4S, R38E.. (F. Council Tract,
Perpetual: To Idaho Power Co. on 6/16/55, powerline right-of-way for construction and maintenance with full right of ingress and egress across NE¼Sec. 3, T4S, R38E, (F. Council Tract)

Perpetual: To The Inland Telephone and Telegraph Co. on 11/20/1897, right-of-way for telephone and telegraph lines over and across SE¼Sec. 31, T3S, R39E, (Boothman Tract)

Perpetual: To Eastern Oregon Light and Power Co. on 7/29/55, easement for transmission lines across E½SW¼and NW¼SW¼ Sec. 31, T3S, R39E, (California-Pacific Utilities Co. is successor). (Boothman Tract)

Perpetual: to the Pacific Telephone and Telegraph Company on 5/12/41, easement for poles with right of ingress and egress across N½ Sec. 6, T4S., R39E., S½ Sec. 31, T3S., R39E., and E½SE¼Sec. 36, T3S, R38E, (Boothman Tract)

Perpetual: To California-Pacific Utilities Co. on 6/16/48, easement (8"wide) to construct, operate and maintain powelines across N½ Sec. 6, T4S, R39E, with right of crossing over adjoining lands. (Boothman Tract)

Perpetual: To ODFW from R. Brogoitti on 12/9/64, easement for construction, maintaining and replacing a canal for transfer of water between Gekeler Slough and Ladd Creek, NE¼SW¼ and SE¼ Sec. 25, T3S., R38E.

To Salt Lake Pipe Line Co. on 3/1/50, pipeline right-of-way (16.5" wide) to construct and maintain pipeline across Sec. 34, T3S, R38E, (Exact location is not disclosed of record). (R. Smutz Tract)

Perpetual: To Pacific Northwest Pipeline Corp. on 12/2/55, right-of-way contract to select route, construct and maintain pipeline in Sec. 34, T3S, R38E. (Exact location is not disclosed of record). R. Smutz Tract)

Perpetual: To Idaho Power Co. on 6/29/55, right-of-way and easement for powerline across E $\frac{1}{2}$ Sw $\frac{1}{4}$ and S $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 34, T3S, R38E.. (R. Smutz Tract)

Perpetual: To El Paso Natural Gas Co. on 5/3/76, right-of-way and easement for gas line across N $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 3, T4S, R38E.

Perpetual: To Pacific Telephone and Telegraph Co. on 5/9/55, easement for poles across N $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 35, T3S, R38E. (C. Hill Tract)

Perpetual: To California-Pacific Utilities Co. on 4/13/48, powerline right-of-way (8"wide) across SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 35, T3S. R38E.. (C. Hill Tract)

Perpetual: To Northwest Bell Telephone Co. on 10/15/68, road easement (10" wide) on existing road in the NE $\frac{1}{4}$ Sec. 35, T3S. R38E.. (C. Hill Tract)

Perpetual: To California-Pacific Utilities Co. on 4/13/48, powerline right-of-way (8"wide) across SW $\frac{1}{4}$, Sec 34, T3S, R38E. with right of crossing adjoining lands. (H. Council Tract)

Perpetual: To Salt Lake Pipe Line Co. on 3/1/50, pipeline right-of-way (10.5" wide) across Sec. 34, T3S, R38E., with right of ingress and egress. (H. Council Tract)

Perpetual: To California-Pacific Utilities Co. on 11/18/53, powerline right-of-way (8" wide) across Sec. 3, T4S. R38E., with right of access across adjoining lands. (H. Council Tract)

Perpetual: To Salt Lake Pipe Line Co. on 7/7/54, pipeline fight-of-way (16.5" wide) across north 45 rods of Lots 1 & 2, Sec. 3, T4S R38E., with right of ingress and egress. (H. Council Tract)

Perpetual: To Salt Lake Pipe Line Co. on 6/26/53, right-of-way for installation and operation of a cathodic pipe protection system on a parcel of land adjoining the existing pipeline right-of-way in Lots 1 & 2, Sec. 3, T4S, R38E.. (H. Council Tract)

Perpetual: To Idaho Power Co. on 6/15/55, powerline right-of-way across a part of Sec. 3, T4S., R38E., with right of ingress and egress. (H. Council Tract)

Perpetual: To Pacific Northwest Pipeline Corp. on 9//19/57, contract to construct and maintain a cathodic protection unit in Lots 1 & 2, Sec. 3, T4S, R38E.. (H. Council Tract)

Perpetual: To California-Pacific Utilities Co. on 4/13/48, powerline right-of-way (8" wide) near the west line of the NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 2, T4S, R38E., with the right of ingress and egress (M. Peebler Tract)

Perpetual: To General Telephone Company of the Northwest on 1/18/65, right-of-way and easement for transmission lines located on the SW $\frac{1}{4}$ Sec. 25, T3S., R38E.. (Crossland Tract)

Perpetual: To the Inland Telephone and Telegraph Company on 1/26/1898, right-of-way for telephone lines across the SW $\frac{1}{4}$ Sw $\frac{1}{4}$ Sec. 32, T3S, R39E.. (Water Board Tract)

Perpetual: To Eastern Oregon Light and Power Company (now Oregon Trail cooperative) on 8/29/25, right-of-way for transmission lines across SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 32, T3S, R39E.. (Waterboard Tract)

Perpetual: To CP National on 7/25/80, easement (15" wide) for electric and telephone lines and or gas, water mains across a portion of Sec. 31, T3S, R39E.. (Waterboard Tract)

Perpetual: To C. Grandy, C. Hill, C. Smutz and I Smutz on 7/29/60, right-of-way agreement for ditches across Sec. 26, T3S., R38E.. (Rinke Tract)

Perpetual: To GTE Northwest on 1/18/65, right-of-way and easement for transmission line. Right of access to maintain lines in the SW¼ of Sec. 25, T3S, R38E.. (Smutz Tract)

Perpetual: to American Telephone and Telegraph Company on 11/8/89, easement for communication system, 20 foot wide strip along Pierce Lane on west side, measured from centerline of Pierce Lane. (Smutz Tract)

Perpetual: To American Telephone & Telegrap Company on 11/9/89, easement for station in SW¼SW¼ Sec. 25, T3S, R38e. (Smutz Tract)

Perpetual: To Oregon Trail Consumers Cooperative on 11/9/89, easement and right to provide electric service to the AT&T repeater in SW¼SW¼Sec. 25, T3S, R38E. (Smutz Tract)

Perpetual: From City of La Grande, OR. To: ODFW on 08/17/01. Wetland, Recreation and Wildlife Easement, 70.7 ± acres. W 1/2 NW ¼ Sec. 28, T3, R39E

Perpetual: To City of La Grande, OR on 02/23/01, Pipeline right-of-way for construction and maintenance with full right of ingress across Sections 23, 25, and 36 of T. 3S, R. 38E and Section 31 of T. 3S, R 39E of the Willamette Meridian, Union County, Oregon.

Perpetual: To City of La Grande, OR on 05/15/01. Wetland/Impound Treatment Facility Easement. Construction and maintenance of wetland cells and treatment facilities. A parcel of land in Section 5, T. 4S, R 39E and Sections 31 and 32, T 3S, R 39E of the Willamette Meridian, Union County, OR.

Perpetual: To the United States of America (Wetland Reserve Program) on 06/23/99 Wetland Restoration and Protection Easement. Northeast quarter of Section 35 or T. 2 S, R. 39 E of the Willamette Meridian, Union County, Oregon

Perpetual: To the United States of America (Wetland Reserve Program) on 09/28/99 Wetland Restoration and Protection. The South half of the Southwest quarter including the Government Lot 4 of section 33, T. 3 S, R. 39 E and the northwest quarter and the east half of the southeast quarter of the northeast quarter

Thirty Years: To the United States of America (Wetland Reserve Program) on 06/23/99. Wetland Restoration and Protection. SE quarter of Section 29 and in the North half of Section 32, in Township 3 South, Range 39 East of the Willamette Meridian, In Union County Oregon.

Appendix F. Legal Obligations Influencing Management of the Ladd Marsh 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
ORS 570.535 Landowner responsibility for weed control

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
635-008-0120 Ladd Marsh Wildlife Area

Division 011 - Statewide Angling Regulations

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

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

Oregon Department of Environmental Quality (DEQ)

The City of La Grande operates its wastewater treatment facilities under permit from the Oregon DEQ through the National Pollution Discharge Elimination System. Their permit (#101549) dictates limitations to allowable public access in areas where treated effluent is discharged.

Union County Ordinances

Union County Zoning, Partition and Subdivision Ordinance, Article 16, addresses the Union County Airport Overlay Zone which restricts activities within 10,000 feet of the airport runway.

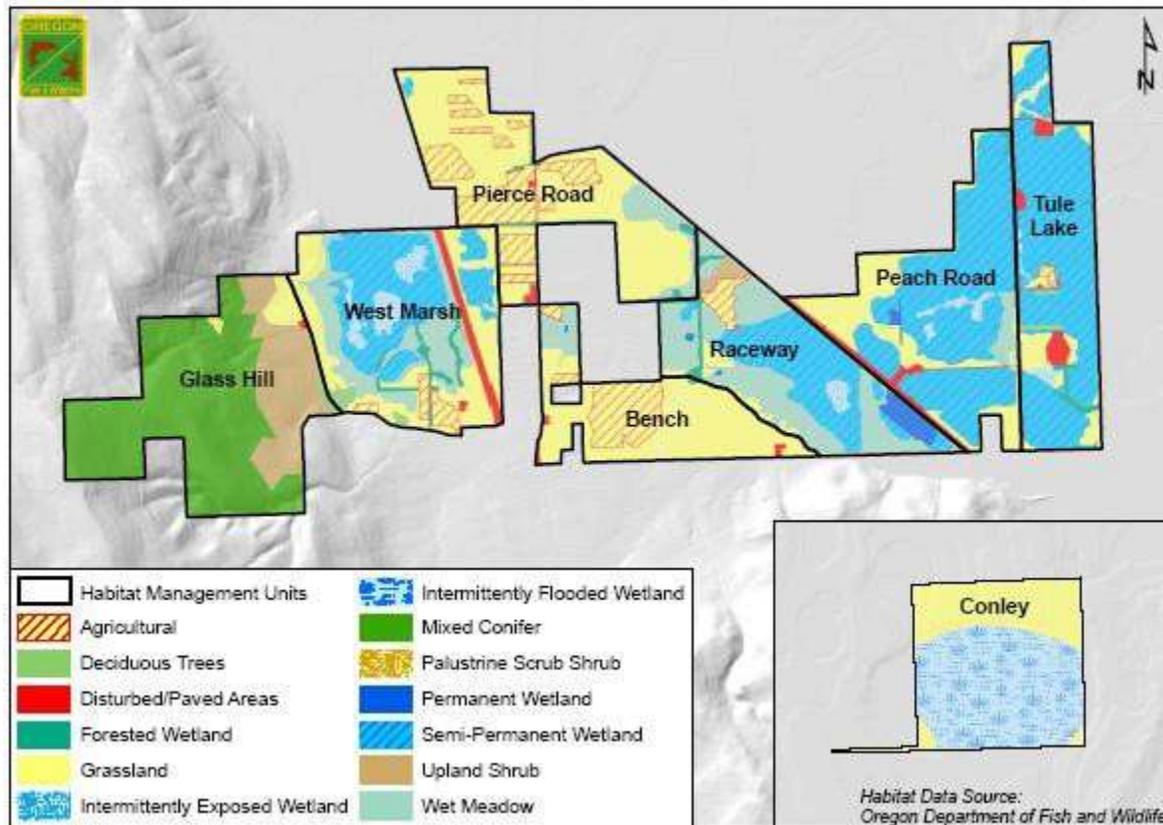
Appendix G. Description of Habitat Management Units on the Ladd Marsh Wildlife Area

Introduction

Eight Habitat Management Units (HMUs) are delineated on Ladd Marsh Wildlife Area (LMWA). These HMUs have been delineated and will be described based on administrative and physical features or boundaries, habitat types and vegetation, current or past management activities and sources of water in the case of wetland units.

Immense evapotranspiration loss and weather events are very important considerations and are factored into management actions. Habitat capabilities and resource outputs across LMWA are based on management actions within the individual units.

Figure 4 - Ladd Marsh Habitat Management Units and Habitat Types



Tule Lake

Background

The 720 acre Tule Lake HMU is predominantly semi-permanently flooded wetlands surrounded by upland grasslands. The north end (480 acres) is owned by the City of La Grande and managed by the Department under a Cooperative Management Agreement.

Prior to Euro-American settlement the entire HMU was part of a 10,000 acre wetland complex known as Tule Lake. The area was drained in the late 1800s for grazing and agriculture.

Except for home sites and a historical schoolhouse, the entire area was enrolled in the U.S. Department of Agriculture's Wetland Reserve Program. Along with several other cooperators including Bonneville Power Administration, The Nature Conservancy, The Confederated Tribes of Umatilla Indian Reservation, U.S. Fish and Wildlife Service and the City of La Grande, the area was restored to wetlands by constructing several levees and a water delivery system. Wetland cells were designed for moist soil management capabilities. Construction was completed in 2004. There are six distinct wetland cells which vary in size from 27 to 126 acres.

The water sources for this HMU are natural runoff, Catherine Creek water rights and treated effluent from the City of La Grande. The treated effluent is pumped to an elevated distribution pond and along with Catherine Creek water, distributed via a system of canals and control structures. Water sources cannot offset evapotranspiration during dry summers and falls, therefore most of the cells dry out annually. Waterfowl brood areas are identified and maintained with available water.

As a newly restored wetland, this area is at an early successional stage. It has a mosaic of plant communities including hardstem bulrush, cattail, wet meadow, and wetland annuals.

Uplands on the area were planted to native grasses and forbs to provide nesting areas for waterfowl and upland game.

This unit has become a very popular and productive hunting area. Pit blinds are available in several units if hunters so desire. Access is a short walk from several parking areas along Peach Road.

The Tule Lake Public Access Area is located on this area. An auto tour route and several miles of hiking trails are available to the public March 1 to July 31st. Additional facilities including a host site, kiosks and trail markers are planned for the area.

Management Strategies

This unit will be managed for semi-permanent and seasonal wetland habitat. Initially, plant communities will be monitored for diversity and encroachment of robust emergents.

Habitat management activities including drawdowns, burning, disking and herbicide application will be used to manipulate plant communities. This will provide nesting, brood rearing, molting, and migration habitat. Infrastructure including levees and water control structures will be maintained and or replaced during drawdowns.

Several improvements to the Tule Lake Public Access Area have been implemented since the restoration was completed. These include two kiosks, public restrooms, trail signs and a viewing platform.

Peach Road

Background

This HMU was part of the Tule Lake wetland complex prior to Euro-American settlement. It was drained for grazing and agriculture. It was purchased and enrolled in the Wetland Reserve Program by The Nature Conservancy in 1998 and donated to the Department in 2000. Prior to the Department's acquisition, Ladd Creek was channelized and the entire area drained for grazing and agriculture. Restoration included levee construction to create wetland cells and protect adjacent private land, installing water control structures and excavation of a water delivery system. Three miles of Ladd Creek were also restored by excavating a new channel and planting with native trees and shrubs.

Currently this 823 acre HMU has permanent, semi-permanent, and intermittently exposed wetlands surrounded by grasslands. There are six actively managed wetland cells within this HMU. Four cells, 109 to 184 acres in size are managed by LMWA staff. Two cells, 24 and 38 acres, are treatment wetlands for the City of La Grande. These cells are managed by the City of La Grande with input from LMWA staff. The treatment cells are within and managed as waterfowl refuge during hunting seasons.

Ladd Creek flows through the two northern cells. Ladders were installed on the control structures for these two units to ensure fish passage.

Water sources for this HMU are natural runoff, Ladd Creek and treated effluent from the City of La Grande. Water sources cannot offset evapotranspiration during extended dry periods, therefore most of the cells dry out annually. Waterfowl brood areas are identified and maintained with available water.

Management Strategies

This unit will be managed for semi-permanent and seasonal wetland habitat. Initially, plant communities will be monitored for diversity and encroachment of robust emergents.

Habitat management activities including drawdowns, burning, disking and herbicide application will be used to manipulate plant communities. This will provide nesting, brood rearing, molting, and migration habitat. Infrastructure including levees and water control structures will be maintained and or replaced during dry periods

Raceway

Background

The Raceway Habitat Management Unit was part of the Tule Lake Wetlands prior to Euro-American settlement. It was drained for grazing and agriculture in the late 1800's. This 726 acre unit has a mosaic of habitat types including permanent, semi-permanent and forested wetlands, upland shrub, agriculture and grasslands.

The permanent wetland area is a natural wetland fed by warm springs. It provides open water during winter. It also provides foraging and brood habitat in late summer.

The semi-permanent wetland habitat was primarily agriculture prior to 1998. This area was enrolled into the Wetland Reserve Program for wetland restoration. Restoration work completed in 1999 created five wetland cells, 25 to 77 acres in size. The cells have independent management capabilities. A fish ladder was installed on the R1 unit for fish passage on Barney Creek.

Management Strategies

This unit will be managed for semi-permanent and seasonal wetland habitat. Initially, plant communities will be monitored for diversity and encroachment of robust emergents.

Habitat management activities including drawdowns, burning, disking and herbicide application will be used to manipulate plant communities. This will provide nesting, brood rearing, molting, and migration habitat. Infrastructure including levees and water control structures will be maintained and or replaced during dry periods.

Bench

Background

This 601 acre HMU is on an alluvial fan created from sediments out of Ladd Canyon. It has shallow well drained coarse soils. Part of this area was converted to agriculture in the early 1900s. The remaining area was intensively grazed which allowed invasive species such as medusahead rye and cheatgrass to replace the native grasses. Prior to its conversion, bluebunch wheatgrass and Idaho fescue were the dominant plant communities. Projects to restore this area to native grassland and upland shrub began in 1996. Several areas have been planted to bluebunch wheatgrass, Idaho fescue and native forbs. Bitterbrush and sagebrush were included to enhance the area for wintering big game.

Ladd Creek water rights were established as early as the late 1800s to support crop production. A portion of these water rights have been converted to storage rights for wetland management.

Management Strategies

Management strategies for this area will continue to focus on restoring native grasslands and upland shrubs. Degraded grasslands will be chemically fallowed and reseeded with native grass, forb and shrub species. The present level of agriculture and associated wildlife needs will be reviewed to determine if additional crop fields should be restored to grassland.

Pierce Road

Background

This 826 acre HMU consists predominately of upland habitat types. The major portions of the agricultural lands are located in this unit. Prior to conversion to farming this area was basin wild rye grasslands and wetlands associated with the middle fork of Ladd Creek. During settlement the creek was aligned with property lines and deepened to improve the area for crop production. The management focus in this area has been to restore native grasslands and restore the middle fork of Ladd Creek.

Management Strategies

Management strategies for this area will continue to focus on restoring native grassland and upland shrubs. Degraded grasslands will be chemically fallowed and reseeded with native grass, forb and shrub species. The present level of agriculture and associated wildlife needs will be reviewed to determine if additional crop fields should be restored to grassland.

Efforts to restore the middle fork of Ladd Creek began in 2008. Funding was secured, cultural resource and topographical surveys were completed and designs were drafted by ODFW BPA Fish Habitat program. The restoration and revegetation has been completed and monitoring efforts are still ongoing.

West Marsh

Background

The 1,158 acre West Marsh HMU has several habitat types. Wetlands include a 308 acre natural wetland which was enhanced in 2006 with the construction of a perimeter levee and a water control structure. Prior to these improvements, this area was experiencing cattail and reed canary grass encroachment. This area also provided a refuge for large populations of carp which had a devastating effect on LMWA wetlands. Improvements enable LMWA staff to control carp populations, manage emergent encroachment and store water for this unit as well as wetlands downstream.

Included in the West Marsh HMU is a 26-acre wetland cell that was established in 2006 as a cooperative effort between LMWA and the Oregon Department of Transportation (ODOT). This cell is being managed as a compensatory wetland mitigation site that includes a mixture of palustrine scrub shrub wetlands and palustrine emergent

wetlands. ODOT will pursue recognition of the area as a Wetland Bank with the regulatory agencies. As such, the cell will be managed in perpetuity as a wetland.

This HMU also has wetlands created in 1993 as a pilot program for using treated effluent. These four wetland cells, located on the east side of Interstate 84, are maintained entirely by treated effluent. This unit provides foraging and nesting areas for waterfowl.

Upland areas consist of grasslands, agricultural crops and deciduous trees. Forested wetlands are located on the west branch of Ladd Creek and a small intermittent stream. The upland habitats are generally comprised of a variety of native species (except agricultural areas) with minor outbreaks of non-native weeds. Thus these habitats are monitored for invasive weed infestation but are otherwise not subject to intensive management activity.

The West Marsh Unit contains the largest posted refuge (wildlife sanctuary) on LMWA. It is well located as it is relatively isolated from huntable areas to the east. However, in recent years, the wetlands in this area have dried out or very nearly dried out by late summer and Ladd Creek flows have been inadequate to flood them during fall. Under those conditions, the area is not attractive to waterfowl so it does not function as a sanctuary during the waterfowl hunting season. When that occurs, an alternate refuge area should be considered.

Management Strategies

Management strategies for this unit will focus on maintaining semi-permanent and seasonal wetland habitat. Habitat management activities including drawdowns, burning, disking and herbicide application will be used to manipulate plant communities. This will provide nesting, brood rearing, molting, and migration habitat. Infrastructure including levees and water control structures will be maintained and or replaced during dry periods. The refuge area will be monitored and evaluated under various water conditions.

Glass Hill

Background

This 1,005 acre unit is a mix of upland shrubs, grasslands and mixed conifers. Eight hundred fifty acres are owned by the Rocky Mountain Elk Foundation and managed by the department through a cooperative management agreement. There are two intermittent streams and several springs in the unit. Several miles of boundary fence were constructed to keep neighboring landowners' livestock out of the area and to manage cattle grazing if that option is selected for vegetation management in the future. The remainder of the boundary has been surveyed, and once funding and partnerships are established the remainder of the unfenced boundary will be fenced.

Prior to department management, this unit was part of a family cattle operation. It was intensively grazed by cattle and portions were logged. The lower area, near Foothill Road, was also used as a winter feeding site for cattle.

This unit has been designated as critical big game range in the Union County Land Use Plan. Elk are present year-round, with up to 400 animals wintering in the general area. One hundred to two hundred deer also winter in the area.

Present habitat conditions vary on the unit. The mixed conifer area which includes Ponderosa pine, grand fir, Douglas fir and Western larch is in good condition as defined by live, healthy trees with an open understory of native shrubs, no major infestations of noxious weeds or insects and little to no fuel loading to cause an elevated fire risk. The previously logged areas have been re-planted with seedlings and selective logging to improve wildlife habitat was completed in 2004.

The upland shrub and grassland areas are severely degraded. They are dominated by several invasive species including sulfur cinquefoil, medusahead rye, cheatgrass and sweetbriar. In 2006, the department began a restoration project to eliminate invasive species and restore native habitat. Approximately 60 acres of the lower grass dominated habitat was restored to a native bunch grass prairie. Invasive plants continue to be the biggest issue in the restoration and in the shrub step portion of Glass Hill.

This unit is a very popular deer and elk hunting area. An adjacent 1,000 acres of private land are enrolled in the department's Access and Habitat Program. Habitat restoration and vehicle restrictions on both parcels provide security for big game.

Management Strategies

This HMU will be managed primarily for big game habitat. Upland shrub and grassland habitat enhancement projects will include burning, herbicide application and reseeding with native grasses, forbs and shrubs. The remaining unfenced boundary will be surveyed and fenced to manage trespass livestock. The main access road will be maintained for fire suppression and management activities. The logged areas will be monitored for seedling recruitment and if necessary, replanted. Restored areas will function as demonstration sites for rangeland restoration projects.

Conley Lake

Background

The unit consists of a 120 acre playa lake (Conley Lake) and 40 acres of grassland. Several attempts to drain the lake were made over the years. The uplands were farmed prior to acquisition. Conley Lake Unit is an important spring waterfowl migration area in northeast Oregon during years with average or above average precipitation. Over 1,000 swans, 3,000 greater white-fronted geese and numerous other waterbirds were observed on the area in 1997.

Conley Lake was purchased by The Nature Conservancy in 1998 and enrolled in the Wetland Reserve Program for enhancement and protection. It was donated to the Department in 2000. The grasslands were planted to native species including needle and thread, bluebunch wheatgrass, and Idaho fescue. The upland seeding has been a failure due to severe drought conditions. The lake bed is primarily alkali grass and saltgrass. Hardstem bulrush was present in the deepest area when acquired but has since disappeared. Historically this unit was filled by ground water and spring runoff almost every year. With continued below average to average precipitation in the Grande Rhonde valley the lake is dry for the majority of the year. Several nearby irrigation wells which were recently installed may also be contributing to decreasing ground water conditions in the unit.

Management Strategies

Future management will include monitoring water depths and wildlife use. Supplemental water sources will be explored and evaluated. Grassland management will include chemical fallow to eliminate cheatgrass and annual rye and reseeding to native grasses and forbs. A boundary fence will be constructed to manage trespassing livestock.