

WHATCOM WILDLIFE AREA MANAGEMENT PLAN

Washington Department of Fish and Wildlife



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2006

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Washington State Wildlife Area Plan

WHATCOM WILDLIFE AREA

Washington Department of Fish and Wildlife
Wildlife Management Program
600 Capitol Way North
Olympia, WA 98501-1091

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Director, Washington Department of Fish and Wildlife

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EXECUTIVE SUMMARY

The Whatcom Wildlife Area was established in the 1940's as a major wintering waterfowl area. The first purchase, consisting of 1,500 acres of farmland, was acquired to preserve waterfowl habitat and provide opportunities for waterfowl hunting, fishing, and public recreation. To restore these lands the Department dammed Terrell Creek, creating the shallow 500-acre Lake Terrell. Later, funds acquired from the Interagency Committee for Outdoor Recreation allowed purchase of the 140-acre Pine and Cedar Lake unit in 1969, and the 360-acre Tenant Lake unit in 1974. Both are cooperatively managed with the Whatcom County Parks and Recreation Department to conserve outdoor public recreation opportunities and protect critical wetlands for fish and wildlife. In 1991 the Department purchased 588 acres on Lummi Island to preserve a peregrine falcon nesting site. An additional 112 acres were bought on Lummi Island in 1997. The most recent acquisition is the 627-acre Nooksack unit, purchased in phases between 2001 and 2005 using grants and cooperative multi-agency funding. This unit was purchased to reconnect wetland channels and restore salmon rearing habitat. A significant restoration effort was completed in 2007.

The Whatcom Wildlife Area contains two leased properties. The Intalco Aluminum Corporation unit was first leased in 1970 and contains 1,000 acres of industrial property, located one mile south of the Lake Terrell headquarters. The British Petroleum Oil Company unit is also approximately 1,000 acres, and was first leased in 1990. It is located four miles north of the Lake Terrell headquarters. Both properties are leased by the Department for public hunting, fishing and related recreational activities. Lands managed as part of the Whatcom Wildlife Area currently total 5,327 acres.

Primary management concerns and public issues identified in the Whatcom Wildlife Area Management Plan are:

- Manage conflicting and/or overcrowded recreational uses
- Maintain and improve nesting and wintering habitat for waterfowl
- Protect, restore and enhance wetland and riparian habitats
- Control noxious weeds and other undesirable vegetation.
- Provide outdoor recreation opportunities for a broad audience
- Address litter, vandalism and enforcement issues

The Whatcom Wildlife Area provides 280,000 visitor days of recreation each year, including hunting, fishing, dog walking, bird watching, boating, and interpretive tours. Increased non-consumptive uses have required new regulations to address user conflicts, such as on-leash vs. off-leash dog areas, and hiking vs. hunting on public lands.

A total 180 acres of cereal grains are planted annually on the Wildlife Area. A lessee plants 100 acres of corn on the Nooksack unit, leaving 10 acres standing for wildlife, then plants approximately 30% of the harvested field back to a winter cover crop. Wildlife area staff plant 60-70 acres of barley at the Lake Terrell unit, and British Petroleum plants 20 acres of barley using State Duck Stamp funds on leased industrial lands.

Numerous sportsmen and volunteers participate annually to release 5,000 pheasants, maintain 42 hunting/viewing blinds, and maintain a public archery range.

Duck Stamp funds are sought to implement habitat enhancement projects that can improve waterfowl nesting and rearing. One water control structure was installed in 2007 on an Intalco parcel to store rainwater later into summer. Another is planned for 2008.

Wildlife Area staff monitored and/or controlled noxious weeds on 1,300 acres using mechanical, biological, cultural and chemical methods. Staff controlled, or coordinated with the WDFW weed crew in the control of, yellow flag iris, purple loosestrife, Japanese knotweed, and scotch broom. Sprayed annual weeds on 180 acres of agricultural land, and mowed to control reed canarygrass and encroaching alders.

Activities planned for 2008

- 1) Plant a minimum 180 acres of cereal grains for wintering waterfowl.
- 2) Monitor and/or control weeds on 1,000 acres.
- 3) Work with Watershed staff to increase summer flows in Terrell Creek without negative impacts to Lake Terrell.
- 4) Continue 20-site photo point monitoring of Nooksack restoration and coordinate planting maintenance with NRCS.
- 5) Monitor success of Lake Terrell island plantings – replant if necessary.
- 6) Maintain 1 mile of fence on Lake Terrell unit to protect reserve from trespass.
- 7) Pursue opportunities to create wheelchair-only hunting site on the Nooksack unit.
- 8) Release 5,000 pheasants with the assistance of 30-40 volunteers.
- 9) Coordinate with WA Waterfowl Association to maintain 42 hunting blinds and 4 boat launches at Lake Terrell, Tennant Lake, Nooksack and Intalco units.
- 10) Coordinate with sportsmen to maintain Intalco archery range.
- 11) Survey dog-walkers once per month throughout the year to establish numbers/ impacts of dogs on the wildlife area.
- 12) Post signs establishing on-leash and off-leash dog areas.
- 13) Survey for Townsend's big-eared bats in Marietta barn prior to fall demolition.
- 14) Post regulations and boundaries on Lummi Island units.
- 15) Coordinate with Ducks Unlimited to install a water control structure at Intalco.
- 16) Coordinate with British Petroleum to open newly acquired land to public hunting.
- 17) Create maps detailing wildlife area boundaries and features such as dog areas, blinds, archery range etc.
- 18) Apply for grants to meet various strategies as needed.
- 19) Coordinate with other land managing agencies.
- 20) Create an action plan detailing efforts to cooperatively manage fish, wildlife, and habitats affected by the Lake Terrell dam.

CHAPTER I. INTRODUCTION

The Washington Department of Fish and Wildlife (WDFW) is entrusted with managing state-owned lands and preserving their natural resources. As a steward of the land, the Department is dedicated to protecting, restoring and perpetuating healthy ecosystems throughout the state, while fostering an attitude of partnership with local communities.

This plan provides management direction for the Whatcom Wildlife Area. It will be updated annually to maintain its value as a flexible working document, and to remain sensitive to change over time. This planning process incorporates local needs and concerns as indicated by citizen participation, and guides management activities on this wildlife area based on the Department's statewide goals and objectives.

1.1 Agency Mission Statement

The Washington Department of Fish and Wildlife serves Washington's citizens by protecting, restoring and enhancing fish and wildlife and their habitats, while providing sustainable fish and wildlife-related recreational and commercial opportunities.

1.2 Agency Goals and Objectives

The underlined goals and objectives directly apply to this wildlife area. These goals and objectives can be found in the Agency's Strategic Plan.

Goal 1: Healthy and diverse fish and wildlife populations and habitats

- Objective 2: Protect, restore and enhance fish and wildlife populations and their habitats.
- Objective 3: Ensure WDFW activities, programs, facilities and lands are consistent with local, state and federal regulations that protect and recover fish, wildlife and their habitats.
- Objective 5: Minimize adverse interactions between humans and wildlife.

Goal 2: Sustainable fish and wildlife-related opportunities

- Objective 6: Provide sustainable fish and wildlife-related recreational and commercial opportunities compatible with maintaining healthy fish and wildlife populations and habitats.

Goal 3: Operational Excellence and Professional Service

- Objective 14: Reconnect with those interested in Washington's fish and wildlife.
- Objective 15: Provide sound operational management of WDFW lands, facilities and access sites.

1.3 Agency Policies

The following agency policies provide additional guidance for management of agency lands.

- Commission Policy 6003: Domestic Livestock Grazing on Department Lands
- Policy 6010: Acquiring and disposing of real property
- Policy 5211: Protecting and Restoring Wetlands: WDFW Will Accomplish Long-Term Gain of Properly Functioning Wetlands Where Both Ecologically and Financially Feasible on WDFW-Owned or WDFW-Controlled Properties
- Policy 5001: Fish Protection At Water Diversions/Flow Control Structures And Fish Passage Structures
- Policy: Recreation management on WDFW Lands
- Policy: Commercial Use of WDFW Lands
- Policy: Forest Management on WDFW Lands

- Policy: Weed Management on WDFW Lands
- Policy: Fire Management on WDFW Lands
- Other policies/contractual obligations/responsibilities

1.4 Whatcom Wildlife Area Goals

The Whatcom Wildlife Area consists of a mix of open water, wetland, grassland, riparian shrub, and mixed forest in five separate units in northwestern Washington, totaling just over 5,000 acres. The management goals for this Area are to preserve habitat and species diversity for fish and wildlife resources, maintain healthy populations of game and non-game species, protect and restore native plant communities, and provide diverse opportunities for the public to encounter, utilize, and appreciate wildlife and wild areas. Specific management goals and objectives for the Whatcom Wildlife Area can be found in Chapter 3.

1.5 Planning Process

The plan is part of a statewide planning process to ensure consistency in wildlife area management and policy implementation. For the Whatcom Wildlife Area, a multifaceted approach has been undertaken to assess all proposed strategies. This process included identifying agency goals and objectives that apply to this Area; reviewing the purpose for purchasing the Area; reviewing existing habitat conditions and species; soliciting guidance and input from an internal District Team and forming a long-term Wildlife Area Citizens Advisory Group for external review.

The District Team (Table 1) helps identify existing species plans, habitat recommendations, watershed plans, ecoregional assessments, etc. that are used to identify local issues and needs to ensure that the Whatcom Wildlife Area Plan is consistent with the Department’s statewide and regional priorities, in addition to addressing issues identified in previous planning efforts. This team consists of local representatives from each Department program, incorporating cross-program input and review at the regional and headquarters level by the habitat, wildlife, enforcement and fish program.

Table 1. WDFW District Team Members

Enforcement	Fisheries	Habitat	Wildlife
Bill Heinck	Mark Downen	Pete Castle	Mike Davison
Ryan Valentine	Tasha Geiger	Chris Dietrick	Kye Iris
	Doug Huddle		Shana Winegeart
	Steve Seymour		
	Bob Warinner		

Public participation, in the form of a Citizens Advisory Group, has been used to identify cultural, economic and social issues important to the residents of northwestern Washington, and is influential in managing the Whatcom Wildlife Area. The Citizens Advisory Group (Table 2) is comprised of concerned citizens, local landowners and representatives of local interest groups or other land management agencies. Members are considered spokespersons for their interest groups, and bring a wide variety of concerns and issues to the wildlife area manager’s attention. This group also provides input to help resolve current and future management issues and conflicts related to this Wildlife Area. Their participation in the planning process adds credibility and support for land management practices, helps build constituencies and fosters stewardship.

Table 2. Citizen Advisory Group Members

Name	Representing
Barbara Brenner	Whatcom County Council rep
Mariann Brown	WDFW Land Advisory Council rep
Doug Channel	Custer Sportsmen Club/archery
Dennis Conner	Hovander Park manager
Jack Crandall	Pheasant hunter/sportsman
Ken Ford	Tennant Lake neighbor
Lynne Givler	Whatcom County Parks & Recreation Dept
Bob Harriman	Borderline Bass Club rep
Joe Meche	Audubon member
Ken Miller	Waterfowl hunter/volunteer
Chuck Rameau	Borderline Bass Club rep
Ann Marie Ross	Dog walker/conservationist
Ed Ross	Dog walker/conservationist
Paul Sadler	Pheasant hunter/sportsman
Bill Stinson	Custer Sportsmen Club/archery
Gene Watson	Tennant Lake neighbor/dog trainer/sportsman
Paul Woodcock	Audubon member

Other stakeholders not represented on the Citizens Advisory Group include the U.S. Forest Service, U.S. Fish and Wildlife Service, Lummi Indian Nation, Nooksack Indian Tribe, Natural Resource Conservation Service, Washington Department of Natural Resources, Whatcom County government, local drainage districts and the Nature Conservancy. These entities typically cooperate on projects and some have provided input during this planning process.

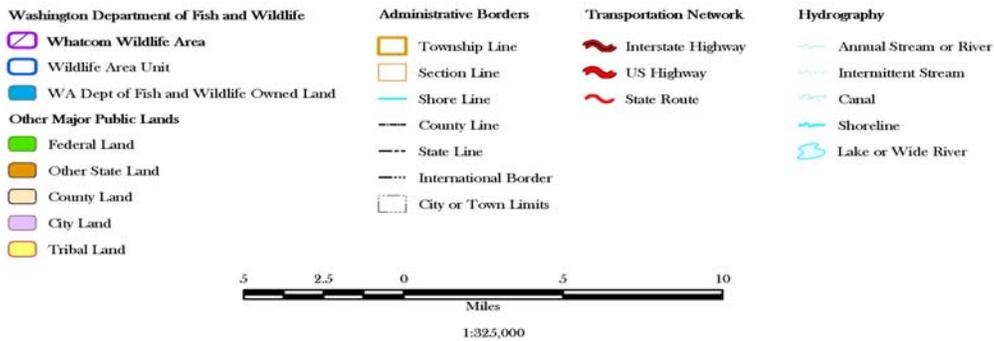
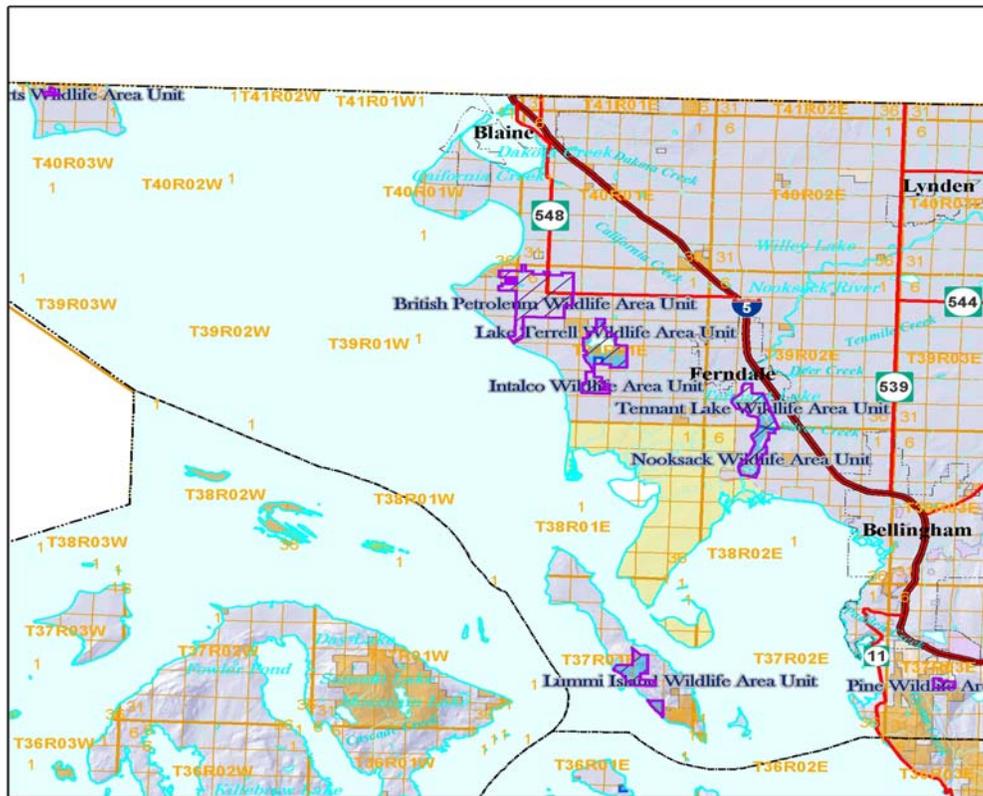
The Whatcom Wildlife Area plan will be reviewed annually with additional input from the Citizen Advisory Group and District Team to monitor performance and desired results. Strategies and activities will be adapted where necessary to accomplish management objectives.

CHAPTER II. AREA DESCRIPTION AND MAP

2.1 Property Location and Size

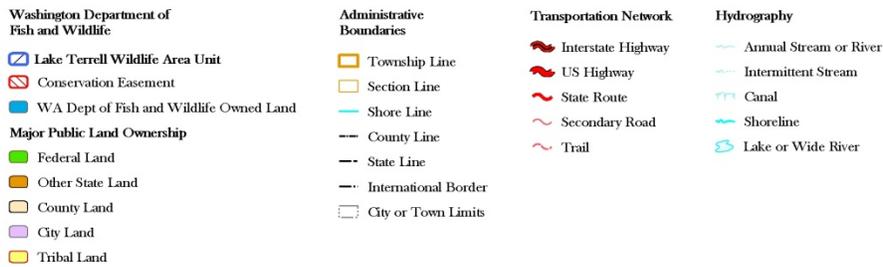
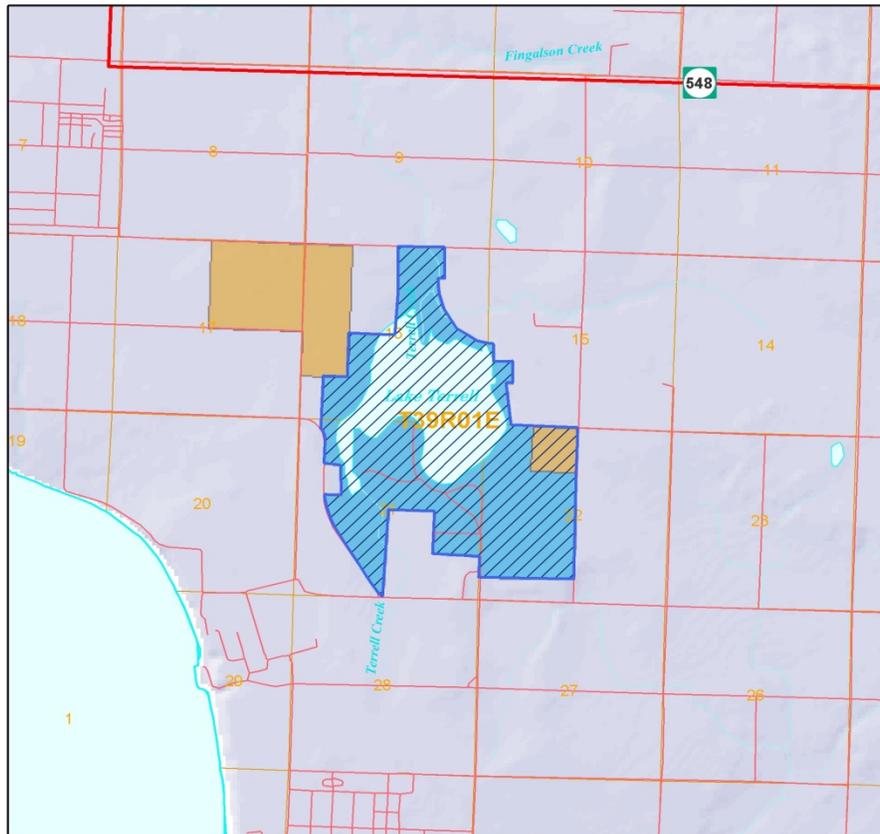
The 5,814-acre Whatcom Wildlife Area (Figure 1) consists of seven parcels in Whatcom County, north of the City of Bellingham. The majority of this wildlife area lies within a few miles of Puget Sound, and about ten miles south of the Canadian border.

Figure 1. Whatcom Wildlife Area



The Lake Terrell unit (1,500 acres) is ten miles northwest of Bellingham and five miles west of Ferndale (Figure 2). It includes Lake Terrell, a 500-acre shallow lake with two peat bog marshes on its south and southwest sides, and Terrell Creek.

Figure 2. Lake Terrell Unit

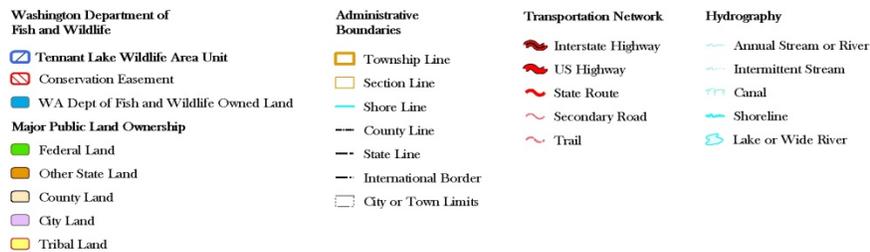
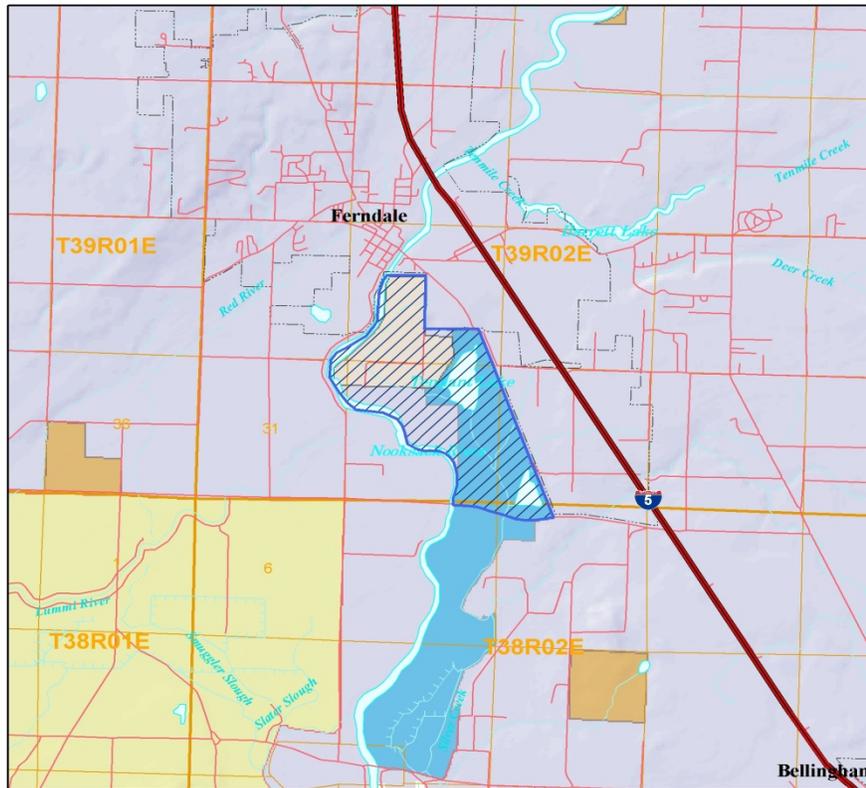


1:50,000

1 inch equals 0.79 miles

The Tennant Lake unit (360 acres) about two miles north of Bellingham and one mile south of Ferndale is mostly in the floodplain of the Nooksack River (Figure 3). Some of the lower portions flood annually. Tennant Lake itself is an 80-acre, shallow, peat-bog lake. One half mile south of this lake is Claypit Pond, forming as clay was dug up to manufacture brick and glass (prior to department ownership). Fairly extensive swamp/marsh areas occur adjacent both lakes.

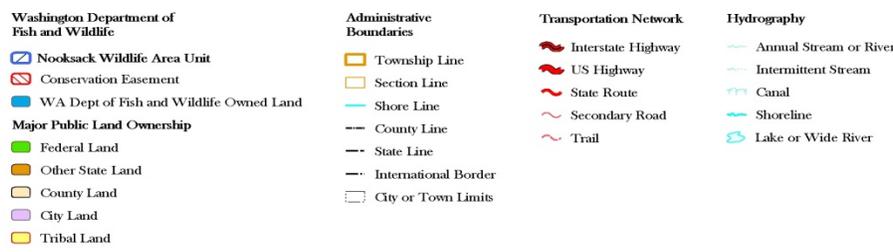
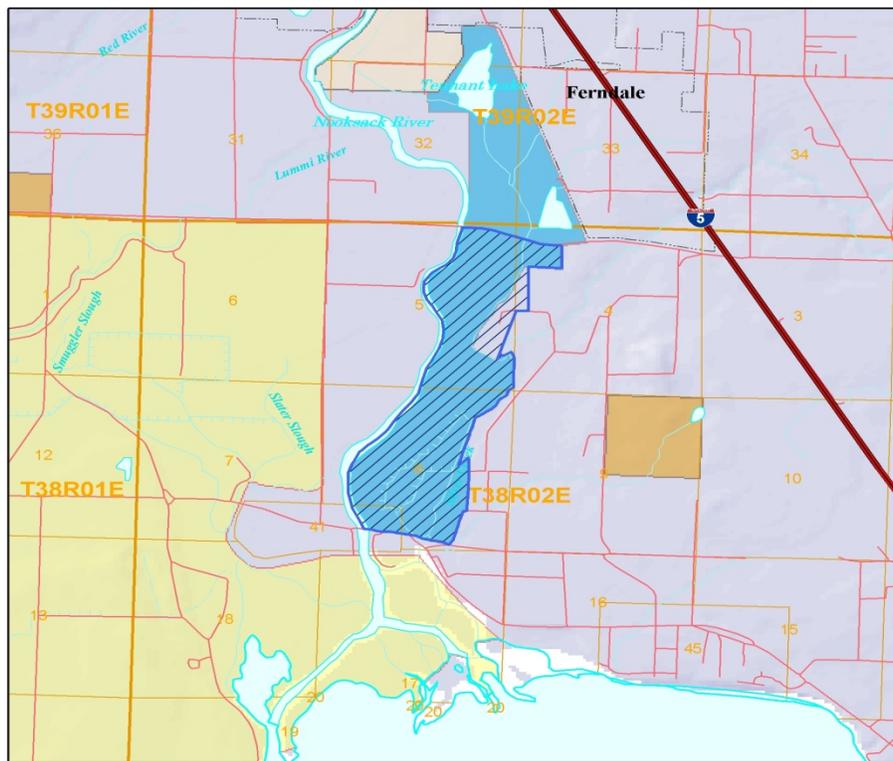
Figure 3. Tennant Lake Unit



1:60,000
1 inch equals 0.95 miles

The Nooksack unit (627.5 acres) extends from the Nooksack River estuary north to Slater Road, where it meets the Tennant Lake unit. With these purchases, the eastern bank of the Nooksack River is protected from its mouth to Ferndale, as well as most of Tennant and Silver creeks. A dike along the east bank currently protects previously farmed lowlands from flooding. As this unit is a significant part of the Nooksack estuary, it is quickly being replanted with native riparian vegetation, and tidally-influenced habitats are being restored for salmon and waterfowl.

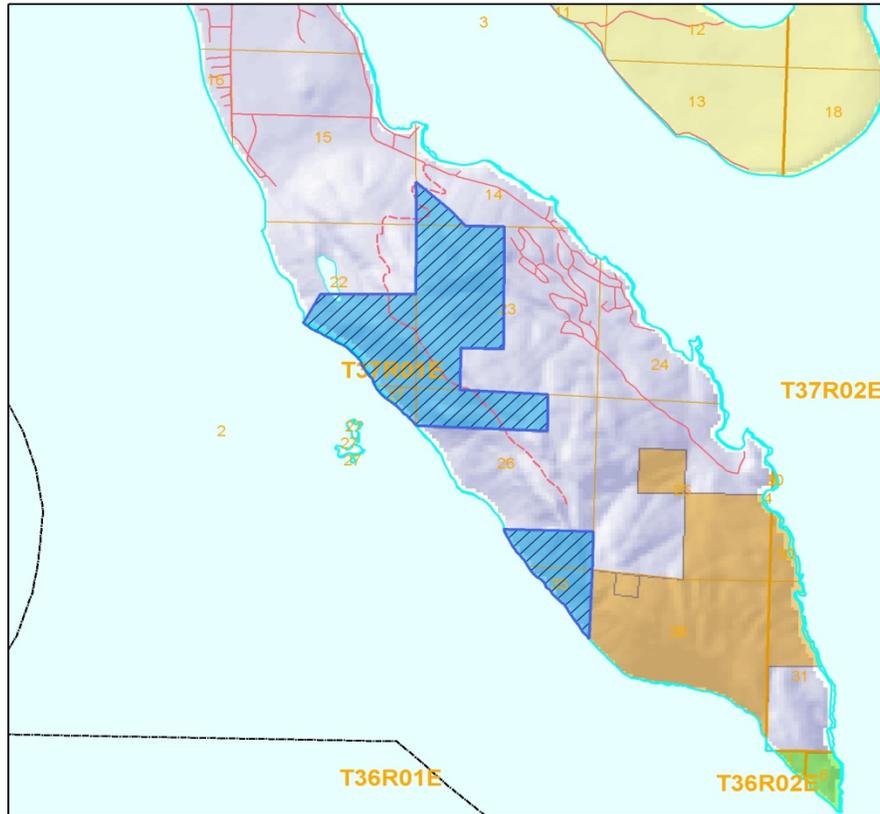
Figure 4. Nooksack Unit



1:50,000
1 inch equals 0.79 miles

The Lummi Island unit (700 acres) is seven miles southwest of Bellingham. The property is located on the island's steeper, rockier west side (Figure 5). The Pine and Cedar Lakes unit (140 acres) is several miles south of Bellingham on Chuckanut Mountain. A steep 2.5-mile trail leads to these two lowland mountain lakes, situated above 1,000 feet.

Figure 5. Lummi Island Unit.

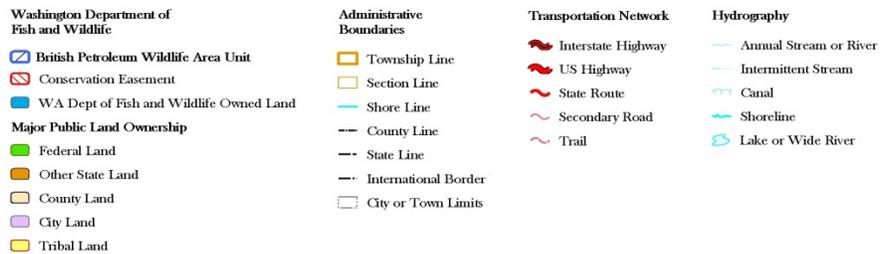
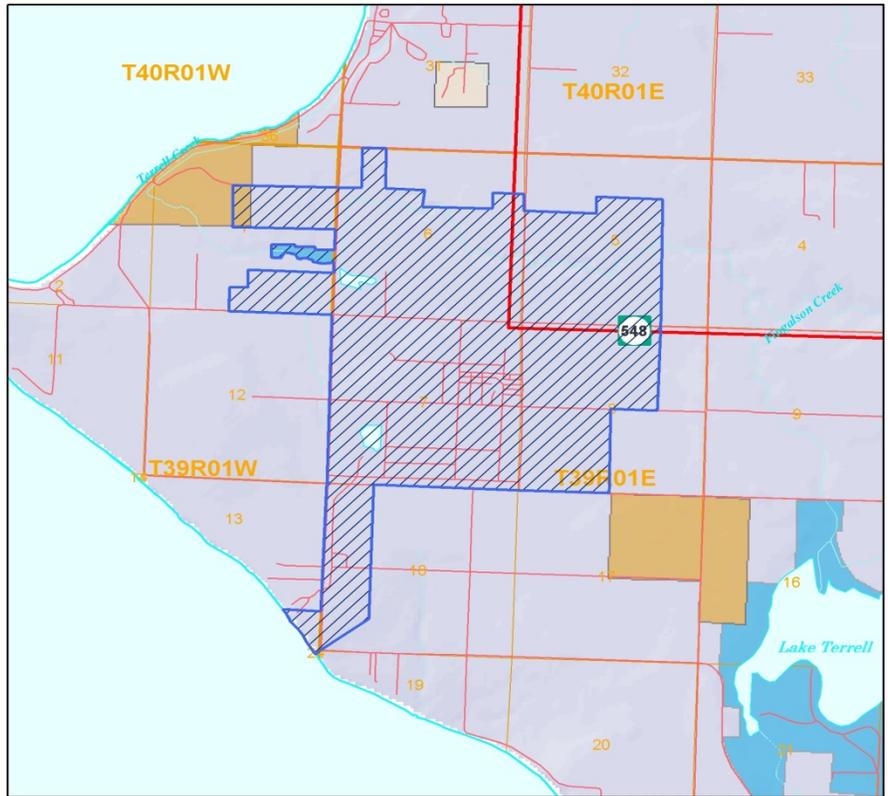


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|--|--|--|--|
| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Lummi Island Wildlife Area Unit Conservation Easement WA Dept of Fish and Wildlife Owned Land <p>Major Public Land Ownership</p> <ul style="list-style-type: none"> Federal Land Other State Land County Land City Land Tribal Land | <p>Administrative Boundaries</p> <ul style="list-style-type: none"> Township Line Section Line Shore Line County Line State Line International Border City or Town Limits | <p>Transportation Network</p> <ul style="list-style-type: none"> Interstate Highway US Highway State Route Secondary Road Trail | <p>Hydrography</p> <ul style="list-style-type: none"> Annual Stream or River Intermittent Stream Canal Shoreline Lake or Wide River |
|--|--|--|--|

1:50,000
1 inch equals 0.79 miles

The British Petroleum (formerly Arco) Oil Company unit is approximately 1,000 acres of privately owned industrial land four miles north of the Lake Terrell headquarters. The Intalco Aluminum Corporation segment is another 1,000 acres of industrial property, one mile south of the Lake Terrell headquarters. Both properties are leased by the Department for public hunting, fishing and related recreational activities.

Figure 6. British Petroleum Unit



1:50,000
1 inch equals 0.79 miles

2.2 Purchase History and Purpose

The Whatcom Wildlife Area was purchased as a major wintering waterfowl area. It is ideally situated between the Fraser and Skagit rivers, and between the largest estuaries on Puget Sound/Georgia Basin and major Pacific Flyway waterfowl wintering areas. The Skagit estuary to the south supports the highest numbers of wintering waterfowl in Puget Sound and the Fraser estuary in western Canada is that region's most important waterfowl wintering area (Ducks Unlimited Canada 2004). As waterfowl and shorebirds move between these two estuaries, they either pass through or stop in the Whatcom Wildlife Area.

Lake Terrell Unit

Four dairy farms were purchased in the late 1940s to preserve waterfowl habitat, and provide opportunities for waterfowl hunting, fishing and appreciative public recreation (Table 3). To restore these lands for waterfowl, the Department dammed Terrell Creek, creating shallow 500-acre Lake Terrell, six to nine feet deep. Approximately 75 percent of this drainage basin is farmland, while 25 percent is second growth forest or fallow fields. This area provides the first major resting and feeding area that waterfowl from the North (Canada) find as they migrate south along the Pacific Flyway. Whatcom Wildlife Area is used by an abundant diversity of migrating and wintering waterfowl – ducks, geese, swans and shorebirds. With Puget Sound's continuous population growth and development, Lake Terrell has become an even more critical feeding area for numerous wintering waterfowl.

Table 3. Purchase History and Purpose

Unit Name	Year Acquired	Acreage	Original Purpose	Funding Source
British Petroleum (formerly Arco)	Leased starting in 1990	1,000	Additional acreage for public recreation and wildlife habitat	Leased
Intalco Aluminum	Leased starting in 1970	1,000	Additional acreage for public recreation and wildlife habitat	Leased
Lake Terrell	1940s	1,500	Waterfowl habitat/hunting, fishing	Federal Aid in Wildlife Restoration Funds
Lummi Island	1991, 1997	700	Preserve peregrine falcon nesting habitat	Donors, Whatcom County Land Trust, Trust for Public Lands, WWRP
Nooksack	2001-03	627.5	Restore wetland/estuary/salmon habitat, preserve waterfowl habitat	Salmon restoration funds, North American Wetland Conservation grant, state wildlife funds
Pine and Cedar Lakes	1969	140	Fishing, wildlife habitat	Interagency Committee for Outdoor Recreation
Tennant Lake	1974	360	Waterfowl and deer hunting, fishing, preserving critical wildlife and fish habitat	Interagency Committee for Outdoor Recreation, salmon habitat restoration funds, North American Wetland Conservation grant

At present, about 55 acres are farmed annually to produce winter food for waterfowl and upland game. Wild rice has been planted in the lakebed for several years now and is producing seed annually. Several artificial islands, constructed to attract nesting waterfowl, have been used extensively by Canadian geese. The adjacent fields are excellent brooding areas for goslings. Wintering trumpeter and tundra swans also use the lake as a night roost area. Pen-raised pheasants are released weekly in the fall, (late September through November). Duck blinds have been constructed on some of the artificial islands, and the lake has been developed with boat launches and other amenities. Wild rice was planted in Lake Terrell for several years (starting in 1988) and is producing seed annually.

Although Terrell Creek was originally dammed to create an impoundment and restore wetland habitat for waterfowl, the resulting water body also provides ideal habitat for a number of introduced fish species. In fact, Lake Terrell, with its uniquely undeveloped shoreline and diverse fishery, has become one of the destination fishing venues in North Puget Sound. Anglers target largemouth bass (which reproduce naturally in the lake), channel catfish and triploid trout while generalists fish for perch, sunfish and bullheads. Several major bass fishing tournaments are held on the lake annually.

Lummi Island Unit

The Department purchased approximately 588 acres on Lummi Island in 1991 to preserve a peregrine falcon nesting site. In 1997, an additional 112 acres were bought with assistance from the Trust for Public Lands, the Whatcom County Land Trust and an unnamed donor. The steeply sloped property includes 1,665-foot tall Lummi Peak (the highest point on the island) and remains as an undisturbed reserve to protect these threatened birds and their unique habitat.

Nooksack Unit

In 2001, 250 acres were acquired adjacent to the Nooksack River (south of Slater Road), to protect critical salmonid and waterfowl habitat. The Natural Resource Conservation Service first purchased a conservation easement on the property; then the Department acquired the balance of the property with salmon restoration funds. The following year 350 adjoining acres were purchased, and the next year, 27.5-acres adjacent to that property were purchased with North American Wetland Conservation Act and state wildlife funds. These three purchases, totaling 627.5 acres, now form a continuous corridor of land from Ferndale to the mouth of the Nooksack River that is owned by the Department or the Whatcom County Parks and Recreation Department. This is a significant part of the Nooksack estuary.

Federal grants (awarded to the Lummi Indian Nation), Natural Resource Conservation Service habitat restoration funds, Washington State duck stamp funds, Ducks Unlimited funds, and Federal Fish and Wildlife funds all contributed to a very successful partnership that completed nearly one million dollars of habitat restoration in the past three years on this unit. The Lummis have secured federal funding through the Natural Resource Conservation Service and other federal grants to plant riparian trees and shrubs on more than 70 acres along the Nooksack River. About 250 acres are farmed annually to provide winter food crops for wildlife.

Pine and Cedar Lakes Unit

The Department purchased 140 acres on Chuckanut Mountain, including these two lakes, in 1969 with Interagency Committee for Outdoor Recreation funds. Cedar Lake (1,280 feet in elevation) covers approximately 10 acres; Pine Lake (1,574 feet in elevation) is about 15 acres in size. The Department stocks the lakes with 500-1,000 coastal cutthroat trout fry per lake every spring. The 2.5-mile trail to the lakes is steep but popular, and is hiked year round. Rustic camping is allowed at both lakes, but no campfires are permitted. Horseback riding and bicycles are not allowed due the wetland conditions at both lakes. The Whatcom County Parks Department maintains the parking area and toilet facility at the trailhead and the trail to the lakes. This trail connects with other hiking and mountain bike trails on Chuckanut Mountain.

Tennant Lake Unit

Most of this unit was acquired in 1974 in a cooperative agreement with the Whatcom County Parks and Recreation Department. Each agency purchased 360 acres with Interagency Committee for Outdoor Recreation funds and agreed to co-manage Tennant Lake and Hovander County Park for outdoor recreational opportunities and to protect critical wetlands for fish and wildlife.

After initial land purchases, the area was primarily managed by the Department for hunting of waterfowl and deer, and spiny-ray fishing. Following acquisition, an interpretive center and scent garden for the blind, an observation tower, upland interpretive trail, and an elevated wetland boardwalk trail, and a boat launch on the Nooksack River were developed. These improvements, along with a permanent full time interpretive position (funded by the Department), provide important recreational and educational opportunities for school district and general visitors.

Leased Lands

Two public use agreements have been negotiated with local industries. The Intalco Aluminum Corporation has provided public access to 1,000 acres for hunting and related recreational activities since 1970. A walk-through archery range (two-mile loop through woods with 21 shooting stations) and several water impoundments and associated wetlands, were constructed on the Intalco property. The British Petroleum Oil Company lease has provided an additional 1,000 acres for public hunting since 1990. A 20-acre winter grain farming agreement with the company provides a valuable food source for wintering waterfowl and has created a high quality waterfowl hunting area. Two ponds and adjacent wetlands have been constructed with State duck stamp funds. The property is also a very valuable pheasant release site during the fall hunting season.

2.3 Ownership and Use of Adjacent Lands

Originally, this Wildlife Area was bordered by agricultural land and dairy farms. Today, the surrounding area is mainly private residences on acreage and undeveloped woodlots on the suburban/rural fringe.

Public lands adjacent to this Wildlife Area are those owned by Whatcom County Parks on the Tennant Lake unit, The Lummi Tribe owns land adjacent to and southeast of the Nooksack unit, and the Washington Department of Natural Resources owns land that WDFW leases on the Lake Terrell unit. In the nearby lowlands and along the marine shoreline, the Nature Conservancy has acquired four sites for conservation (The Nature Conservancy 1993). Federal lands of the Mount Baker National Forest and North Cascades National Park make up the eastern two-thirds of Whatcom County. Lummi Indian Reservation itself is southwest of the Wildlife Area, on a large peninsula west of the Nooksack River.

The nearest town in this semi-rural/suburban setting is Ferndale (population 9,300), five miles east of the Lake Terrell headquarters. Major urban centers include Bellingham (population 71,000), several miles south of headquarters, and Mount Vernon (population 28,000) 30 miles further south. Most of the 167,000 residents of Whatcom County live in the western third of the county, which is also where this wildlife area is located. Between Vancouver, B.C. (60 miles north) and Seattle (90 miles south)—the largest metropolitan areas in North Puget Sound—live more than three million people. According to the Whatcom County Comprehensive Plan, the county's population is projected to increase by about 65,000 people between 2000 and 2022, with the majority of this growth expected to occur in lowland urban or urban growth areas (Whatcom County Planning Department 2003).

While agriculture and forestry remain the major industries, the county also supports more dairy cattle than any other county in the Pacific Northwest (Goldin 1992). Hay, pasture, berries, truck vegetables and seed potatoes are important crops. Other land uses include residential development, mining, commercial and industrial development (Whatcom County Planning Department 2003). Two refineries that process Alaskan oil are major employers in the Whatcom County economy.

Interstate 5 runs north and south through the nearby population centers just five miles east of the headquarters area, making access by auto ideal. Fishing and hunting are major recreational and economic activities, along with hiking, bird watching, photography and boating. Birch Bay State Park, Tennant Lake, and the North Fork Nooksack River between Deming and Kendall have been identified as high quality wildlife viewing areas (La Tourette 1992). In recent years, wildlife watching has grown in popularity and can be an important source of income to local communities. In 2001, wildlife watching expenditures in the U.S. exceeded \$38 billion, or an average of \$738 per individual (U.S. Department of Interior et al. 2002).

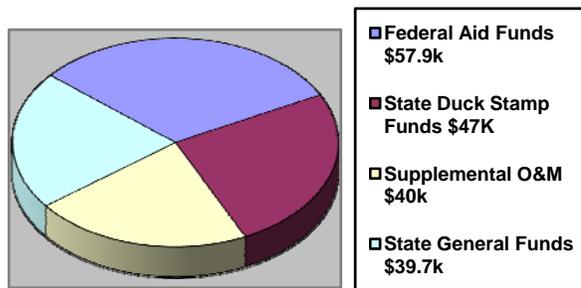
The nearby Nooksack River drainage is recognized as a “usual and accustomed” use area of the Lummi and Nooksack Indian tribes. The Nooksack Watershed provides opportunities for fishing, hunting and gathering by tribal members, and although much of the land is owned by private or public agencies, the tribes retain an active interest in the functional resources of the watershed. The Lummi Indian Nation is located on the lower reaches of the Nooksack River and is an active partner in restoration activities on the Nooksack and Tennant Lake units.

2.4 Funding

Most land purchases were made with Federal Aid in Wildlife Restoration Funds, state general funds, or Washington Interagency Committee for Outdoor Recreation funds. Salmon restoration funds, a North American Wetland Conservation Act grant and state general funds were all used to purchase the latest additions.

Operating funds to manage the Whatcom Wildlife Area come from state general funds, Federal Aid in Wildlife Restoration funds and state duck stamp funds (Figure 2). State general funds provide a 25 percent match for Federal Aid dollars. The current two-year budget (July 1, 2005 to June 31, 2007) includes \$57,874 in Federal Aid funds, \$39,752 in state general funds, \$40,000 in supplemental budget funds (for operation and maintenance) and \$47,000 in state duck stamp monies slated for special enhancement projects.

Figure 7. Whatcom Wildlife Area Funding Sources



Portions of three staff positions are supported—a full-time Wildlife Area Manager (fish and wildlife biologist 3), one full-time Conservation Education Program Specialist I, and a four-month Laborer position.

The Department will, as part of the Plan’s implementation, submit grant proposals and applications and identify other strategies to address unfunded management needs on this wildlife area.

2.5 Climate

Both continental and maritime systems exert their influence on the local climate. Puget Sound and the Pacific Ocean tend to dampen temperature extremes, resulting in milder winters and cooler summers. However, changes in a semi-permanent low-pressure system over the Pacific Ocean bring storms with strong and sometimes damaging winds, rain, and snow as it moves inland. In addition, cold continental air masses heading south from Canada’s Fraser River Valley bring occasional bitter cold weather during winter months.

Annually, the area’s temperatures average between 30 to 40 degrees F in winter and 60 to 70 degrees F in summer (National Oceanic and Atmospheric Administration 1998). Daily weather, however, can change from sunny and clear to rain and hail on the same day. Average yearly rainfall is 35 inches, mostly falling from late summer through fall. Snowfall averages about 14 inches a year, falling mainly between November and March. Wind, an important climatic factor here, averages about ten miles per hour, but occasional high velocity gusts during storms can be well over 100 miles per hour.

2.6 Soils and Geology

All units except Tennant Lake are located in the Whatcom Basin, a nearly level to rolling plateau that lies within the Puget Trough. The low topography of this basin is a result of glacial, marine, river and wind deposition (Goldin 1992). It consists of hummocky glaciomarine drift plains from sea level to 300 feet in elevation, and nearly level outwash terraces that contain large bogs and rolling uplands.

Soils include Bellingham drift, a relatively impermeable glacial deposit consisting primarily of clay and silt. Wetlands are common on Bellingham drift deposits and the Lake Terrell unit is no exception (Whatcom County Planning Department 2003). The Tennant Lake unit, located in the Nooksack River’s lower floodplain, consists of recessional outwash material from glaciers reworked by the river, and contains stratified silt and clay deposits left by the impoundment of glacial lakes.

2.7 Hydrology and Watersheds

Past glacial deposits and scouring created the landforms and landscape conditions that sustain the numerous types of wetlands in Whatcom County. Most of the remaining large wetland systems are associated with the floodplains of major rivers (Tennant Lake unit), or with large lakes (Lake Terrell unit). Terrell Creek, Lake Terrell's inlet and outlet stream, courses through the glacial drift of the Whatcom Basin. It's maintained primarily by groundwater discharge from the glacial material and is mainly a seasonal stream below Lake Terrell. Both Silver and Tennant creeks flow towards the Nooksack from the east; Silver Creek cuts south and joins the Nooksack River, while Tennant Creek cuts north and flows into Tennant Lake.



The Whatcom Wildlife Area is located in the Nooksack watershed. The Nooksack River system contains approximately 1,300 miles of streams and tributaries, and over three miles of Nooksack riverfront are adjacent to the Wildlife Area. High flows occur in late fall and early summer. Most wetlands in the lower Nooksack River were diked and ditched by the beginning of the 20th century (Nooksack Indian Tribe 2004). The Tennant Lake unit is situated in the Nooksack River's floodplain; the river borders the unit's western boundary.

Nooksack Estuarv

Forestry practices have changed the hydrological regime of the Nooksack River and other streams, resulting in higher peak flows especially during rain-on-snow events (Nooksack Indian Tribe 2004). Flooding has occurred with more frequency in the past ten years. It has been a common occurrence the last four years to have floodwater overtop the dikes along the Nooksack River below the town of Ferndale (Nooksack unit). River dikes on the areas closest to salt water are overtopped annually. Tennant Lake's 80-acre depressional flow-through peat bog receives Nooksack River floodwaters on a regular basis and stores excess water even during the wet winter season, when soils are already saturated (Whatcom County Planning Department 1992a).

2.8 Fire History

The wetter climate in western Washington usually minimizes wild fire danger in Whatcom County. The only fire on any unit in the last thirty years occurred on the Lummi Island property in the mid 1990's. A campfire was left with hot coals still alive, and started a small wild fire, which the Washington Department of Natural Resources extinguished.

2.9 Vegetation

The Whatcom Wildlife Area is located within the Pacific Lowland Mixed Forest Province. Habitat types here include submergent and emergent marsh, grasslands, and deciduous, coniferous and mixed forest. Without disturbance, the climax vegetation in this area would be western red cedar and Douglas fir. However, agriculture, forestry, and urban development have modified vast areas in the Whatcom Basin.

In the Whatcom Basin, expansive areas of wetlands and upland forest habitats were converted to agricultural practices more than a century ago as indicated by habitat type mapping of the upper and lower Nooksack River floodplain in 1880 versus 1998 (Nooksack Indian Tribe 2004). Vegetation was cleared, and extensive diking and draining created conditions suitable for crops, grazing, and hay production (Goldin 1992). This is likely what happened on much of the land in and surrounding the Whatcom Wildlife Area, with the exception of the Lummi Island and Pine and Cedar Lakes units. Forestry practices have generally caused a decline in overall habitat diversity and integrity, and an increase in habitat fragmentation

Forested Land

These areas comprise 25 percent of the Wildlife Area's total acreage. Deciduous, coniferous and mixed lowland forests include three species of evergreen trees (Douglas fir, hemlock and western redcedar), six species of deciduous trees (including bigleaf maple, alder and madrona) and ten species of shrubs. Riparian corridors along small streams and the Nooksack River contain overstory trees such as red alder, black cottonwood, big leaf maple and willow species, while the understory vegetation is composed of salmonberry, elderberry and ferns. The department acreage on Lummi Island is mostly a mix of conifer and deciduous trees typically found in the islands. Numerous snags there provide resting and hunting perches for raptors.

Non-forested land

These areas (approximately 64 percent of the Wildlife Area) consist mostly of agricultural lands and fallow fields. The farmed areas (70 acres-55 usually planted) are planted annually with cereal grains to provide winter food for waterfowl and upland game birds, as well as bolster spring reproductive rates for waterfowl. The fallow fields—constantly invaded by blackberry, alder thickets, reed canarygrass and other invasive weeds—are currently being restored to typical forested riparian communities thanks to several partnerships with other agencies.

More than 190 acres of the Nooksack unit have been planted with 107,000 native trees and shrubs since 2001. A large-scale wetland restoration project is underway on the same unit along the lower Nooksack River. Land for this project was initially purchased by the Department and is being restored in coordination with Ducks Unlimited, the Lummi Nation's Natural Resources Department, U.S. Fish and Wildlife, and the Whatcom County Parks and Recreation Department.

Open water/wetlands

This Wildlife Area is approximately 11 percent water, due to two large lakes, two smaller lakes, several smaller man-made impoundments, wetlands and several unique peat bogs. In addition, fairly extensive swampy and marshy wetlands adjoin the larger lakes. A 1999 Lake Terrell Warmwater Fish Enhancement Report (Downen and Mueller 2000), states that habitat along Lake Terrell's shoreline is rimmed by undeveloped second growth forest, grasslands and marshes. The littoral zone includes most of the lake bottom, and shallow channels and artificial islands add substantially to shoreline complexity.

Uniform emergent plant communities of cattail, rushes, sedges, and willow occur along approximately 85 percent of the shoreline. Patchy, floating plant communities of water lily, potamogeton and watershield occur along approximately 25 percent of the shoreline while submergent plant species, including spirogyra and coontail, are patchily distributed throughout the littoral zone. The lake substrate is composed of combinations of sand, clay, peat and detritus.

Natural coarse woody debris occurs along 90 percent of the lake shoreline. Additionally, several artificial snags have been installed in the lake to further enhance this important habitat feature.

2.10 Important Habitats

The Washington Department of Fish and Wildlife identifies wetlands, riparian zones and cliffs as priority habitats due to important or unique features that significantly affect fish or wildlife populations.

Wetland

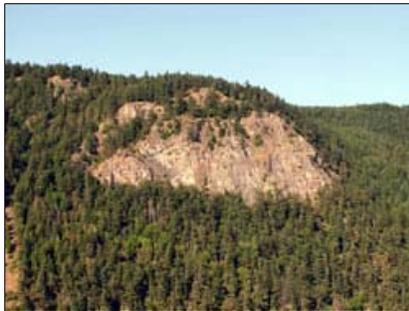
Whatcom Wildlife Area wetlands provide excellent wildlife habitat as they contain a variety of vegetation types, open water, and forest structure for breeding, cover, and forage. These wetlands are also strategically located along the Pacific Flyway. This habitat was the primary motivator to purchase the area, as it offers essential feeding and loafing grounds for migrating ducks, geese, swans and shorebirds, in addition to excellent hunting grounds for bald eagles, peregrine falcons and other birds of prey. The Lake Terrell unit also contains bog habitat with some unique plant species.



Tennant Lake Wetlands

Riparian

This habitat is a primary factor influencing the quality and health of fish habitat. Riparian vegetation provides thermal cover, creates stream channel features such as pools, and maintains stream bank stability. In addition to fish benefits, riparian habitats are highly productive and significantly impact terrestrial wildlife species. The vast majority of wildlife species utilize riparian habitats during some portion of their life cycle.



Cliffs on Lummi Island

Cliffs

Cliffs greater than 25 feet high and occurring below 5000 feet, such as those found on the Lummi Island unit, offer significant wildlife breeding habitat for cliff-dependent species such as the peregrine falcon. Rock cliffs and outcrops are scattered along this unit's steep forested slopes and provide excellent, protected nesting sites.

2.11 Fish and Wildlife Resources

Fish and wildlife diversity is a primary goal guiding the Department's management efforts. The Whatcom Wildlife Area contains a wide range of wetland- and riparian-dependent species, as well as upland species.

Birds

Approximately 50 bird species live on the Wildlife Area year round. Another 45 species winter here, 40 species spend summers here, and 22 species migrate through (Appendix 6). Waterfowl arrive in the highest numbers in winter – up to 25,000 dabbling ducks, 1,000 diving ducks, 750 geese and 500 swans. Wintering birds include bufflehead, ring-neck, pintail, mallard, gadwall, greater and lesser scaup, widgeon, and greater Canada goose as well as tundra and trumpeter swans.

Snow geese, brant, canvasbacks, grebes, loons and other migrating waterfowl pass through annually. Black and grey-bellied brant migrate south from parts of Alaska, Canada and Wrangel Island, Russia. Below, in Table 4, are the mid-winter (January) aerial counts conducted by the Department or the U.S. Fish and Wildlife Service (Canniff 2003).

Moderate numbers of shorebirds also stop here every year. In turn, this density of waterfowl and shorebirds attracts raptors such as bald eagles, peregrine falcons, osprey, marsh hawks, red-tailed hawks, rough-legged hawks, short-eared owls, barn owls and an occasional golden eagle, gyrfalcon, snowy owl and merlin. More than 125 nest boxes for wood ducks have been established throughout the Wildlife Area to improve waterfowl nesting.

Table 4. Mid-Winter Aerial Waterfowl Counts

Species	2003	2002	2001	2000	1999	1998	1997
Mallard*	62,785	92,096	74,659	98,618	126,554	90,259	52,005
Pintail*	35,028	36,540	26,075	46,932	49,606	26,413	7,655
American widgeon*	48,212	58,679	54,574	59,978	87,969	70,984	14,987
Green-winged teal*	2,775	4,225	1,542	4,347	6,161	1,209	1,068
<i>Total Dabblers</i>	<i>148,900</i>	<i>191,540</i>	<i>156,850</i>	<i>209,875</i>	<i>270,290</i>	<i>188,865</i>	<i>60,010</i>
Black and grey-bellied brant*	4,880	8,955	4,881	7,915	9,345	6,340	6,220
Trumpeter swans	766	1,327	509	962	876	451	601
Tundra swans	342	119	407	241	304	143	111
<i>Total Swans</i>	<i>1,108</i>	<i>1,446</i>	<i>916</i>	<i>1,203</i>	<i>1,180</i>	<i>594</i>	<i>712</i>

*Includes birds in Island, Skagit, Snohomish and Whatcom counties

Five thousand ring-necked pheasants are released annually on the Lake Terrell unit and neighboring industrial units each fall. Very few birds survive the winter months. Table 5 shows the average upland bird and waterfowl harvest in this and two neighboring counties for the past three hunting seasons. While all pheasant hunting is done exclusively on the Department's wildlife areas, waterfowl hunting also includes private and federal areas.

Table 5. Average Bird Harvest, 2001-2004 Season

County	Pheasants	Ducks	Geese
Skagit	1,848	37,598	1,676
Snohomish	1,981	19,366	1,029

Whatcom	3,401	23,596	1,138
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Fish

Fish found on the Wildlife Area include native species such as rainbow trout, coastal cutthroat trout and threespine stickleback (Appendix 7). The Department has stocked rainbow and cutthroat trout annually in Lake Terrell since the 1960s. In 2005, the Department planted 10,000 cutthroat trout and 1,000 triploid rainbow trout in Lake Terrell, and 1,500 cutthroat trout fry in Pine and Cedar Lakes. Warmwater species introduced in Lake Terrell include largemouth bass, black crappie, yellow perch, pumpkinseed, bluegill, brown bullhead and channel catfish. Records of the historical fish community in Lake Terrell are incomplete, but anecdotal information suggests that brown bullhead became established shortly after the lake was created. Largemouth bass were stocked in the mid-1960s and again in the 1970s, and during this time illegally introduced yellow perch also became established. In 1988, the Department began stocking channel catfish, starting with an initial introduction of 9,000 catfish; then 4,000 to 7,000 each following fall. At around the same time, unauthorized introductions of bluegill, pumpkinseed, and black crappie into Lake Terrell also created reproducing populations. In the past five years, 500 to 800 channel catfish (2 lb average) have been released annually.

Tennant Lake does not lend itself well to fishing due its shallow, weedy environment and lack of official access. However, unauthorized introductions of largemouth bass and yellow perch long ago have also created reproducing populations that are sporadically pursued.

Various species of salmon, lamprey, sturgeon and minnows are found in the adjacent Nooksack River. The Tennant Lake unit borders the river for several miles and encompasses two of its tributaries – Silver and Tennant creeks. Perhaps the greatest impact to salmonid habitat in Whatcom County is the loss of floodplain connectivity and associated functions (Smith 2002). The major tributaries of the Nooksack River were historically meandering channels, but these streams have been straightened and diked, and much of the floodplain off channel and wetland habitat has been lost. Overall, floodplain and riparian functions tend to be more degraded in the lower mainstem Nooksack, downstream from the forks.

Mammals

Although an extensive survey has not been conducted, research and personal communication with various specialists indicate approximately 45 species of mammals live on this Wildlife Area (Appendix 8). Mammals observed here include black-tailed deer, coyote, raccoon, cougar, black bear, red squirrel, flying squirrel, opossum, skunk, beaver, muskrat, river otter, weasels, mink, red fox, cottontail rabbit, mice, shrews and moles.

Reptiles, Amphibians, Invertebrates

Five species of reptiles and seven species of amphibians are likely to occur, including garter snakes, salamanders, rough-skinned newt, western toad, chorus frog and true frogs (Appendix 9). The Oregon Spotted frog is a potential, but undocumented, species on the Wildlife Area and further surveys are needed to confirm presence or absence.

Species of Concern

These are species listed at the state level as Endangered, Threatened, Sensitive, or Candidate by the Washington Department of Fish and Wildlife, or listed (or proposed for listing) at the federal level by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. On this Wildlife Area, 12 bird species, 1 mammal species, 2 fish species and 1 reptile species are either threatened, sensitive, species of concern or candidate species for listing at the state or federal level (Table 6). Species included in these categories are known to be experiencing, or have experienced, failing or declining populations due to factors such as limited numbers, disease, predation, exploitation, or a loss of suitable habitat.



Peregrine Falcon on Lummi Island

Table 6. Listed Species on Whatcom Wildlife Area

Species	Federal Status	State Status*	Units
Bald eagle	Threatened	Threatened	Lake Terrell, Tennant Lake
Common loon	---	Sensitive	Lake Terrell
Golden eagle	---	Candidate	All
Marbled murrelet	Threatened	Threatened	Lummi Island
Merlin	---	Candidate	All
Northern goshawk	Species of Concern	Candidate	All
Peregrine falcon	Species of Concern	Sensitive	Lummi Island
Pileated woodpecker	---	Candidate	Lake Terrell, Tennant Lake
Purple martin	---	Candidate	Lake Terrell
Vaux's swift		Candidate	Lake Terrell
Western grebe		Candidate	Lake Terrell, Tennant Lake
Townsend's big-eared bat	Species of Concern	Candidate	unknown
Chinook salmon	Threatened	Candidate	Tennant Lake + River
Bull trout/Dolly varden	Threatened	Candidate	(Nooksack River)
Coho salmon	Candidate	n/a	(Nooksack River)
Pacific lamprey	Species of Concern	n/a	(Nooksack River)
Western toad	Species of Concern	Candidate	Lake Terrell, Tennant Lake

**Definitions: Endangered = any species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state.*

Threatened = any species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats.

Sensitive = any species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened throughout a significant portion of its range within the state without cooperative management or removal of threats.

Candidate = species that the Department will review for possible listing if sufficient evidence suggests that its status may meet the listing criteria defined for State Endangered, Threatened, or Sensitive.

Bald eagle

Bald eagles are commonly seen on the wildlife area in winter months, feeding on fish and waterfowl or scavenging on carcasses. Despite state and federal protection, many adult bald eagle fatalities are human-caused, including shooting, poisoning, vehicle collisions, electrocution, and black market trade. Large shoreline trees preferred by eagles are becoming a limited resource as more land is dedicated to residential development. Management practices that benefit bald eagles include planting cereal grains to attract wintering waterfowl, establishing nest boxes to increase waterfowl nesting success, and setting aside 'no hunting' reserves to increase waterfowl use of the Wildlife Area. The bald eagle was federally de-listed from Threatened to Sensitive status in June 2007, and State de-listing is expected to follow soon.

Common Loon

Loons prefer undisturbed forest lakes at least 20 ha (49 ac) in size, with islands available for nest sites and seclusion from intense human activity. Lake Terrell is one of the few lakes in western Washington with confirmed nesting of common loons. An adult loon and young were sited in 1980, but since then no young have been seen. Management practices benefiting common loons include maintaining a 'no hunting' reserve on both Lake Terrell and Tennant Lake, posting Lake Terrell islands as 'no trespassing' during nesting season, designating Lake Terrell and Tennant Lake as non-toxic shot only areas, and maintaining steady water levels at Lake Terrell in spring.

Golden eagle

As late as the 1980s a few golden eagles were observed nesting in the San Juan Island archipelago, although they prefer mature and old growth forests near the edges of clearcuts in higher elevations. Threats include limited habitat, lack of undisturbed nest sites, and inadequate prey such as rabbits or hares. Golden eagles are rarely seen on the wildlife area.

Marbled murrelet

Marbled murrelets feed offshore in protected bays, foraging on sand eels and small fish. These birds fly inland to nest, and prefer mature forest habitats. Population numbers remain low due to loss of old growth forests, predation, human disturbance, ocean conditions and climate change. The only potential marbled murrelet habitat on the Whatcom Wildlife Area is found on the Lummi Island unit. Although presence of murrelets on the island is unconfirmed, there is a documented observation within 9 miles of the property. Management practices designed to benefit murrelets include posting Agency lands to restrict improper uses, and maintaining quality mature forest on the Lummi Island parcels. Surveys are proposed for 2008.

Merlin

Peregrine falcons, great horned owls and goshawks prey on merlin, however the most significant threats are habitat destruction and collisions with man-made objects. Although not common on the wildlife area, merlin are attracted to the high densities of shorebirds and wintering waterfowl that congregate on the lakes and fields. Management practices that benefit merlin include planting cereal grains to attract wintering waterfowl, establishing nest boxes to increase waterfowl nesting success, and setting aside 'no hunting' reserves to increase waterfowl use of the Wildlife Area.

Northern goshawk

Northern goshawks prey on forest birds such as grouse and band-tailed pigeon, and hunt along openings in mature forests. Goshawks utilize a variety of habitats during nesting, rearing and foraging, and require structurally diverse forest stands to meet these needs. Threats include lack of suitable nesting habitat, logging, and habitat disruptions that impact prey populations. Management actions benefiting Northern goshawks include posting Agency lands to restrict improper uses, and maintaining diverse forest stands.

Peregrine falcon

Washington's peregrine population remains vulnerable due to small numbers, chemical pollutants and human disturbance. Two parcels of Agency land on the Lummi Island unit have documented nesting pairs of peregrines. Management actions designed to benefit peregrines include posting Agency lands to restrict improper use and minimize disturbance, maintaining forest stands with snags for perching, and pursuing land purchases to provide a larger buffer around nesting cliffs.

Pileated woodpecker

Pileated woodpeckers prefer to nest in cavities of large dead trees in dense forests. Diet consists of insects such as beetle larvae and carpenter ants, and also fruits, berries, and nuts. Threats include logging and habitat fragmentation. Management actions designed to benefit pileated woodpeckers include maintaining quality mature forests, planning future conifer plantings to increase habitat diversity, and retention of all snags and logs that do not pose public safety hazards.

Purple martin

Purple martins feed on flying insects, and nest colonially in snags (especially snags near water) or in loose clusters of man-made martin houses. Threats include habitat loss and competition for nest sites from house sparrows and starlings. Management actions designed to benefit purple martins include retention of all snags that do not pose public safety hazards, managing for pileated woodpeckers, which excavate cavities used by martins, and encouraging volunteer projects building and installing purple martin nest structures.

Vaux's swift

Vaux's swifts feed on beetles, wasps, and termites and nest in cavities with vertical openings such as chimneys and hollow snags. Management actions designed to benefit Vaux's swifts include planting and maintaining mature trees for future snag recruitment, and retention of all snags and logs that do not pose public safety hazards as nesting and roosting features.

Western grebe

Western grebes are winter residents in Puget Sound (September-April), with some non-breeders remaining in the summer. Breeding season is spent on freshwater lakes and marshes east of the coastal range from Canada south into the central states. Western grebes nest in large colonies, and a mating pair builds a floating nest of wet or decaying vegetation anchored to submerged plants. An 85-95% decline has been observed in Western grebe populations all along the Pacific coast of the U.S. and Canada, although the reasons for this decline are unknown. Little can be done on the wildlife area to improve Western grebe populations.

Townsend's big-eared bat

Townsend's big-eared bat resides in abandoned mines and caves to breed and hibernate. Habitat destruction for the most part is accounted to recreational caving, renewed mining, and mine reclamation; Townsend's big-eared bat is more sensitive to human interaction than other bats. Their diets consist of beetles and moths. Due to disturbance and destruction of their roosts this species is placed at vulnerable in its conservation status.

Chinook salmon

A spring Chinook run (March-April) and a fall run (September-November) spawn in the Nooksack River, although the fall run individuals (mostly nonnative) tend to use the river's lower reaches. Much of the mainstem Nooksack River is lined with dikes and levees to protect against flooding, and this practice has reduced habitat quality for salmon. Other threats include poor forestry practices, dams, and excess silt in spawning grounds. Management actions designed to benefit Chinook salmon include participation in cooperative agreements and projects to reconnect off-channel sites such as the Marietta slough restoration project.

Coho salmon

Coho salmon are less common than Chinook on the wildlife area and encounter many of the same threats. Management actions designed to benefit Coho salmon include cooperating in agreements and projects that reconnect off-channel sites, such as the Marietta slough restoration project.

Bull trout

Compared to other salmonids, bull trout have more specific habitat requirements and are seldom found where water temperatures exceed 59-64 degrees (F). They also require stable stream channels, silt-free spawning gravel, structurally complex cover, and unblocked migratory corridors. Bull trout can be Resident (spend life in one stream), Migratory (rear in large bodies of water then migrate back to small stream to spawn) or Anadromous (some coastal Puget Sound populations spawn in streams but rear in the ocean). Resident and juvenile bull trout prey on invertebrates and small fish. Adult migratory bull trout primarily eat fish. Bull trout are present and spawn in all three forks of the Nooksack. Management actions designed to benefit bull trout include participation in cooperative agreements and projects to reconnect off-channel sites such as the Marietta slough restoration project.

Pacific lamprey

Pacific lamprey have an anadromous life cycle similar to salmon and play an important role as a food source in estuarine, stream, and river ecosystems. They became a conservation concern in the early 1990s when populations declined to perilously low numbers. Losses are attributed mainly to the Columbia River hydroelectric dams, which have caused significant mortality and blocked migration. Exotic predatory fish such as small mouth bass has also been a factor in their decline. Threats to Pacific lamprey include reduced and diverted river flows, dredging, channelization, loss of riparian vegetation, and stream passage barriers. Management actions designed to benefit Pacific lamprey include participation in cooperative projects to reconnect off-channel wetlands, and planting riparian vegetation.

Western toad

Western toads are mainly terrestrial and live in a variety of habitats, although most are found around marshes and small lakes. Western toads breed in small bodies of water and then disperse into forests and grasslands. They spend much of their time underground and although capable of digging, they generally shelter beneath logs, in small mammal burrows, and within rock crevices. Threats include pollution, aquatic predators such as bass, habitat fragmentation, and disease. Human developments, such as roads and buildings, cause significant impacts. Many migrating toads are killed crossing roads, and developments around wetlands isolate populations and fragment habitat. Management actions designed to benefit the Western toad include closing old roads, and retaining logs that do not pose public safety hazards.

Oregon spotted frog

In Washington, the Oregon spotted frog was historically found in the Puget Trough from Canada south to the Columbia River. Preferred habitat includes shallow emergent wetlands associated with lakes and slow-moving streams. Exotic plants like reed canarygrass have changed the character of many wetlands and reduced their habitat value. Some mass die-offs have been associated with natural factors such as predation, winterkill, and disease, however human impacts take a significant toll, including altered habitat, introducing nonnative species, and introducing toxic chemicals into aquatic systems. Most significant predators are introduced warmwater fish such as bass and perch, and the bullfrog. Management actions that could benefit Oregon spotted frogs include maintaining stable water levels at Lake Terrell, planting or maintaining riparian vegetation along stream banks and lake margins, controlling reed canarygrass, and pursuing funding for presence/absence surveys.

2.12 Recreational Uses

The Whatcom Wildlife Area provides 280,000 visitor days of recreation each year, including hunting, fishing, dog walking, bird watching, boating and Hovander Park/Tennant Lake Interpretive Center visitors. In addition to the draw of waterfowl hunting on Lake Terrell and pheasant hunting (using released birds) on the British Petroleum and Intalco Aluminum units, there are other annual activities popular with a large number of hunters. Deer and rabbit hunting take place on the upland areas, and rabbit-hunter numbers have been steadily increasing in the last ten years. Both Terrell and Tennant lakes offer excellent bass, channel catfish, cutthroat trout and triploid rainbow trout fishing, which continues to be increasingly popular among anglers.

Other activities visitors can participate in include abundant and varied bird watching at both lakes and on other segments, boating and kayaking, mushroom and berry picking, photography, archery practice and dog training and walking. Table 7 shows various user groups and their frequency of use on this Wildlife Area over time.

Table 7. Wildlife Area Users and Frequency

Type of Use	Year Started	User Days* 10 yrs ago	User Days* In 2005	Trend in Use
<i>Consumptive uses</i>				
Fishing	1940s	15,000	25,000	Increasing
Pheasant hunting	1940s	7,000	8,000	Increasing
Waterfowl hunting	1940s	4,500	6,500	Increasing
Berry/mushroom picking	1940s	100	300	Increasing
Big game hunting	1940s	200	200	Steady
Rabbit hunting	1940s	50	200	Increasing
Trapping	1940s	75	0	Decreasing
<i>Nonconsumptive uses</i>				
Hovander Park	1974	110,000	150,000	Increasing
Interpretive Center	1980	25,000	34,000	Increasing
Archery practice	1997	n/a	25,000	Increasing
Dog walking	1970s	4,000	20,000	Increasing
Walking/jogging	1970s	2,500	4,000	Increasing
Dog training	1970s	500	900	Increasing
Bird watching	1970s	250	500	Steady
Boating	1970s	200	400	Increasing
Horseback riding	1970s	5	25	Increasing

**This is the number of users multiplied by the number of days on site. Compiled from earlier WDFW reports and records kept by Wildlife Area manager, interpretive center naturalist and Hovander Park manager.*

Over the past fifty-fives years, changes have occurred in how the public uses this Wildlife Area. From the 1940s to the 1970s, hunting and fishing were the main activities. By the 1970s, big game hunting had leveled off while pheasant and rabbit hunting increased. Waterfowl hunting has also gradually increased over time, thanks to additional acreage that was purchased and an increasing number of blinds built with quality hunting opportunities in mind.

As the human population of nearby towns and cities has increased, passive recreational uses have followed suit. With the opening of Hovander Park in 1974, new non-consumptive uses on many units occurred or increased, spurring the development of various regulations to deal with conflicting uses and/or overcrowding. Overall, Hovander Park and Tennant Lake Interpretive Center users make up the majority of non-consumptive visitor use-days. However, archery training and dog walking have significantly increased in the past ten years, thanks to a vibrant archery club and more dog owners looking for pleasant places to exercise their pets.



Waterfowl Hunter

Educational and recreational facilities on the Whatcom Wildlife Area include one interpretive center staffed with a fulltime naturalist, one viewing tower, 15 parking areas, three interpretive center reader boards, five informational reader boards, one archery range, two interpretive trails (one mile of upland trail and 0.33 mile of elevated boardwalk through marsh), 2.5 miles of lowland mountain hiking trail, 42 hunting/observation blinds (12 on Tennant Lake unit – one is wheelchair accessible; 26 on Lake Terrell unit, four on Intalco unit), seven water access sites, and seven toilet facilities (three are wheelchair accessible).

Tennant Lake also provides wonderful and unique educational opportunities for both the public and local schools. During the school year, local school districts bring classes to the interpretive center where the fulltime Department-staffed naturalist offers various educational programs, walks and hands-on activities. The interpretive naturalist is responsible for interior displays, educational and general public tours, and interpretive trails on the Tennant Lake unit. Some 6,000 students visit the interpretive center annually. It provides information about a wide range of topics, including local fish and wildlife, ecological relationships and the area's natural history.

The wildlife observation tower, while not accessible to the disabled, does have a video camera installed near its top. A video monitor equipped with zoom-in and directional capabilities is provided for disabled patrons at ground level. These features actually provide better wildlife viewing opportunities than the general public has access to. A wheelchair accessible fragrance garden grows adjacent to the center, complete with Braille identification plates for all plants. Herbal classes, workshops and tours are also provided for the public.



*Tennant Lake Tower
& Fragrance Garden*

Hovander Park is a day use historical site that is within the Wildlife Area boundaries, managed by Whatcom County Parks and Recreation Department. Annual events at the park include the Scottish Highland Games weekend, a Civil War reenactment weekend, and tours of the Hovander house, a restored farmhouse from the early 1900s. Other users include typical picnickers and families on outings.

CHAPTER III. MANAGEMENT OBJECTIVES, ISSUES AND STRATEGIES

Statewide goals and objectives listed in chapter one shape management priorities on wildlife areas. Specific wildlife area information including why the area was purchased, habitat conditions, species present, and public issues and concerns are evaluated to identify wildlife area activities or strategies. *Public issues from past planning efforts and the Citizens Advisory Group are noted here in italics and are captured in Appendix 1.* Objectives and associated strategies or tasks specific to the Whatcom Wildlife Area are listed where appropriate under applicable agency objectives. Unfunded needs are underlined.

Agency Objective: Ensure WDFW Activities, Programs, Facilities and Lands are Consistent with Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats

1. Manage species and habitats in compliance with the Endangered Species Act and Washington State fish passage, road management and forest practice rules

Federal law requires the protection and management of threatened and endangered species. State law requires fish passage and screening issues and forest road sedimentation issues to be addressed on state public lands. Forest thinning operations on agency lands must follow state forest practice law.

The Endangered Species Act of 1973 was enacted to identify animals and plants that are in trouble and to protect those plants and animal and their habitat. This law defines endangered as any species which is in danger of extinction throughout all or a significant portion of its range. Threatened is defined as any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Four species found on the Whatcom Wildlife Area are considered federally threatened: the bald eagle, marbled murrelet, Chinook salmon and bull trout/Dolly varden. The salmon species – perhaps due to their more intimate relationship with humans via recreational and commercial fishing, food and related business activities – have come to the forefront regarding recovery measures. In 1999, the governor's Salmon Recovery Office commissioned the departments of Fish and Wildlife, Ecology, and Transportation to develop technical assistance guidance for those who want to protect and restore salmon and trout habitat. The scope of the program has recently broadened and now includes the promotion, protection, and restoration of fully functioning marine, freshwater, and riparian habitat through comprehensive and effective management of activities affecting Washington's aquatic and riparian ecosystems. The resulting Aquatic Habitat Guidelines include the following principles for upstream fish passage facilities:

- Ecological health and species diversity are promoted by maintaining connectivity and historical distribution of species. They are also promoted by providing passage for all life stages of all species that historically have had access
- Natural channel conditions generally provide the best opportunity for passage and distribution of species and life history stages
- A properly functioning fish passage will operate effectively at all times and flows at which fish migrate, accommodate for natural migratory behaviors of all species and stages of fish life, and minimize predation associated with the facility

- Fish passage barriers and migration delays result in loss of production capacity of the watershed
- Natural channel disturbances, morphological changes, and severe environmental conditions can open, close, or change the need for fish passage over time
- Appropriate operating and maintenance procedures are necessary to maintain fish passage at engineered fish passage facilities
 - A. Strategy: Work with experts to determine best practices and enhancement options (if any) for salmon in Terrell Creek, Tennant Creek and Silver Creek (**Lake Terrell, Nooksack, Tennant Lake units**). *Funding:* W.A. operating budget. *Timeframe:* 2006-07.
 - B. Strategy: Work with TAPPS Section to correct known fish passage barriers to allow fish (salmon) movement on all applicable units (Lake Terrell, Nooksack, Tennant Lake). *Funding:* Habitat Division, Lummi Tribe, Nooksack Salmon Enhancement Association.
 - C. Strategy: Determine salmon use of restored habitat designed to benefit Chinook in Nooksack River (Nooksack unit). *Funding:* Fisheries and Habitat Division, Lummi Tribe.

2. Manage weeds consistent with state and county rules

Weed control is required by state law to protect public, economic and natural resources. Invasive weeds are one of the greatest threats to fish and wildlife habitat quality and quantity. Noxious weeds on this Wildlife Area include Canada thistle, Japanese knotweed, purple loosestrife, reed canarygrass, scotch broom and yellow flag iris. Himalayan blackberry (invasive but not any noxious weed list) is also present on all units. Cooperative weed efforts are encouraged to improve efficiency and to minimize impacts on adjacent landowners as part of the agency's good-neighbor effort. For details on specific weeds, see the Weed Management Plan (Appendix 2).

- A. Strategy: Continue to seek funding to assure a 4-month FTE to assist with weed control efforts. *Funding:* W.A. operating budget. *Timeframe:* Annual
- B. Strategy: Continue to use Integrated Pest Management strategies, including biological control, chemicals, mechanical and cultural methods to control invasive weeds. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.
- C. Strategy: Coordinate weed control efforts with federal, state and county agencies to maximize efforts. Apply for grants to control weeds, plant native vegetation and utilize the WDFW Weed Crew, as well as local volunteer groups. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

Agency Objective: Protect, Restore and Enhance Fish, Wildlife and Their Habitats

1. Manage for native species diversity

Washington is home to a remarkable variety of fish and wildlife species. However, changes to the landscape and native habitat as a result of human activity have put many of these diverse species at risk. In consultation with other governmental and nongovernmental organizations, the Department developed a Comprehensive Wildlife Conservation Strategy (CWCS) in 2005 with the intention of creating a new management framework to protect those species and habitats in greatest need of conservation. Its guiding principles include: 1) conserving species and habitats with the greatest need while recognizing the importance of keeping common species common, and 2) building

and strengthening partnerships with other conservation agencies, tribes, local governments, and non government organizations.

State planning efforts through Washington's Comprehensive Wildlife Conservation Strategy are moving towards a more holistic approach of biological diversity. While Washington's CWCS only focuses on fish and wildlife species and their associated habitats, it is important to try to frame the discussion in the larger context of the state's full biological diversity. Most of the state's native animal species fall within the legal definition of "wildlife" and are under the purview of WDFW.

Biodiversity is the full range of life in all its forms and stages: the habitats in which various life stages occur, the complex interactions of species, habitats, and the physical environment, and the processes necessary for those interactions. The CWCS partially characterizes biodiversity as species richness of an area—the number of plants and animals that spend all or part of their lifecycle in a particular area. Washington is the permanent or temporary home to thousands of plant and animal species, including 140 mammals, 470 freshwater and saltwater fish species, and 341 bird species that use these habitats during some portion of their annual cycle ranging from breeding to migrations, as well as 150 other vertebrate species, more than 20,000 invertebrates, and 3,100 vascular plants.

The Whatcom Wildlife Area has diverse habitat types that are identified as priority levels one and two in the reference manual, *Wildlife-Habitat Relationships in Oregon and Washington*, used to classify habitats for the CWCS plan. These habitats include: bays and estuaries, herbaceous wetlands, Westside lowland conifer-hardwood (mature) forest, Westside riparian-wetlands (priority one), montane mixed conifer forest (priority two), and agriculture, pasture, and mixed environs (other).

The Whatcom Wildlife Area can be part of a proactive effort to protect and preserve fish and wildlife by focusing on Washington's biodiversity. However, to be effective it is necessary to identify what species are present in order to develop appropriate management/restoration strategies. Also, the Department of Ecology and Whatcom County Health Department have tested and analyzed the lake's water quality and fish tissue. No health concerns were noted. *Some concerns remain about possible chemical contamination of fish and wildlife on the Tennant Lake unit from an old county dumpsite and adjacent industrial chemical storage facilities.*

A. Strategy: Develop a prioritized list of Whatcom Wildlife Area units in which to conduct an inventory of species, use and needs. *Funding:* W.A. operating budget. *Timeframe:* 2006-07.

B. Strategy: Assess the effects of all proposed management programs and projects on species composition and diversity. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

C. Strategy: Monitor and protect unique bog habitats on **Lake Terrell** and **Tennant Lake units**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

D. Strategy: Continue performing quantitative surveys of native birds on **Tennant Lake unit**. *Funding:* Local Audubon Chapter. *Timeframe:* Quarterly.

E. Strategy: Create inventory surveys and facilitate on-the-ground surveying of plant, plant community, small mammals, birds, reptiles, amphibians, and invertebrates as per prioritized list of units. *Funding:* Federal/state grant proposals, interns, volunteers, Advanced Hunter Education members, conservation organizations (Audubon-birds, Native Plant Society-plants, etc.). *Timeframe:* After Comprehensive Wildlife Conservation Strategy is approved.

F. Strategy: Protect or create habitat elements for species of concern/sensitive species listed in Table 6 (snags, nest boxes, revegetation with native plants, etc.)

Funding: student project, volunteer groups

G. Strategy: Investigate using **Tennant Lake** as a biodiversity education site.

Funding: Information and Education Program. *Timeframe:* 2006-08.

2. Protect, restore and enhance wetland and riparian habitats

Wetlands and estuaries have remarkably high fish and wildlife densities and species diversity, and are important breeding habitat as well as important fish and wildlife seasonal ranges and movement corridors. These habitats are not common.

Wetland habitats in Puget Sound have declined dramatically since European settlement. In general, wetlands provide valuable habitat functions (food, shelter, hiding cover) for fish and wildlife. Freshwater wetlands also have other valuable ecological functions, such as improving water quality by retaining sediment, contaminants, and floodwaters. Freshwater wetlands and estuaries have similarly high biodiversity in plant and animal life and are important to both resident and migrant wildlife populations.

These habitats are all highly vulnerable to human alterations such as diking, draining, development, and erosion. Loss of wetland function in the Nooksack River system has been widespread in the lower reaches, so projects to restore and/or enhance wetland processes within the Whatcom Wildlife Area are a high priority. Riparian areas also provide habitat for a large diversity of fish and wildlife species, including Federally listed Chinook salmon and bull trout. Riparian habitats also support high densities of wildlife and provide important breeding, feeding, nesting and movement corridors. Listed species that can benefit from wetland or riparian restoration include, bald eagle, golden eagle, common loon, Northern goshawk, purple martin, Vaux's swift, Western grebe, Chinook salmon, bull trout, Coho salmon, Pacific lamprey, and Western toad. In the absence of species specific criteria, buffer widths will begin at 150 feet.

A. Strategy: Establish, restore and/or maintain riparian buffer zones between creeks/river and agricultural fields. Protection includes Silver, Terrell and Tennant Creeks and the east bank of the Nooksack River (**Nooksack, Lake Terrell and Tennant Lake units**). *Funding:* W.A. operating budget, Natural Resources Conservation Service, Ducks Unlimited, State Duck Stamp, Lummi Nation. *Timeframe:* 2006-08.

B. Strategy: Maintain buffer zones to protect peregrine falcons (species of concern) on **Lummi Island Unit**. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

C. Strategy: Pursue using area north of Slater Road (**Tennant Lake Unit**) as Port of Bellingham wetland mitigation site (Port would fund restoration). *Funding:* W.A. operating budget, Port of Bellingham. *Timeframe:* Ongoing.

D. Strategy: Establish riparian plantings on all island segments in created wetlands on **Nooksack Unit**. *Funding:* State Duck Stamp proposal.

E. Strategy: Investigate riparian restoration options on Tennant Lake Unit property north of Slater Road. *Funding:* Student class project, volunteer group.

F. Strategy: Work with Lummi Tribe to create a Nooksack estuary reserve (**Nooksack Unit**). *Funding:* Fisheries and Habitat Division, Lummi Tribe.

3. Maintain and improve nesting and wintering habitat for waterfowl

The Whatcom Wildlife Area was purchased with federal Pitman Robertson funds to preserve the two major lakes and neighboring wetlands, marshes, ponds and impoundments as key wintering and nesting areas for at least 18 species of waterfowl. A wide variety of dabbling and diving ducks, greater Canadian geese, trumpeter and tundra swans use these habitats (60,000-270,000 birds annually). *A mix of agricultural ground (<100 acres) that provides cereal grains for wintering waterfowl is strongly supported.* While this Wildlife Area is a large draw for waterfowl hunting, a growing number of birders have discovered the waterfowl viewing opportunities here as well.

The WDFW Game Management Plan's statewide goals for waterfowl include:

- Manage statewide populations of waterfowl for a sustained yield consistent with Pacific Flyway management goals
- Manage waterfowl for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, cultural and ceremonial uses by Native Americans, wildlife viewing and photography
- Preserve, protect, perpetuate, and manage waterfowl and their habitats to ensure healthy, productive populations

Habitat Management Issue Statement

Wetlands and other waterfowl habitats are being lost throughout Washington due to development and conversion to other uses. Objective 108, under waterfowl management states, "Provide funding through state migratory bird stamp/print revenues and the Washington Wildlife and Recreation Program to protect/enhance 1,000 acres of new habitat annually for all migratory birds." This acreage target was selected based on past annual accomplishments of the migratory bird stamp/print program. Objective 108 strategies include:

- a. Determine habitat protection and enhancement needs considering Joint Venture plans, literature and regional expertise
- b. Solicit project proposals from regional staff and external organizations
- c. Develop a stamp/print expenditure plan before the start of each new biennium, using an evaluation team from a statewide cross-section of Department experts
- d. Provide emphasis on projects to increase waterfowl recruitment in eastern Washington, wintering habitat and access in western Washington
- e. When allocating migratory bird stamp funds, consider fund allocation goals presented to the Legislature when the program was established: habitat acquisition - 48%, wildlife area enhancement - 25%, project administration - 18%, and food plots on private lands - 9%

Monitor effectiveness of habitat projects through focused evaluation projects before and after implementation. (Washington Department of Fish and Wildlife 2003)

In addition, efforts are currently underway to improve the function of wetlands on various units with water control techniques that will contribute to the growth of native plant and invertebrate communities. Some of the wetlands are man-made and meant to mimic the historic natural processes that occurred in the area before the land use changed. This technique, called 'moist soil management', integrates agricultural enhancements and native vegetation to increase freshwater habitat diversity and natural food sources for many species of waterfowl. Improved waterfowl numbers provide greater foraging potential for such listed species as bald eagle, golden eagle, peregrine falcon, Northern goshawk, and Merlin.

A. Strategy: Continue the habitat enhancement program (planting cereal grains such as corn, barley and winter wheat) on all units where applicable. Future of program is contingent on available funding and evaluation of restoration/wetland management projects as they are implemented. **BP Unit** = up to 17 acres (7 ac donated by BP oil refinery). **Lake Terrell Unit** = up to 55 acres, plus maintain 20 acres in grass to rotate grain crops. *Funding:* State Duck Stamp funds, W.A. operating budget, conservation donations. *Timeframe:* Annually until further notice

B. Strategy: Continue managing water levels in five impoundments on **Intalco Unit** to benefit nesting and wintering waterfowl. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Maintain maximum water levels on Lake Terrell in mid-April through summer months (**Lake Terrell Unit**). This optimizes waterfowl nesting, assures shallow water levels remain in the two marshes to attract wintering waterfowl, and keeps reed canarygrass and spirea from encroaching into marshes (this is critical). *Funding:* W.A. operating budget. *Timeframe:* Annual.

D. Strategy: Initiate a three-foot draw down on **Lake Terrell** every five years to encourage emergent aquatic species growth in the lake's two marshes. *Funding:* Future operating budget. *Timeframe:* March 2009.

E. Strategy: Complete the wetland restoration effort on the **Nooksack Unit** (finish installing native plants and continue with necessary maintenance) with partners listed below. *Funding:* Natural Resource Conservation Service, Ducks Unlimited, Lummi Indian Nation. *Timeframe:* 2006.

F. Strategy: Manage the **Nooksack Unit's** north 350 acres of wetland habitat for waterfowl. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

G. Strategy: Continue cooperative farm agreements and share crop leases with local farmers, as well as developing other funding options, to provide cereal grain enhancements on various units. *Funding:* W.A. operations budget, grant proposals, donations. *Timeframe:* Annually until further notice.

H. Strategy: Work with Ducks Unlimited, Natural Resource Conservation Service and other interested stakeholders to identify sites on various units where controlling water levels could improve wetland management. This would allow native wetland vegetation and invertebrate communities to flourish (providing natural food sources), or cereal grain enhancement areas to be flooded. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

I. Strategy: Continue to maintain some areas as Game Reserves to provide resting places for migrating waterfowl (**Lake Terrell Unit**). *Funding:* Ducks Unlimited, W.A. operations budget. *Timeframe:* 2006.

4. Maintain and improve fish populations

Presently 12 species of fish (mainly warmwater species) are found in the waters of the Whatcom Wildlife Area. Warmwater game fish are the fastest-growing segment of Washington's resident sport fishery. The number of warmwater anglers almost doubled in less than 30 years (estimated 170,000 in 1968 to 334,000 in 1994) and the number of warmwater angler-days nearly tripled (2.1 million to almost 6.2 million). The percentage of all resident anglers fishing for warmwater species increased 10+ percent (to 62.7 %) and the number of Washington anglers that prefer warmwater species increased 11+ percent (to 34.3 %).

During its 1996 regular session, the Washington State Legislature unanimously passed Fourth Senate Substitute Bill 5159. This legislation, requested by various warmwater fishing organizations within the state, established a Warmwater Gamefish Enhancement Program within the WDFW, with the stated broad goal of increasing "opportunities to fish for and catch warmwater game fish." The bill authorized WDFW to fund the program through a \$5 license surcharge to fish for black bass (largemouth and smallmouth), walleye, channel catfish, tiger musky and crappie. The warmwater enhancement surcharge was eliminated in 1999, and funding for this program now comes from the basic freshwater and combination license fees.

Goals of the agency's Warmwater Enhancement Program include:

- Identify 80 to 100 waters with significant warmwater enhancement potential that are geographically distributed to benefit all warmwater anglers; include mixed species management waters; avoid ESA and wild salmonid conflicts
- Management objectives for each water include either panfish, bass, or walleye management, quality fishing or juvenile/urban angling
- Specific projects for each water body include access development, harvest regulation, habitat improvement, stock assessment, stocking, promote fishing opportunity or enforcement (Washington Department of Fish and Wildlife 2005b)

From decades earlier plantings of largemouth bass and more recent annual plants of channel catfish in Lake Terrell, both species are now heavily targeted by public fishing. Lake Terrell has become one of the destination lakes in western Washington for largemouth bass fishing. Four or five large mouth bass tournaments are held on the lake yearly and the local (Borderline Bass) club has assisted with creating warmwater fish habitat. In addition, 10,000 fingerling cutthroat trout are planted in Lake Terrell each spring. Since 2003, triploid rainbow trout have also been planted (937 trout in 2005). Anglers seeking these planted trout are considerable in April, May and early June.

With the exception of fish passage barrier removal, there is little that can be done to improve or maintain fish populations here. Maintenance of what exists is the primary objective, and the TAPPS Section of the Habitat Program's Environmental Restoration Division has investigated all potential ocean-going salmon and trout barriers. The barrier assessment is completed and included a metric description of all structures in waters of the Wildlife Area with assessment of salmonid passage capability. A final report is available. It is assumed that other aquatic life will benefit from managing for suitable conditions for the species that are currently present.

Fish surveys in lower Terrell Creek (drains from Lake Terrell) suggest limited use by Coho salmon and cutthroat trout. An egg box was installed next to the lake's dam structure and chum salmon fry were released in March 2005 to determine if salmon can survive in this warm water environment. Experiments are currently underway to determine how much lake water can be released during the dry summer months into Terrell Creek without adversely harming habitat for waterfowl and shorebirds. Lowering water levels too much can dramatically encourage invading plants such as spirea and reed canarygrass into the marshlands. Water release information gathered in summer 2005 indicates a minimal flow in creek can be maintained without adversely effecting Lake Terrell marshlands.

A. Strategy: Work with Nooksack Salmon Enhancement Association to maintain riparian plantings along Terrell Creek (**Lake Terrell Unit**). *Funding:* BP Oil, Nooksack Salmon Enhancement Association. *Timeframe:* 2006.

B. Strategy: Investigate increasing/enhancing native fish habitat in **Tennant Lake**, Tennant and Silver creeks by planting native vegetation in the riparian zone. *Funding:* W.A. operating budget. *Timeframe:* 2006-07.

C. Strategy: Complete planting native vegetation in riparian zone along Nooksack River (**Nooksack unit**). *Funding:* W.A. operating budget, Lummi Nation, US Fish and Wildlife Service. *Timeframe:* 2006.

D. Strategy: Manage water levels in ponds for optimal water releases from Lake Terrell to benefit salmon in Terrell Creek and maintain marshes (**Intalco Unit**). *Funding:* W.A. operating budget. *Timeframe:* 2006.

E. Strategy: Maintain maximum water levels in **Lake Terrell** in mid April through summer months to optimize warmwater fish habitat. *Funding:* W.A. operating budget. *Timeframe:* Annual.

F. Strategy: Investigate whether chum salmon can be re-introduced in Terrell Creek (**Lake Terrell Unit**). This includes determining whether continuous water releases to Terrell Creek in summer are possible without harming waterfowl, and if chum salmon can survive the lake's warm water and low flow volumes. *Funding:* W.A. operating budget, Nooksack Salmon Enhancement Association, WDFW watershed steward. *Timeframe:* 2006.

G. Strategy: Continue to stock **Pine and Cedar lakes** with the Lake Whatcom strain of cutthroat trout fry each spring (Pine Lake~1,000 fry/Cedar Lake~500 fry). *Funding:* Fisheries Division.

H. Strategy: Evaluate breach of Nooksack dike on resident fish populations and habitat changes (**Nooksack Unit**). *Funding:* Fisheries and Habitat Divisions, Lummi Tribe.

I. Strategy: When rebuilding dam at **Lake Terrell** outlet, include a fish ladder to allow continuous controlled water releases through dry season **IF** lake temperature is beneficial to downstream salmonids, **AND IF** water reductions will not encourage growth of invasive plants. *Funding:* Fisheries and Habitat Divisions, Nooksack Salmon Enhancement Association.

J. Strategy: Evaluate warm-water fish plants versus native fish opportunities in **Lake Terrell**. *Funding:* Fisheries Division.

K. Strategy: Evaluate survival and catch rate of cutthroat and triploid trout in **Lake Terrell** as compared to other lowland lakes. *Funding:* Fisheries Division.

L. Strategy: Initiate a three-foot draw down on **Lake Terrell** every five years to produce more and larger spinyray fish, and encourage emergent aquatic species growth in the two marshes connected to lake. *Funding:* 2009 operating budget.

5. Acquire land for fish and wildlife habitat

The Department has prioritized the importance of habitat for hunted and non-hunted species alike. These areas can provide habitat for a large diversity of fish and wildlife species, for high densities of species, for important breeding areas and essential feeding or movement corridors. From the recently completed Lands 20/20, A Clear Vision for the Future document, the Department seeks to maintain a citizen supported portfolio of lands that will provide benefits to fish, wildlife and the public and ensure operational excellence following these guidelines:

- All potential Department land acquisitions will be evaluated based on their contribution towards the conservation of fish and wildlife and the provision of fish and wildlife related opportunities for the public
- Local interests and perspectives will be solicited and accommodated to the greatest extent possible for all proposed Department acquisitions
- In addition to fee-simple acquisition by the Department, management alternatives such as land preservation agreements, management agreements, and partnerships will be evaluated for all proposed Department acquisitions

Below are examples of plans that provide the detailed strategies and priorities for evaluating individual land acquisitions and management decisions. These plans are dynamic and change as new information about conservation and recreation is acquired:

- Washington Department of Fish and Wildlife Strategic Plan includes detailed goals and objectives for the agency
- Comprehensive Wildlife Conservation Strategy, completed in October 2005, will help shape the lands portfolio by identifying species and habitats that are most in need of conservation. This plan will maintain state eligibility for federal Wildlife Conservation and Restoration Program funds
- Based on the Washington Biodiversity Conservation Strategy Report, the Washington Biodiversity Council began meeting in the fall of 2004 to develop a statewide biodiversity strategy. When completed, this strategy will guide biodiversity conservation efforts of the Department and other agencies
- Ecoregional Assessments—produced through collaboration of the Department, The Nature Conservancy, and the Washington Department of Natural Resources— assess the biodiversity and conservation potential of lands across the nine

ecoregions of Washington State. These ecoregional assessments will provide a land evaluation that presents the relative conservation value and vulnerability of lands across each ecoregion (Washington Department of Fish and Wildlife 2005a)

A. Strategy: Prioritize habitat needs and potential parcels to purchase for each unit. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

B. Strategy: Acquire, as an absolute minimum, the 3-acre lakebed in-holding on **Lake Terrell Unit** (without this the entire Game Reserve is threatened) *Funding:* W.A. operating budget, grant proposals.

C. Strategy: Acquire the 10 acres of upland lakeshore abutting **Lake Terrell's** Game Reserve to prevent dock construction and residential development. *Funding:* W.A. operating budget, grant proposals.

D. Strategy: Acquire adjacent land on **Lummi Island Unit** to create an adequate buffer that will better protect the falcon eyrie from human disturbance. *Funding:* W.A. operating budget.

E. Strategy: Evaluate opportunities to purchase additional estuary habitat downstream of **Nooksack Unit**. *Funding:* W.A. operating budget.

Agency Objective: Minimize Adverse Interactions between Humans and Wildlife

Wildlife Areas were purchased to preserve, protect, and enhance fish and wildlife populations and their habitats, and provide fish- and wildlife-oriented recreational opportunities for the public. Recreational activities that are compatible with 'preserving, protecting, and enhancing fish and wildlife populations and their habitats' are allowed and promoted on wildlife areas. Wildlife area biologists and managers realize that research indicates it is important to not disturb fish and wildlife during certain life cycle events. These may include breeding, nesting, migrating, winter-feeding, and roosting etc.

1. Restrict public use by establishing reserves or closed areas for fish and wildlife

A. Strategy: Continue to maintain **Lake Terrell's** north half as a Game Reserve where no hunting is allowed (provides a large undisturbed resting area for wintering waterfowl). *Funding:* W.A. operating budget. *Timeframe:* Annual.

B. Strategy: Continue to maintain the northern two-thirds of **Tennant Lake** as a Game Reserve where no hunting is allowed. This provides large undisturbed resting area for wintering waterfowl. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Continue to prohibit public access on **Lake Terrell's** islands from March 1-July 1, posted with 'No Trespassing' signs. This eliminates public disturbance of nesting geese and provides an undisturbed spawning area for largemouth bass. *Funding:* W.A. operating budget. *Timeframe:* Annual.

2. Monitor and manage public access to minimize negative effects on fish and wildlife

A. Strategy: Continue to protect nesting peregrine falcons on **Lummi Island unit** from human disturbance by limiting public entry to foot access only. *Funding:* W.A. operating budget. *Timeframe:* Annual.

B. Strategy: Continue to end pheasant-release program on **BP, Intalco and Lake Terrell units** by Thanksgiving to reduce disturbance to waterfowl using winter food plots. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Continue to restrict public boating on **Lake Terrell** to only waterfowl hunters from October through January. This helps assure that the waterfowl in the Game Reserve are not disturbed. *Funding:* W.A. operating budget. *Timeframe:* Annual.

D. Strategy: Continue to close access on all appropriate units where road or trail conditions have a significant negative impact on fish and/or wildlife. *Funding:* W.A. operating budget. *Timeframe:* Annual.

E. Strategy: Continue to investigate opportunities to minimize adverse interactions between humans and fish/wildlife. *Funding:* W.A. operating budget. *Timeframe:* Annual.

F. Strategy: Staff and maintain three land-based WDFW enforcement officer positions in Whatcom County to enforce increasing public uses on Wildlife Area. Two of three positions are currently not filled). *Funding:* Enforcement Division.

G. Strategy: Design future trails as shorter point access routes for viewing to minimize public use. This will maintain larger undisturbed areas for fish and wildlife. *Funding:* W.A. operating budget, grant proposals.

Agency Objective: Provide Sustainable Fish and Wildlife-Related Recreational and Commercial Opportunities Compatible with Maintaining Healthy Fish and Wildlife Populations and Habitats

The WDFW has an obligation to provide sustainable fish and wildlife populations while offering compatible fish- and wildlife-oriented recreational opportunities. Current habitat enhancement programs for hunting include planting cereal grains, flooding fields seasonally, planting native vegetation, and manipulating water levels to boost the growth of native marsh/wetland plant communities, and native insect and amphibian populations (all natural food sources for water-fowl). Cereal grain enhancements—a long-standing tradition dating back to the 1950s—are especially popular with bird hunters. The Department’s strategies and priorities for management will change as the status of species and habitats change, and as new information and science emerge. These changes may affect public use and other activities in the future.

1. Provide and manage resource-compatible hunting and fishing opportunities

The July 2003-June 2009 Game Management Plan will guide the Washington Department of Fish and Wildlife’s management of hunted wildlife for the next six years. The focus is on the scientific management of game populations, harvest management, and other significant factors affecting game populations. As mandated by the Washington State Legislature (RCW 77.04.012), “... the department shall preserve, protect, perpetuate, and manage the wildlife...”; “the department shall conserve the wildlife... in a manner that does not impair the resource...”; and “The commission shall attempt to maximize the public recreational... hunting opportunities of all citizens, including juvenile, disabled, and senior citizens.” It is this mandate that sets the overall policy and direction for managing hunted wildlife. Hunters and hunting will continue to play a significant role in the conservation and management of Washington’s wildlife.

Washington’s citizens played a strong role in developing this plan. A variety of public involvement opportunities were used to solicit ideas. In all, several thousand citizens provided comments, edits, and priority issues. The Game Management Advisory Council, a group of citizens representing conservation and hunting organizations, landowners, and

biologists, was continually involved in identifying and refining issues. The Wildlife Diversity Advisory Council, representing environmental organizations and mostly non-consumptive viewpoints, also provided important counsel on key predator management issues. In addition, an extensive public opinion survey was conducted for the Department by the private consulting firm, Responsive Management.

The priority issues identified by the public include scientific/professional management of hunted species, public support for hunting as a management tool, hunter ethics and fair chase, private lands programs and hunter access, tribal hunting, predator management, hunting season regulations, game damage and nuisance, and species-specific management issues.

The overall goals are to protect, sustain, and manage hunted wildlife, provide stable, regulated recreational hunting opportunity to all citizens, protect and enhance wildlife habitat, and minimize adverse impacts to residents, other wildlife, and the environment. With all of these issues, it is understood that the implementation of strategies are conditioned first on meeting game population objectives. Science is the core of wildlife management, supporting WDFW's Legislative mandate to preserve, protect, and perpetuate wildlife populations while maximizing recreation.

The U.S. Fish and Wildlife Service and the Pacific Flyway states, including Washington, cooperatively manage migratory birds. Management efforts will continue to emphasize protection and enhancement of declining wetland habitats and to closely monitor harvest management. Refinement of harvest strategies will further emphasize regional differences and address crop damage concerns, while protecting populations of migratory birds of management concern. Studies will be developed to determine the impact, of snipe hunting on other wildlife (especially shorebirds) and investigate hunting impacts on mourning doves.

Strategies for upland game birds (pheasant, quail, and partridge) and wild turkeys will continue to focus on enhancing populations in suitable habitats and providing appropriate harvest opportunities for these largely non-native species. Pheasants continue to be the focus of upland bird management efforts. Other upland bird populations such as California quail are either considered healthier or receive less attention from hunters. Dedicated and targeted funding for pheasant management is discussed with identified strategies for changes in funding emphasis. Access to private lands continues to be emphasized with strategies to focus on expanding opportunities in higher quality pheasant habitat and hunting areas. Forest grouse management strategies suggest emphasis on improving harvest management and population monitoring.

A. Strategy: Continue to limit all firearms for small game hunting to shotguns with nontoxic shot only. *Funding:* W.A. operating budget. *Timeframe:* Annual.

B. Strategy: Continue pheasant-release program in late September through November on **BP, Intalco and Lake Terrell units**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Continue to maintain maximum water levels in **Lake Terrell** in mid-April through summer months to provide a waterfowl hunting area. *Funding:* W.A. operating budget. *Timeframe:* Annual.

2. Develop and maintain recreational access sites for public use

The WDFW provides fish and wildlife oriented recreational use opportunities for all citizens, including juvenile, disabled and senior citizens. The public needs access, which can include roads, parking lots, trails, toilets, reader boards, etc. Some access sites are vandalized, used as illegal dumping grounds or for parties, etc. This often causes seasonal closures of these areas. *One of the public's and our Citizen Advisory Group's most common complaints is that our access areas are not properly maintained, including grading roads and picking up litter.* The budget and staff to do this work are not adequate. *The Citizen Advisory Group also strongly recommends that WDFW develop good, detailed maps, and highway and interpretive signage to properly inform and educate the public about available access sites. This has been repeatedly requested by the public since the 1970s.*

A. Strategy: Encourage and implement programs that reduce illegal dumping and vandalism at access sites. This may include Adopt-An-Access-Area, volunteer stewards, increased enforcement, dusk to dawn (gated) closures, etc. *Funding:* W.A. operating budget. *Timeframe:* 2006-07.

B. Strategy: Continue to provide ADA-accessible restrooms on **Lake Terrell and Tennant Lake units**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Continue to limit fishing dock vehicle access from the main parking area to vehicles with disabled decals (**Lake Terrell Unit**). *Funding:* W.A. operating budget. *Timeframe:* Annual

D. Strategy: Provide wheelchair-only blind and hunting area on **Nooksack Unit**. *Funding:* State Duck Stamp. *Timeframe:* 2005-06.

E. Strategy: Continue to limit all units to day use only. Exceptions are commercial use permits for archery tournaments and dog trials. *Funding:* W.A. operating budget. *Timeframe:* 2006

F. Strategy: Post archery course access regulations at **Intalco Unit** to address safety concerns. *Funding:* W.A. operating budget. *Timeframe:* Annual.

G. Strategy: Continue to maintain 100-yard vehicle access restriction at gated gravel roads, except for disabled users. This has been in effect since 1974 (**Lake Terrell Unit**). *Funding:* W.A. operating budget. *Timeframe:* Annual

H. Strategy: Work with other Department personnel to expedite the development of a detailed color map/informational brochure for the Whatcom Wildlife Area showing up-to-date boundaries, roads, parking areas, trails, boat launches, blinds, viewing areas, toilets, etc. *Funding:* W.A. operating budget, other divisions, grant proposals.

I. Strategy: Replace recently lost funding with dedicated funds to consistently maintain access areas. *Funding:* Wildlife Division, State Duck Stamp, IAC.

J. Strategy: Provide hunting opportunities for persons with disabilities. Currently there is only one wheelchair-accessible hunting blind on the **Lake Terrell Unit**. *Funding:* Wildlife Division, State Duck Stamp.

K. Strategy: Replace old fishing dock on **Lake Terrell**. *Funding:* Local sponsors, donations.

3. Manage conflicting and/or overcrowded recreational uses

As residential developments move closer and nearby human populations continue to increase, the Whatcom Wildlife Area is experiencing increasing use by hunters and

anglers that are not always compatible (i.e. waterfowl vs. pheasant hunters, boat vs. dock anglers, non-hunting boaters vs. waterfowl hunters, etc). This Wildlife Area is also experiencing increasingly park-like uses that are not necessarily fish- or wildlife-oriented (dog walking, jogging, biking, etc). Others come to watch wildlife or train their hunting dogs. Not all of these activities are compatible, in line with the Department's mission, or safe at certain times of the year.

A. Strategy: Continue odd-even license pheasant hunting system to reduce over crowding and unsafe hunter densities on **BP, Intalco and Lake Terrell units**.

Funding: W.A. operating budget. *Timeframe:* Annual.

B. Strategy: Continue regulations on **Lake Terrell Unit** that prohibit fishing from any floating device during waterfowl hunting season. This minimizes conflicts between anglers and waterfowl hunters. *Funding:* W.A. operating budget.

Timeframe: Annual.

C. Strategy: Continue to restrict public boating on **Lake Terrell** to waterfowl hunters only from October through January. This eliminates conflicts and safety concerns between non-hunting boat users and waterfowl hunters. *Funding:* W.A. operating budget. *Timeframe:* Annual.

D. Strategy: Continue to restrict waterfowl hunting over decoys on **Lake Terrell and Tennant Lake units** to established blinds. This reduces crowding and maintains a quality hunting experience. *Funding:* W.A. operating budget.

Timeframe: Annual

E. Strategy: Continue to only open the south end boat launch and parking area on **Lake Terrell Unit** during waterfowl hunting season. This provides a foot-access-only fishing and hiking trail. *Funding:* W.A. operating budget. *Timeframe:* Annual

F. Strategy: Continue to limit access during non-hunting season on **Lake Terrell Unit** to an upland foot trail from secondary duck hunter boat launch (vehicle use during off-season conflicts with foot traffic and non-consumptive recreational uses).

Funding: W.A. operating budget. *Timeframe:* Annual.

G. Strategy: Limit public access on **Nooksack Unit** to parking/entry from Slater Road lot or Marine Drive lot only. This maintains a more isolated middle section for higher quality hunting opportunities). *Funding:* W.A. operating budget. *Timeframe:* Annual.

H. Strategy: Continue no pheasant releases on **Tennant Lake Unit**. This reduces conflicts with waterfowl hunters. *Funding:* W.A. operating budget. *Timeframe:* Annual.

I. Strategy: Maintain and enforce the 80-yard safety (no shooting) zone along dike trail on the **Tennant Lake Unit**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

J. Strategy: Increase enforcement presence during odd/even pheasant hunting to minimize public concerns regarding high hunter densities on **BP, Intalco and Lake Terrell units**. *Funding:* Enforcement Division.

4. Assess and minimize impact of dogs on fish and wildlife populations

While hunting with and training hunting dogs on Wildlife Areas are traditional (and regulated) recreational uses, there is an increasing demand for "off leash" dog walking areas in the Northwest. As residential developments move closer and human populations continue to increase, the Whatcom Wildlife Area is experiencing increasingly park-like

uses, as are many other Wildlife Areas across the state. Many people come here specifically to walk their dogs; some on a daily basis (approximately 20,000 dog walker days per year or 55 dogs and their walkers per day). The Department is currently reviewing its policies regarding dog use on all agency lands. Meanwhile, current regulations are unit-specific. A unit-by-unit assessment needs to be made to determine if and how dog use is adversely impacting fish and wildlife populations and their habitats.

A. Strategy: Work with Citizen Advisory Group, dog trainers, hunters, fish and wildlife advocates, wildlife watchers, and District Team to examine current dog-use situation on all units. Propose short- and long- term recommendations regarding what dog uses should be allowed where. *Funding:* W.A. operating budget, volunteers, grant proposals. *Timeframe:* Begin in 2006.

B. Strategy: Continue to allow dog field trials on the **BP, Intalco, Lake Terrell and Tennant Lake units**, EXCEPT during the nesting season. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Continue to close certain parts of **Lake Terrell and Tennant Lake units** to dog use during nesting season (April 1 through July 15) to eliminate disturbing nesting wildlife. *Funding:* W.A. operating budget. *Timeframe:* Annual.

D. Strategy: Continue to maintain a posted regulation “ALL DOGS MUST BE ON LEASH” on ENTIRE **Lake Terrell Unit** and PORTIONS of **Tennant Lake Unit** from April 1 through July 15. This safeguards waterfowl and other wildlife from disturbance during nesting season. *Funding:* W.A. operating budget. *Timeframe:* Annual

E. Strategy: Restrict dogs on **Nooksack Unit** to dike trail February 1 through July 15. This minimizes disturbing wintering and nesting wildlife on rest of unit. *Funding:* W.A. operating budget. *Timeframe:* Annual.

F. Strategy: Designate portion of unit/units for off-leash dog training where dogs can be off leash but must remain under their owner’s control (verbal, hand, audible) at ALL times. *Funding:* W.A. operating budget. *Timeframe:* Annual.

G. Strategy: Continue using **Tennant Lake Unit** for year-round dog training. *Funding:* W.A. operating budget. *Timeframe:* Annual.

H. Strategy: *Establish and post leash and off-leash areas on the Nooksack Unit.* *Funding:* W.A. operating budget. *Timeframe:* 2006.

I. Strategy: Continue to restrict all pets from **Tennant Lake** boardwalk. *Funding:* W.A. operating budget. *Timeframe:* Annual.

J. Strategy: Review current policy (no restrictions) regarding dogs on **Lummi Island Unit** and change if needed. *Funding:* W.A. operating budget. *Timeframe:* Annual.

K. Strategy: Post a regulation that dog owners must pick up and properly dispose of their dog’s waste in all areas where dogs are allowed. *Funding:* W.A. operating budget. *Timeframe:* 2006.

L. Strategy: Provide poop-scoop bags and trashcans on Lake Terrell and Nooksack units. *Funding needed for feces bags and receptacles.* *Funding:* Donations, grants, local businesses.

M. Strategy: Enlist adequate enforcement presence to enforce dog-related restrictions. *Funding:* Enforcement Division.

5. Provide and increase watchable fish and wildlife recreational opportunities

According to the strategic plan, Wildlife Viewing Activities in Washington (2004), wildlife viewing has become increasingly popular and important. Nature-based tourism is the fastest growing outdoor activity and segment of the travel industry. In 2001, 2.5 million U.S. residents 16+ years old participated in wildlife viewing activities in Washington. In Washington State, 47 percent of residents participated in wildlife watching, while 16 percent fished and 5 percent hunted. Bird watching is one of this state's most popular of wildlife viewing activities; Washington has the fourth-highest participation rate in the country. Thirty six percent of Washington residents regularly participate in bird watching activities. Economic contributions to this state's economy alone are \$1 billion per year (U.S. Department of the Interior et. al. 2001).

With that in mind, in 2003 the State Legislature passed SB 5011, requesting that the departments of Fish and Wildlife and Community, Trade and Economic Development draft a strategic plan promoting wildlife-viewing tourism to provide sustainable economic development in rural areas while maintaining the state's wildlife diversity, as well as its many hunting and angling opportunities. The Legislature also passed a bill stating that tourism is a growing sector of the state's economy.

Expanding tourism efforts can provide Washington residents with jobs and local communities with needed revenues. Current efforts to promote Washington's natural resources and nature-based tourism to national and international markets are diffuse and limited by funding. A collaborative effort among state and local governments, tribes, and private enterprises can serve to leverage the investments in nature-based tourism made by each. Steady gains in vehicle-use permit sales appear to mirror increasing interest in statewide wildlife viewing.

The Whatcom Wildlife Area is a destination for more than 100,000 visitors a year, including hunters, anglers, bird watchers, nature lovers, photographers, walkers and sightseers. Additionally the uniqueness of this Wildlife Area in terms of history, plant and wildlife species diversity, scenery and geology provides ample opportunities to educate the public. Further benefits from the Tennant Lake Interpretive Center include being a much needed educational and hands-on field-based resource for local and regional schools, colleges and universities to use for environmental, ecological and natural resource management purposes. The Whatcom Wildlife Area has one unofficial Watchable Wildlife site—the observation tower at Tennant Lake.

A. Strategy: Manage full-time interpretive naturalist at **Tennant Lake Unit** responsible for interior displays, educational and general public tours, and interpretive trails. *Funding:* W.A. operating budget. *Timeframe:* Annual.

B. Strategy: Maintain observation tower video camera/display via video monitor for disabled patrons at ground level (**Tennant Lake Unit**). *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Maintain wildlife observation and hunting blinds on **Intalco, Lake Terrell, Nooksack and Tennant Lake units**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

D. Strategy: Identify potential watchable wildlife opportunities on the Wildlife Area. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

E. Strategy: Update interpretive center displays at Tennant Lake Unit to include more interactive, hands-on approaches and materials (current displays are 25 years old). *Funding:* Grants, donations, partnerships.

F. Strategy: Connect the observation tower video camera Tennant Lake Unit to the Internet for home viewing access. *Funding:* Grants, donations, partnerships.

G. Strategy: Partner with agency staff, other agencies and volunteers to create safe, compatible wildlife viewing experiences on appropriate units. *Funding* I&E Division, other agencies, grants, donations.

6. Acquire land for fish and wildlife-oriented recreational uses

One of the Department's two mandated priorities is resource compatible recreational use. As various Whatcom Wildlife Area uses have increased and/or become more incompatible with each other, the need for additional lands for a variety of active and passive recreational uses has become apparent and will only become increasingly important over time. Acquisition of land for hunting, fishing, and wildlife viewing opportunities is based upon demographics, economics, and the needs expressed by Washington citizens individually and through various plans and processes. The following list includes some of the key decision making tools:

- The Fish and Wildlife Commission holds authority for all Department acquisitions and through formal public meetings and hearings around the state, offers an opportunity for citizens to voice their concerns and actively participate in the acquisition process
- Numerous external citizen advisory councils provide valuable input to the Department on the implementation of its Strategic Plan. (Game Management Advisory Council, Steelhead Policy Advisory Group, Inland Fish Policy Advisory Group, Lands Management Advisory Council, etc.)
- Wildlife Viewing Activities in Washington: A Strategic Plan includes specific recommendations for new Department of Fish and Wildlife initiatives that would enhance the number and quality of wildlife viewing opportunities in the state
- Habitat Conservation and Recreation Plan 2004 - 2010 is required by the Interagency Committee for Outdoor Recreation to apply for acquisition and development grants. This report identifies the overall status of recreational access and habitat conservation needs for fish and wildlife in Washington
- The Department's Game Management Plan guides the management of hunted wildlife and was developed over a period of two years with input from thousands of hunting constituents
- An Assessment of Outdoor Recreation in Washington State, produced by the Office of the Interagency Committee for Outdoor Recreation, provides recommendations to the Department to augment and improve recreational access on its lands

A. Strategy: Develop an acquisition plan with prioritized recreational needs and parcels identified for each unit. *Funding:* IAC, federal/state/county grants, State Duck Stamp.

Agency Objective: Work With Tribal and Local Governments and Private Landowners to Ensure Fish, Wildlife and Habitat Management Objectives are Met

Two Indian tribes have portions of their usual and customary hunting and fishing areas on or adjacent to the Whatcom Wildlife Area. As a sovereign government, tribes have an interest in creating and managing sustainable fish and wildlife populations and habitats. Local government agencies and many private landowners also have a regulatory or personal interest in seeing that our fish and wildlife populations are well managed. The WDFW will provide the Whatcom Wildlife Area Management Plan to tribes, local governments and the public for review and comment in the later half of 2006.

1. Develop and coordinate fish, wildlife and habitat conservation projects with these groups

A. Strategy: Continue working with tribal agencies to plan and implement restoration projects on **Nooksack Unit**. *Funding:* W.A. operating budget, Fish and Habitat Program. *Timeframe:* Ongoing.

B. Strategy: With tribes, the agricultural community, private landowners and county governments, continue to research and discuss additional projects and restoration efforts that will recover salmon populations. *Funding:* Fish and Habitat Programs, W.A. operating budget. *Timeframe:* Ongoing.

C. Strategy: Work with the local agricultural community concerning what is planted; retaining or planting hedgerows for huntable and watchable wildlife; and how farming practices on adjacent and nearby lands might benefit both farmers and fish and wildlife. *Funding:* Fish and Habitat Programs, W.A. operating budget. *Timeframe:* Ongoing.

Agency Objective: Reconnect with Those Interested in Washington's Fish And Wildlife

Washington State's population continues to increase and people of all ages are reconnecting with nature. In the past three years alone, there have been steady increases in the number of seniors buying WDFW licenses. It appears that as "baby-boomers" move into retirement, many are choosing to pursue various outdoor activities. This is a segment of our population with a tremendous amount of knowledge, passion, time and energy. Wildlife Area managers realize that volunteer groups and individuals, when properly trained and supervised, provide invaluable assistance on special projects and on-going activities on individual units. This includes stakeholder groups such as the Nooksack Salmon Enhancement Association, Borderline Bass Club, Washington Waterfowl Association, Master Gardeners, local Audubon and Native Plant Society chapters, and other resource-appreciative groups from the surrounding area.

In addition, the Tennant Lake Interpretive Center could be utilized as a central base for interested volunteer groups and student interns (grade school through college level) to create and implement informational/educational campaigns for Wildlife Area users (i.e. salmon restoration, scoop dog poop). Small teams or entire classes could conduct much-needed research on fish and wildlife species, their habitats, the impacts of development and the effects of various restoration measures to help refine management strategies that will sustain or increase diversity and ecosystem function.

1. Continue to recruit and work with volunteers on committees, stewardship groups, work parties and individual projects

A. Strategy: Continue holding regular meetings for and supporting the work of the Whatcom Wildlife Area Citizen Advisory Group. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

B. Strategy: Continue to train and work with volunteers to release pheasants during hunting season on **BP, Intalco and Lake Terrell units**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Continue to train and work with Washington Waterfowl Association members to maintain waterfowl hunting blinds on **Lake Terrell and Tennant Lake units**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

D. Strategy: Continue to train and work with archery groups to maintain archery range on **Intalco Unit**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

E. Strategy: Coordinate anchoring of floating snags in **Lake Terrell**. *Funding:* W.A. operating budget. *Timeframe:* Annual.

F. Strategy: Establish riparian corridor on Terrell Creek with Nooksack Salmon Enhancement Association members (**Lake Terrell and BP units**). *Funding:* W.A. operating budget. *Timeframe:* 2006-07.

G. Strategy: Identify and establish a volunteer stewardship group to visit **Lummi Island Unit** and report on public use and problems. *Funding:* Students, seniors, volunteers. *Timeframe:* 2006-07.

H. Strategy: Coordinate candidates required to obtain advanced hunter status with conservation projects. *Funding:* 2005-07 assistant position. *Timeframe:* Ongoing

I. Strategy: Coordinate volunteers to assist with habitat restoration projects. *Funding:* Students, seniors, volunteers.

J. Strategy: Recruit and train teams to conduct species surveys. *Funding:* Students, seniors, volunteers.

K. Strategy: Recruit and train teams to conduct number/frequency/user/ dog surveys. *Funding:* Students, seniors, volunteers.

2. Market the Whatcom Wildlife Area to a broader audience

A. Strategy: Investigate methods to reach a broader public via the Whatcom County Parks website and materials, local cable TV, radio programs, etc. *Funding:* IAC, federal/state/county grants, State Duck Stamp.

B. Strategy: Create Whatcom Wildlife Area website showcasing hunting, fishing and viewing opportunities plus interpretive center and volunteer offerings. *Funding:* IAC, federal/state/county grants, State Duck Stamp.

C. Strategy: Offer educational programs to inner city groups. *Funding:* IAC, federal/state/county grants, State Duck Stamp.

D. Strategy: Offer educational programs about hunting and fishing at the Environmental Center (Tennant Lake Unit). *Funding:* IAC, federal/state/county grants, State Duck Stamp.

E. Strategy: Teach Hunter Education at the Environmental Center (Tennant Lake Unit). *Funding:* IAC, federal/state/county grants, State Duck Stamp.

Agency Objective: Provide Sound Operational Management of WDFW Lands, Facilities and Access Sites

1. Maintain a resident manager

Maintaining a resident manager was specifically requested by the Citizen Advisory Group. Public user representatives feel strongly that this IS the most efficient method to manage a Wildlife Area; safeguard its fish, wildlife and habitat resources; effectively interact with the users who pay to recreate, and have a voice in how to manage WDFW wildlife areas. Funding: Wildlife Division. Timeframe: Annual.

2. Maintain facilities, structures and physical improvements

According to the State Labor and Industry standards and safety rules, it is essential to provide safe working conditions for employees and safe visiting conditions for the public, and to know the condition of all facilities and physical structures for planning, budgeting and implementing maintenance needs. According to current statewide facility conditions standards, the condition of the house, office, barn and storage building on the Lake Terrell unit is good, even though they are more than fifty years old.

A. Strategy: Maintain a safe and effective workplace, storage facilities and residence for the wildlife area manager. *Funding:* W.A. operating budget.

Timeframe: Ongoing.

B. Strategy: Maintain all signs, gates, fences, culverts, water structures, wells and irrigation systems (for safe and efficient operation). *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

C. Strategy: Maintain all established wildlife observation and hunting blinds on BP Intalco, Lake Terrell and Tennant Lake units. *Funding:* W.A. operating budget.

Timeframe: Annual.

D. Strategy: Replace/install new boundary, rules, location, etc. signs as needed.

Funding: W.A. operating budget. *Timeframe:* Ongoing.

E. Strategy: Investigate methods of removing old red barn on Nooksack Unit.

Funding: W.A. operating budget. *Timeframe:* 2005-07.

F. Strategy: Update/maintain interpretive center and interior displays, observation tower, scent garden for the blind, .25 mile of boardwalk trail, and upland interpretive trail connecting Hovander Park and interpretive center. *Funding:* Whatcom Co. Parks & Recreation Department, volunteer groups, W.A. operating budget.

Timeframe: Ongoing.

G. Strategy: Replace 1972 fishing float on Lake Terrell. *Funding:* IAC request 2003-05 and 2005-07 bienniums.

3. Provide fire management on agency lands

Fire suppression agreements must exist for all agency lands to protect the people of Washington and to protect natural and economic resources of the agency and adjacent landowners. The wetter climate on this Wildlife Area usually minimizes wild fire danger. The last fire (from a campfire) was on the Lummi Island unit in the 1990's, which the Department of Natural Resources extinguished. See Appendix 3 for the Fire Control Plan, including emergency contact information.

A. Strategy: Provide fire training for Wildlife Area manager. *Funding:* W.A. operating budget. *Timeframe:* Annually in May.

B. Strategy: Contract with local, state or federal entities to provide fire suppression support on the Whatcom Wildlife Area. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Assess timber thinning to reduce potential insect and fire danger and create forest conditions more suitable to a diversity of species (last completed in 2003). *Funding:* Future operating budget. *Timeframe:* Ongoing (every 5 years).

4. Develop, implement and refine a management plan for the wildlife area

The Whatcom Wildlife Area Management Plan will allow the WDFW, with internal and external review and input, to develop comprehensive criteria for acquiring and managing lands with annual reviews and updates.

A. Strategy: Determine changes in land management practices necessary to comply with the conservation needs of listed species. *Funding:* W.A. operating budget. *Timeframe:* 2006-07.

B. Strategy: Provide the framework for all fish and wildlife recreational uses and provide funding for operations and maintenance of the Whatcom Wildlife Area units. *Funding:* W.A. operating budget. *Timeframe:* Annual.

C. Strategy: Work closely with the Citizen Advisory Group, District Team and other stakeholders on unresolved issues. Existing unresolved issues include access/information needs and priorities; overcrowding /conflicting recreational uses; dog-related impacts; and Watchable Wildlife site needs. *Funding:* W.A. operating budget. *Timeframe:* Ongoing at Citizen Advisory Group's earliest convenience.

D. Strategy: Provide annual reviews and updates for Citizen Advisory Group, District Team and other stakeholders. *Funding:* W.A. operating budget. *Timeframe:* Annual.

E. Strategy: Create and include supportive documents for this plan. This includes a Weed Management Plan, Fire Control Plan, Water Rights information, and current species lists. *Funding:* W.A. operating budget. *Timeframe:* Done.

5. Protect cultural resources consistent with state and federal law

Federal and state law requires an assessment of cultural resources on agency lands prior to activities that may impact those resources.

A. Strategy: Perform a cultural/historic resource assessment with assistance from the State Historic Preservation Department before implementing projects that may impact these resources. These projects may include estuary restoration, parking lots, toilets, buildings, new agricultural fields, posts for new fence line, etc. *Funding:* WDFW Contract process.

B. Strategy: Perform an initial assessment prior to acquisition. If proposed acquisition contains cultural/historic resources in need of preservation, request additional funding as a part of acquisition process. Where possible and feasible, adaptive use of historically and culturally important sites and structures will be considered. *Funding:* WDFW Olympia/Regional staff.

6. Pursue additional funding opportunities

Wildlife Area budgets have failed to keep up with the increasing cost of doing business and the growing list of priorities and management objectives and obligations. For this

reason funding to achieve long term management objectives such as enhancement and restoration projects must come from alternate funding sources outside of the general operations budget. Many of these projects are very expensive and may take multiple budget cycles to complete.

A. Strategy: Apply for grants and other funding opportunities consistent with planned priorities to supplement existing funding (e.g. Salmon Recovery Funding Board, North American Wetland Conservation Act, Interagency Committee for Outdoor Recreation, State Duck Stamp, etc.) *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

A. Strategy: Investigate establishing sharecropping agreements with neighbors to address artificial cultivation needs and generate additional revenue to support enhanced operations and management. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

B. Strategy: Continue the volunteer program and develop an internship program for students and other volunteers. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

C. Strategy: Develop partnerships with other conservation government entities (federal, tribal, state, county and local agencies). *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

D. Strategy: Seek out and develop partnerships with non-government fish and wildlife, conservation and agricultural organizations as well as national, regional and local sport and service groups. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

7. Perform administrative responsibilities

Administrative responsibilities and duties are important business functions necessary for efficient use of resources in order to accomplish identified goals and objectives according to plans. Record keeping and monitoring are necessary to ascertain activity status and what remains to be done, as well as providing a basis for adaptive management, e.g., making changes to a plan based upon undesired/unplanned outcomes from a management practice.

A. Strategy: Identify goals/objectives/tasks and write/update the management plan, strategies and annual performance measures based on them. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

B. Strategy: Develop and monitor budgets based on plans, supervise employees, maintain files and records, and monitor outcomes of tasks and projects in relation to agency objectives and agreed upon strategies. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

C. Strategy: Renew agricultural contracts and leases. *Funding:* W.A. operating budget. *Timeframe:* Annual.

D. Strategy: Attend and participate in regional, county and local meetings to stay current on salmon recovery and habitat restoration efforts. *Funding:* W.A. operating budget. *Timeframe:* Ongoing.

8. Maintain equipment

A. Strategy: Service all equipment including trucks, tractor and implements, weed sprayers, trailers, etc. Request replacement equipment when needed.

Funding: W.A. operating budget. *Timeframe:* Ongoing as needed.

B. Strategy: Rent equipment when it is more efficient than acquisition.

Funding: W.A. operating budget. *Timeframe:* Ongoing.

9. Pay county PILT (payment in lieu of taxes) and assessment obligations

State law requires the agency to pay PILT and county assessments. The Department is the only state agency to contribute directly to counties through “payments in lieu of taxes” (PILT). For Department-owned areas in excess of 100 acres, county governments can elect to receive an amount equal to that currently paid on similar parcels of open space land, or choose the greater of \$.70 per acre or the per acre amount paid in 1984.

Alternately, the county government may choose to receive fines or forfeitures on game violations that are prosecuted within the county. Revenues from fines vary depending on the number and seriousness of the infractions written in that area. Each county chooses whether PILT or game violation fines best meets its needs. In 2004, the Department paid \$429,000 to counties for payment in lieu of taxes. For Whatcom County, the total was \$69.24.

A. Strategy: Pay PILT and assessments to Whatcom County. *Funding:* W.A. operating budget. *Timeframe:* Annual.

10. Protect and apply water rights for best use

Water rights can impact Wildlife Area operations and fish and wildlife habitat including food plots, restoration projects, in-stream volumes for fish, and marsh and lake volumes for waterfowl, fish and other creatures.

A. Strategy: Identify and record all water rights and uses of water on the Whatcom Wildlife Area (Appendix 4). *Funding:* W.A. operating budget. *Timeframe:* Done.

CHAPTER IV. PERFORMANCE MEASURES, EVALUATION AND UPDATES TO WHATCOM WILDLIFE AREA

Wildlife Area Plan performance measures are listed below. Accomplishments and desired outcomes will be evaluated to produce an annual performance report. The Whatcom Wildlife Area Plan is a working document that will evolve as habitat and species conditions change, as new regulations are enacted, and as public issues and concerns change. Plan updates will address these changes.

1. The Whatcom Wildlife Area performance measures for 2006 include:

- Plant 262 acres of cereal grain (190 in silage corn, 72 in barley) for wintering waterfowl
- Monitor winter and spring waterfowl use of 270 acres of planted grain fields to determine cost benefits
- Establish 20 photo points on Nooksack restoration projects to monitor plant progression
- Monitor 470 acres of restored habitat
- Plant native riparian vegetation on 20 acres
- Maintain 1 mile of fence line on Lake Terrell unit to protect reserve from trespass
- Monitor Tennant Lake Interpretive Center programs to confirm they are meeting environmental education needs of local school districts and the public
- Coordinate local sportsman's club maintenance of 58-station archery range
- Coordinate 40-50 volunteers releasing 5,000 pheasants during hunting season
- Coordinate local waterfowl association's construction/maintenance of 42 hunting/viewing blinds
- Monitor five to ten percent of the 15,000-20,000 waterfowl and 7,000 pheasant hunters to determine if orderly, legal hunts are occurring and investigate problems
- Coordinate weekly enforcement efforts with the enforcement division for eight months of hunting
- Coordinate advanced hunter education graduate's enhancement projects
- Coordinate volunteer litter patrols on Tennant Lake
- Monitor 650 acres for reed canarygrass encroachment to facilitate timely control efforts
- Monitor 200 acres for purple loosestrife encroachment to facilitate timely control efforts
- Monitor 300 acres for yellow flag iris encroachment to facilitate timely control efforts
- Monitor 50 acres for alder encroachment into agricultural acreage
- Coordinate control of yellow flag iris (~1 acre) with local volunteers
- Coordinate control of purple loosestrife (~1 acre) with WDFW Weed Crew
- Coordinate control of Japanese knotweed (~1/2 acre) with WDFW Weed Crew
- Coordinate control of Scotch broom on 117 acres
- Mow 30 acres of reed canarygrass
- Control perennial weeds on 262 acres of agricultural land
- Apply for grants to meet various strategies as needed

APPENDIX 1. WHATCOM WILDLIFE AREA CITIZEN ADVISORY GROUP AND DISTRICT TEAM ISSUES AND CONCERNS

These comments are not in any order. Underlined comments are from the Department's District Team, others are from three Citizen Advisory Group meetings (March 2002, 2003, and 2005).

Issue A. Access/Recreation

- Conflicts between boat launchers and dock fishermen at new boat dock on Lake Terrell
- Dock was funded with boat access dollars and therefore boat launchers have right-of-way
- Sign has been posted stating that boating community has right of way
- Need to replace the old fishing dock (cost \$30-40,000) with help from local sponsors
- Dog walkers are worried about their safety on dike north of Slater Road where hunting takes place
- This is a year-round dog training spot
- An 80-yard safety zone area was posted on the east side of the dike
- Dog walkers have taken precedence over hunters here, so make this the ONLY off-leash dog area
- One off-leash area per Wildlife Area should be enough, so south of Slater Road should be closed to dogs
- Need more enforcement of the odd-even regulation for pheasant hunters
- Fall enforcement emphasis requests were made by the Wildlife Area manager
(Existing regulation: From 8-10 am, only odd or even numbered license holders can hunt. After 10 am, both groups can hunt)
- Inholding on Lake Terrell -- 40 acres (3 acres of lakebed) need to be purchased, might be developed soon
- No current funding, but will continue to work with Lands agent as funding opportunities arise

Issue B. Wildlife Area Management

- Want leash and off-leash areas established and posted for WDFW area south of Slater Road
- Want adequate enforcement presence there to enforce dog-related laws
- About 1200 gallons of dog feces/week are collected in bags and put in special containers
- About 50-75 people a day walk their dogs at Hovander Park or Wildlife Area north of Slater Road
- People are from Ferndale (walk north end) and Bellingham (walk south end)
- Dogs on wildlife areas is a growing problem, and will only get larger
- Point (short) trails/access will disturb wildlife and habitat less and mainly draws hunters, birdwatchers, anglers, not dog walkers or joggers – that's for parks
- Stay away from dike-top, networked, loop trails as that attract general dog walkers
- What is compatible with our mandate?
- Should dog walking and general dog use be prohibited unless it's related to hunting, etc. or we chose to allow it with certain options?
- Need to establish the foundation/policy for effectively dealing with this issue now and in the future
- This needs to be consistent between Wildlife Areas
- Post "on leash" or "closed to dogs" during nesting season

- Can hunters with hunting dogs do more/have more access than public with non-hunting dogs?
- Areas totally closed to dogs are easier to enforce and easier for people to understand.
- Concerned about future staffing level for Lake Terrell and Tennant Lake Wildlife Areas, as a result of taking away Snoqualmie manager, and lumping into Skagit Wildlife Area (2-3 hours away)
- Want to have a local manager
- WDFW will no longer be able to maintain area's parking lots due to budget cuts
- Expand game reserve status of Tennant Lake to include entire lake
- Washington Waterfowl Association opposes converting the entire lake to a game reserve unless additional lands are bought to replace hunting on lower third of lake (20 acres with 3 blinds) no further action on this proposal has been made (WDFW doesn't own mouth of Silver Creek)
- This area is next to RR line, which disturbs waterfowl several times a day
- This area is next to Hovander Park, with an observation tower and non-consumptive uses
- 500 acres nearby have been bought for hunting
- Maintain agricultural program to provide winter food plots for wildlife
- Strongly support present program:
 - 1) 124-acre agricultural lease on Tennant Lake WLA that provides ten acres of corn be left unharvested (throughout the entire field) for winter waterfowl feed. The harvested section of the field is planted to winter wheat, to provide green feed for swans during the winter
 - 2) Fifty-five acres of spring barley is planted, fertilized and controlled for weeds by WDFW personnel to provide winter waterfowl food around Lake Terrell
 - 3) The planting of ten acres of spring barley on BP leased lands is funded with Washington state duck stamps funds. BP oil refinery has the contract to provide this farmed acreage and donates an additional seven acres annually to the program
- Moist soil management and other options to feed waterfowl are possible
- No water flooding options here
- There is pressure to use grain-planting money on other things
- Don't lose planting option/funding until other options and funding are found

Issue C. Habitat

- Concerned about chemical contamination of Tennant Lake Wildlife Area
- Is there local industrial contamination at Wilder dumpsite off Slater Road and Claypit pond
- What about DOE studies on water quality and fish tissue analysis?
- WDFW warm water fish biologists collected fish samples for analysis
- DOE did a water quality study on Claypit pond to determine level of heavy metal contamination (chromium on perch in late 1980s). Results available through Washington Department of Ecology
- Whatcom County Health Department funded mercury analysis 2-3 years ago and forwarded results to Washington Department of Ecology. No health concerns were noted
- Concerns were raised about contamination from the old county dumpsite.
- The county health department will be invited to brief the CAG on the old dump site status
- Herbicide contamination from neighboring storage area was discussed
- Washington Department of Agriculture investigated the incident--no problem found

- Need water quality studies done Washington Department of Ecology
From DOE: Budgeting for this effort E did not make it through local prioritization process for funding.
- If we had the money, we should do an analysis of local runoff, water quality and heavy metals (used to be copper plant east of RR near Silver Creek)
- Need to know environmental background on Williams property before we buy it
- Don't know if/how much chromium is still in Claypit Pond sediment
- If we wanted to raise the flag, we might be able to generate enough money to clean up Contamination
- Dam on Lake Terrell has no fish ladder, has intermittent drainage out into Terrell Creek
- Can we charge the creek system with additional water?
 - Heavy metals in estuarine areas affects salmon (outmigrating smolts)
- Spiny ray fishery on lake, warm water since lake is shallow
- Eight different impoundments on Lake T WLA – in upper shed, 2 are downstream of the lake
- Value of Terrell Creek to salmonids is questionable
- Graduate student working on this issue, collecting flow and temperature information
- Only trying to keep upper creek alive
- Current experiments are good way to research this effort, ramp up to next step
- Past production probably varied considerably depending on environmental conditions
- Better use might be to water Terrell Creek rather than to remove the dam for salmon
- If the lake level gets lowered, what's the impact on traditional waterfowl and hunting use?
- Best species to manage for in Terrell Creek might be sea-run cutthroat
- Augmenting the flow to the creek by managing (raising) the lake level is an option
- Experiment by planting coho in the lake and see if they survive
- Spiny ray fish in lake do drop into creek – there's no screen on dam
- Young spiny ray prey on salmon fry, will they eat them all in the creek?
- From research, will know more in a year

Issue D. Roads/Waterways - none

Issue E. Enforcement - none

Issue F. Public Information, Education, Involvement - none

Issue G. Monitor, Survey, Inventory

- Neighbors around Tennant Lake perceive reductions in wildlife numbers (muskrats, rabbits, black birds)
- 19-month (baseline) bird survey initiated by local Audubon Society (using WDFW protocols) found no abnormal observations
- Final results of bird survey are being tabulated and will be presented at a future CAG meeting by Joe Meche, census organizer

Issue H. Other

- Need to add wild salmon representatives and developer to CAG (from North Cascades Institute, Friends of Nooksack Basin)

APPENDIX 2. WHATCOM WILDLIFE AREA WEED MANAGEMENT PLAN

Weed Control Goals on WDFW Lands

The goal of weed control on Department lands is to maintain and improve the habitat for wildlife, meet legal obligations, provide good stewardship and protect adjacent private lands.

Weed control activities and restoration projects that protect and enhance fish and wildlife populations and their habitats on Department lands are a high priority. When managing for specific wildlife species on our lands, the weed densities that trigger control are sometimes different than on lands managed for other purposes (e.g. agricultural, etc.). For example, if a weed is present at low densities and does not diminish the overall habitat value, nor pose an immediate threat to adjacent lands, control may not be warranted. WDFW focuses land management activities on the desired plant species and communities, rather than on simply eliminating weeds.

Control for certain, listed species is mandated by state law (RCW 17.10 and 17.26) and enforced by the County Noxious Weed Board. WDFW will strive to meet its legal obligation to control for noxious weeds listed according to state law (Class A and B-Designate weeds).

Importantly, WDFW will continue to be a good neighbor and partner regarding weed control issues on adjacent lands. Weeds do not respect property boundaries. The agency believes the best way to gain long-term control is to work cooperatively on a regional scale. As funding and mutual management objectives allow, WDFW will find solutions to collective weed control problems.

Weed Management Approach

State law (RCW 17.15) requires that WDFW use integrated pest management (IPM). Integrated pest management defined is a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency programmatic pest management objectives to control weeds. These elements include:

Prevention: Prevention programs are implemented to keep the management area free of species that are not yet established but which are known to be pests elsewhere in the area.

Monitoring: Monitoring is necessary to implement prevention and to document the weed species, its distribution and relative density on the Wildlife Area.

Prioritizing: Prioritizing weed control is based on many factors such as monitoring data, the invasiveness of the species, management objectives for the infested area, the invaded habitat's value, the feasibility of control, the weed's legal status, past control efforts and available budget.

Treatment: Treatment of weeds using biological, cultural, mechanical and chemical control serves to eradicate pioneering infestations, reduce established weed populations below densities that impact management objectives for a unit, or otherwise diminish their impacts. Each control method considers human health, ecological impact, feasibility and cost-effectiveness.

Adaptive Management: Adaptive management evaluates the effects and efficacy of weed treatments and makes adjustments to improve the desired outcome for the Wildlife Area. The premise behind a weed management plan is that a structured, logical approach to weed management, based on the best available information, is cheaper and more effective than an ad-hoc approach where one only deals with weed problems as they arise.

Weed Species of Concern on the Whatcom Wildlife Area

Weeds of concern on the Whatcom Wildlife Area include Japanese knotweed (*Polygonum cuspidatum*), purple loosestrife (*Lythrum salicaria*), reed canarygrass (*Phalaris arundinacea*) and Scotch broom (*Cytisus scoparius*). This list is based on species that have been documented on the Wildlife Area (Table 1).

Table 6. Whatcom Wildlife Area weeds including weed class listing, approximate acres and acres treated in 2005.

Weed Species	2005 State Weed Class	2005 County Weed Class	Wildlife Unit	Acres	Acres Treated
Canada thistle	C	C	Intalco	10	0
			Lake Terrell	1	0
			Tennant Lake	2	2
Japanese knotweed	B	B	Lake Terrell	1	1
Purple loosestrife	B	B designate	Lake Terrell	1	1
Reed canarygrass	B	B	Intalco	1,000	0
			Lake Terrell	1,000	200
			Nooksack	100	75
			Tennant Lake	80	10
Scotch broom	B	B	Intalco	20	0
			Lake Terrell	10	10
			Lummi Island	2	2
			Tennant Lake	1	1
Yellow flag iris	C	C	Nooksack Estuary	1	0
			Tennant Lake	1	0
Himalayan Blackberry	Not listed	Not listed	All units	50	3-5

B-Designate are state-listed and mandatory for control to prevent seed production/spread.

Management and control recommendations for individual weed species can be found in the following sections, as follows:

CANADA THISTLE CONTROL PLAN

Latin Name: *Cirsium arvense*

Common Name: Canada thistle

Updated: 2006

DESCRIPTION: Canada thistle is a perennial herb that grows one to four feet tall. Stems are slender, green, and freely branched. Leaves are alternate, deeply lobed with stiff yellowish spines on the margins. Purple flowers bloom in late spring into summer. Plants are male or female and grow in circular patches that often are one clone and sex. Female flowers produce a sweet odor. Fruits are about 1/8-inch long, somewhat flattened, and brownish and may produce 1,000 to 1,500 seeds per flowering shoot. This species develops and spreads mainly via vegetative buds (shoots) in its root system, and secondarily via seeds. Horizontal roots may extend 15 feet or more and vertical roots may grow 6 to 15 feet deep. Plants from seed develop roots four feet deep at the end of the first growing season, and flower the second year. Generally, vegetative reproduction contributes to local spread and seed to long distance dispersal. Seed can remain viable in the soil for up to 20 years.

Habitat: Native to SE Europe and the eastern Mediterranean area, this species was probably introduced to North America by early colonists in the 17th Century. Canada thistle grows in a wide variety of soils and can tolerate up to two percent salt content. It prefers deep, well-aerated cool soils, and is less common in light, dry soils and on wet soils without much aeration. This weed is found in almost every plant community disturbed by humans: roadsides, railway embankments, lawns, gardens, abandoned fields, sand dunes, agricultural fields, forest margins and waterways. Canada thistle is shade intolerant.

Threat: Canada thistle is an aggressive, creeping perennial weed that infests croplands, pastures, rangeland, prairies, streamside areas, roadsides and other disturbed ground. It is an effective competitor for light, moisture and nutrients thereby reducing crop yields, displacing native vegetation, decreasing species diversity, and changing habitat structure and composition. Most alarmingly, this weed has adapted to different environmental conditions, and these plant variations (ecotypes) all respond differently to treatment. Some infestations may be completely controlled by one technique, while others will only be partially controlled because two or more ecotypes are present. Additionally, Canada thistle responds differently under different weather conditions. Therefore it is often necessary to implement several control techniques, and to continuously monitor their impacts.

MANAGEMENT INFORMATION:

Biological: Many insects, a few nematodes, and the American Goldfinch have been reported to feed on various parts of Canada thistle. At least seven insect species have been intentionally or unintentionally released for its control in North America. Only a few of them cause conspicuous damage. A fly, (*Urophora cardui* L.) is the most promising biological control agent. Eggs are laid in the terminal buds and galls develop which divert nutrients and stress the plant. A combination of at least three biocontrol agents, or of biocontrol agents and herbicides, may provide better control than any single agent.

Chemical: Picloram (Tordon 22K), clopyralid (Transline, Curtail), dicamba (Banvel/Vanquish/Clarity) and chlorsulfuron (2,4-D and Telar) are most effective against Canada thistle when combined with manual or mechanical control. Different ecotypes respond differently to the same herbicide, so it is important to vary herbicides to prevent tolerant clones from becoming dominant. For all herbicides except 2,4-D, two or more applications give better control. Herbicide absorption is

enhanced in late summer and fall (the rosette stage). Flower-bud stage is second best. Herbicide effect is enhanced when roots are weakened during the growing season by herbicide treatment, crop competition, frequent mowing or tilling; and 2) new shoots are stimulated to grow. Apply herbicide when new leaves are green (September/October).

Manual: Grasses and alfalfa can compete effectively with Canada thistle. Burning may be the least damaging treatment method, because in many habitats it stimulates native vegetation growth, which subsequently competes with the thistle. Combining biocontrol and prescribed fire or mowing may help control Canada thistle and promote restoration, but this is still in the experimental stage.

Mechanical: Mowing alone is not effective unless conducted at one-month intervals over several growing seasons. Tilling every three weeks for about four months can control minor infestations. Mowing can be more effective if combined with herbicide treatments.

CURRENT DISTRIBUTION

Canada thistle was first seen on this Wildlife Area in 1972. It is currently found in large discreet patches on the Intalco, Lake Terrell and Tennant Lake units. This is a Class C noxious weed.

ACRES AFFECTED: 13	WEED DENSITY: Medium
Goals:	Objectives:
-Control expanding populations	-Survey and map existing and treated populations
-Prevent new occurrences	-Calculate the acres affected by this weed
	-Treat 100% of infestations
	-Survey nearby units for pioneering infestations

ACTIONS PLANNED

In 2006, infestations will be mowed before flowers appear if time/funding allows.

CONTROL SUMMARY AND TREND

- 2002 – Approximately 2 acres were treated
- 2003 – Approximately 2 acres were treated
- 2004 – Approximately 2 acres were treated
- 2005 - Approximately 2 acres were treated

Whatcom County Parks and Recreation Department mows about two acres of Canada thistle on the Tennant Lake unit each year. Intalco is responsible for weeds on their property.

JAPANESE KNOTWEED CONTROL PLAN

Latin Name: *Polygonum cuspidatum*

Common Name: Japanese knotweed

Updated: 2006

DESCRIPTION: Japanese knotweed is an herbaceous perennial that forms large clumps three to 10 feet tall. Leaves are two to six inches long and heart shaped, but hybrids blur these distinctions. The hollow, upright, bamboo-like stems are often reddish or red-speckled; young shoots look similar to red asparagus. Small greenish-white flowers form in July and August, growing in dense clusters from leaf joints. Male flowers are upright; female flowers droop. Although the plant dies back to the ground after hard frosts, bare, reddish brown stalks may persist through the winter. While it can reproduce by seed, primary reproduction is through an extensive network of rhizomes that can spread 20 to 65 feet from the parent plant and penetrate seven feet into the soil. Shoots generally emerge in April and can grow more than three inches a day. Root and stem fragments as small as one-half inch can form new plant colonies. Dispersal can occur naturally when rhizome fragments are washed downstream by currents or floods and deposited on banks or more commonly, when soil is transported as fill dirt. Many patches in the Pacific Northwest appear to be hybrids of Japanese and giant knotweed (*Polygonum X bohemicum*).

Habitat: Native to eastern Asia, it was introduced to the United Kingdom as an ornamental in 1825, and from there to North America in the late nineteenth century. Japanese knotweed is found primarily in moist, unshaded habitats in regions of high precipitation. It will grow in silt, loam, sand and river cobble with pH ranging from 4.5 to 7.4. Its distribution appears to be limited by light as its growth and abundance are depressed in shady locations. It spreads primarily along river banks, but also grows in wetlands, irrigation canals, ditches, waste places, along roadways, and in other disturbed areas.

Threat: Because the Pacific Northwest has so many streams, rivers and associated riparian areas, seasonal flooding constantly spreads small knotweed fragments to new areas where they easily and quickly take hold. Then knotweed's early emergence and great height combine to shade out other vegetation and prohibit native plants and other weed species from growing. It reduces species diversity and destroys critical fish and wildlife habitat. These stem and root fragments (also spread in contaminated fill material) can regenerate when buried three feet deep and grow through two inches of asphalt.

MANAGEMENT INFORMATION:

Biological: Research has only recently begun on biological control. The genetic uniformity of this species makes it a good candidate for biological control, but it may be years before a successful control agent can be found.

Chemical: Glyphosate (Aquamaster, Rodeo, Roundup) is effective on first year plants and sprouts from nodes. Cut or mow plants in spring, then apply in June or July when plants are 3-6 feet tall. Repeated applications over several years may be necessary, especially for large patches. Tests with tricopyr (Garlon 3A) killed 100 percent within two years; Rodeo typically takes three years. Picloram (Tordon) applied in the spring is also recommended, but not near water. Dicamba has also been effective, but is persistent in the soil and nonselective. Other herbicides are those with 2,4-D, imazapyr (Arsenal) or picloram (Tordon). Although some glyphosate products control with one or

two treatments in some cases, frequently several badly mutated stems from each clump survive and must be retreated. Herbicides appear to be more effective when combined with cutting. Digging, pulling or tilling (if conditions warrant) before August and at least one month prior to spraying may also help by increasing the shoot to root ratio and reducing plant vigor and root mass, thereby increasing plant susceptibility to the herbicide.

Manual: No research has been done on burning plants, but it may also remove above ground plant material. Goats are reported to eat knotweed and in some circumstances controlled grazing may be an option similar to intensive mowing.

Mechanical: Thorough and persistent cutting TWICE A MONTH over several years can eliminate knotweed (especially small, isolated patches) as this reduces rhizomatous reserves. Prevent the plants from ever exceeding six inches tall. Remove, rake or carefully dry all knotweed vegetation, because stems or stem fragments can sprout.

CURRENT DISTRIBUTION

Japanese knotweed was first seen on this Wildlife Area in 2005 on the Lake Terrell unit. This is a Class B noxious weed.

ACRES AFFECTED: <1	WEED DENSITY: Low
Goals:	Objectives:
-Control expanding populations	-Survey and map existing and treated populations
-Prevent new occurrences	-Calculate the acres affected by this weed
	-Treat 100% of infestations
	-Survey nearby units for pioneering infestations

ACTIONS PLANNED

In 2006, approximately one acre of infestation will be sprayed with a soil sterilant (Oust). Any plants germinating in mid spring will then be sprayed with Roundup. Control efforts will be annual until plants are eradicated.

CONTROL SUMMARY AND TREND

This is the first year this species will be controlled.

PURPLE LOOSESTRIFE CONTROL PLAN

Latin Name: *Lythrum salicaria*

Common Name: Purple loosestrife

Update: 2006

DESCRIPTION: Purple loosestrife is a perennial, emergent aquatic plant with a woody taproot, often growing six to ten feet tall and five feet wide. The narrow oblong leaves are 1.5 to four inches long, smooth, and opposite or whorled. Magenta flowers appear from July to early October on long, showy spikes. Each mature plant can produce 2.7 million pepper-sized seeds that can remain in the soil for years. Most seeds germinate in high densities (about 1,000 to 2,000/sq. foot) around the parent plant and flower eight to ten weeks later. Purple loosestrife also spreads vegetatively, thanks to substantial root wads with buds that can become shoots or roots.

Habitat: Probably Europe and Asia. During the mid 1900's the nursery industry developed and sold plants thought to be sterile. Of the 12 species in the continental U.S., three are exotic (introduced). Purple loosestrife occurs in freshwater and brackish wetlands, cattail marshes, sedge meadows, open bogs, ditches and other wet disturbed soil areas, and along lakes, streams and rivers. It tolerates a broad pH range (4.0 and 9.1) and grows best in high organic soils, but tolerates clay, sand, muck and silt. Generally found in full sun, it can survive in half shade.

Threat: With its ability to produce prolific amounts of seeds and spread vegetatively from root buds and stem pieces, this species is highly invasive, competitive and long-lived (up to 20 years). It is an extremely successful and sudden invader of disturbed wetlands due to its massive seed bank, outcompeting all native seedlings and severely altering wetland ecosystems. It displaces native plants; nesting and feeding habitat for waterfowl, fur-bearing animals and other bird populations; reduces recreational hunting and trapping grounds; and decreases land values. Purple loosestrife also invades and clogs irrigation systems (costing millions annually to fix) and overtakes wild meadows, hay meadows and wetland pastures used for grazing.

MANAGEMENT INFORMATION:

Biological: Leaf-feeding beetles (*Galerucella californiensis* and *G. pusilla*) may provide long term success. These beetles defoliate and attack the terminal bud area, drastically reducing seed production and leaving a high seedling mortality rate (nearly 50 percent). A root-mining weevil (*Hylobius transversovittatus*) that also eats leaves and severs xylem and phloem tissue (depleting carbohydrate reserves) greatly reduces plant size. Other possible agents include a seed-eating beetle (*Nanophyes marmoratus*) that reduces seed production by 60 percent, another (*N. brevis*) that attacks seed capsules, and a cecidomyiid fly whose galling can reduce the foliage by 75 percent and seed production by 80 percent.

Chemical: Glyphosate (AquaNeat, AquaMaster) are the herbicides labeled for aquatic use in Washington and provide good control if applied in July and August; however they non-specific. For larger infestations where selective application of glyphosate is not practical, broadleaf herbicides (Triclopyr and 2,4-D based) are also effective, if applied in late May to early June. A combination of 2,4-D and dicamba (1:1 tank mix) has been used on a limited basis in western irrigation ditches. Spray loosestrife at 10-15 percent of its mature growth for good results and repeat once during the growing season.

Manual: Flooding plants for five weeks can produce 100 percent mortality, but all growth must be underwater. This is only recommended for large infestations because of problems maintaining constant water levels and harm to native plants. If possible, delay drawdowns until mid-July, after growing season has peaked. Mature flowering stems of small infestations can be cut at the base in late summer or early fall, bagged and disposed of to prevent seed production. Black plastic covering is an interim option for dense seedling infestations, slowing growth and seed production. However, root crowns did die in plots where heavy litter from mowing remained covered until the next June. More study needed. Replacement seeding may be useful to control or contain loosestrife populations on buffer property. Trials with Japanese millet (*Echinochloa frumentacea*) and knotweed (*Polygonum lapathifolium*) sown immediately after marsh draw-down successfully outcompeted loosestrife seedlings. However, the millet didn't regenerate well and has to be replanted every year. The following spring loosestrife grew first due to its over-wintering rootstock.

Mechanical: While mowing alone is not a viable control option, doing so late in the season reduces shoot production more than mid summer cutting. Where disturbance to soil and plants is acceptable, tilling the top six inches of soil with disc or harrow can effectively grub out the root crown where the plant's energy is stored.

CURRENT DISTRIBUTION

Purple loosestrife was first seen in 1998 and is currently widely scattered on the Lake Terrell unit. It is a Class B-designated noxious weed.

ACRES AFFECTED: 1	WEED DENSITY: Low
Goals:	Objectives:
-Control expanding populations	-Survey and map existing and treated populations
-Prevent new occurrences	-Calculate the acres affected by this weed
	-Treat 100% of infestations
	-Survey nearby units for pioneering infestations

ACTIONS PLANNED

In 2006, the Lake Terrell unit will be surveyed and spot treated in mid summer with the herbicide Rodeo. Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND

- 2002 – Approximately 1 acre was treated
- 2003 – Approximately 1 acre was treated
- 2004 – Approximately 1 acre was treated
- 2005 – Approximately 1 acre was treated

For the past six years, less than one acre of purple loosestrife has been sprayed with Rodeo on the Lake Terrell unit (200 acres).

REED CANARYGRASS CONTROL PLAN

Latin Name: *Phalaris arundinacea*

Common Name: Reed canarygrass

Updated: 2006

DESCRIPTION: Reed canarygrass is a perennial grass that can grow three to six feet tall. The sturdy, often hollow stems can be up to 1/2 inch in diameter, with some reddish coloration near the top. Leaf blades are flat and hairless, 1/4 to 3/4 of an inch wide. In June and July flowers are borne on the top three to six inches of a stalk that is held high above the leaves. Reed canarygrass can spread by seeds or creeping rhizomes (roots that sprout shoots) and will also produce roots and shoots from the nodes of freshly cut stems. However, it is shallow-rooted—only two to eight inches deep.

Habitat: While possibly native to North America, it is very likely that the reed canarygrass found in wet places today is a European cultivar specifically bred for its growth and vigor, and widely introduced starting in the 1900s. In some areas, this grass has also been used for erosion control. A wetland plant, this species typically occurs in soils that are saturated or nearly saturated for most of the growing season. Established stands can tolerate extended periods of inundation. It does not survive in deep shade or dry uplands, but can tolerate prolonged drought.

Threat: Reed canarygrass is extremely aggressive and often forms persistent monocultures in wetlands and along rivers and streams. Infestations threaten the diversity of these areas, since the plant chokes out native plants and grows too densely to provide adequate cover for small mammals and waterfowl. The grass can also lead to increased siltation along drainage ditches and streams. Once established, reed canarygrass is difficult to control because it spreads rapidly by rhizomes.

MANAGEMENT INFORMATION:

Biological: There are no known biological control agents for reed canarygrass.

Chemical: Glyphosate (Rodeo, Aquamaster, Glypro), amitrol, dalapon, and paraquat have all been tried with some success. Mowing plants down to 3 feet or less and then spraying at flowering time (late summer to early fall) produced effective control. Only glyphosate (Rodeo) is licensed for use in aquatic systems in Washington. Applying Rodeo, followed in two to three weeks by prescribed burning has also been effective. Sethoxydim (Vantage) is a grass-specific herbicide used with some success in the Pacific Northwest, but not labeled for aquatic use.

Manual: The following covering/mulching techniques can eliminate reed canarygrass: using a thick woven geotextile shade cloth, applying several layers of cardboard covered by 4-6 inches of wood mulch, using a thick woven plastic fabric (Mirafi or Amoco brands) held in place by 7-inch gutter spikes, washers and duck-bill tree anchors, or even rubber, road felt and other thick materials that keep out light. Keep the covering firmly in place for over one year (over an entire growing season), even under water, to kill all plants. Re-vegetation or reseeding is generally necessary. Mowing plants close to the ground prior to applying any covering greatly helps. Flooding an area with more than 5 feet of water for at least three growing seasons has successfully eliminated this weed. While burning generally does not kill mature canarygrass, prescribed fire can be a pretreatment to tillage, shade cloth, or herbicide application with good results, since fire will remove dead litter and standing vegetation. Planting native trees and shrubs in weed-infested

circles or blocks (that have been killed by herbicide) can produce shade and weaken the vigor and growth of adjacent reed canarygrass patches over time. Seeding an area with competitive grass species, such as tufted hairgrass (*Deschampsia cespitosa*), slough grass (*Beckmannia syzichachne*), bentgrass (*Agrostis spp.*) or turf-forming varieties of red fescue (*Festuca rubra*), may prevent significant establishment of canarygrass seeds.

Mechanical: Multiple mowings a year (early to mid-June and early October) may be a valuable control method, since it removes seed heads before they mature and exposes the ground to light, which promotes the growth of native plant species. Cutting, disking or plowing as the plants are coming into flower can also control this weed.

CURRENT DISTRIBUTION

Reed canarygrass was present prior to these sites becoming the Whatcom Wildlife Area. It is currently found throughout the Intalco, Lake Terrell, Nooksack and Tennant Lake units. This is a Class C noxious weed.

ACRES AFFECTED: 2,180+	WEED DENSITY: High
Goals:	Objectives:
-Control expanding populations	-Survey and map existing and treated populations
-Prevent new occurrences	-Calculate the acres affected by this weed
	-Treat infestations prior to habitat restoration plantings
	-Monitor shading effects of riparian plantings
	-Survey nearby units for pioneering infestations

ACTIONS PLANNED

In 2006, 180 acres of reed canarygrass will be mowed and then sprayed/spot-sprayed with Roundup/Rodeo in early summer. The treated areas will be planted with native riparian tree and shrub species the following winter and will eventually shade out the grass or at least weaken its reproductive vigor.

CONTROL SUMMARY AND TREND

On the Lake Terrell unit, maintaining consistently high water levels in the lake drowns most of it. About 15 additional acres are mowed w/ tractor annually to control/keep public access open. On the BP and Intalco units, there is no funding to control this weed. On the Nooksack unit:

- 2002 – Approximately 35 acres were mowed, then sprayed with Roundup/Rodeo
- 2003 – Spot spray around riparian plantings with Roundup; 35 acres mowed with weed-eaters; 40 acres mowed, then sprayed with Roundup/Rodeo
- 2004 – 35 more acres mowed with weed-eaters; 40 acres mowed, then sprayed with Roundup/Rodeo
- 2005 – 55 acres mowed, then sprayed with Roundup/Rodeo
- 2006 – Spot spray and weed on entire acreage

SCOTCH BROOM CONTROL PLAN

Latin Name: *Cytisus scoparius*

Common Name: Scotch broom

Update: 2005

DESCRIPTION: Scotch broom is a woody evergreen shrub growing 3-10 feet tall. The stiff, dark green stems are strongly angled and grow erect and woody, with broom-like branches that spread only slightly from the main stem. Leaves are small, simple and generally three-parted. Small yellow, pea-like flowers bloom from March to June along the entire stem. Brown seed pods are smooth, flattened and contain beanlike seeds that remain viable for up to 80 years. Bushes can produce up to about 10,000 seeds per plant and eject seeds up to 20 feet away. This species grows rapidly thanks to an aggressive taproot that may exceed two feet in length, and a large shallow lateral root system. Within the first year broom can grow more than three feet tall; plants rarely live more than 10 to 15 years.

Habitat: Scotch broom is native to Europe and was likely introduced as an ornamental. By the turn of the century it had become naturalized on Vancouver Island (Bailey 1906) and was probably planted throughout the Pacific Northwest as an ornamental and as a soil binder along highway cuts and fills. Scotch broom grows best in dry sandy soils in full sunlight, but will survive a wide range of soil conditions, as a result of its ability to fix nitrogen from the atmosphere. Broom invades open sites such as logging roads, landings, roadsides, skidtrails and harvest areas.

Threat: Scotch broom is very aggressive, spreads rapidly, growing so dense that it is often impenetrable. It prevents reforestation, creates a high fire hazard, renders rangeland worthless and greatly increases the cost of maintenance of roads, ditches, canals, power and telephone lines. Even wildlife suffers as the growth becomes too dense for traveling or nesting, and there is no natural forage left for deer. Its seeds are slightly toxic, so it is browsed very little.

MANAGEMENT INFORMATION:

Biological: Three biological control agents (a twig mining moth, a seed weevil, and a shoot tip moth) have been ineffective in controlling broom, but they can stress individual plants and limit seed production. Several other candidates have been identified — a seed-feeding beetle (*Bruchidius villosus*), a nodule-feeding insect (*Sitona regensteinensis*), a stem-mining weevil (*Apion immune*), and lastly a gall-forming mite (*Aceria genistae*), that is apparently the only creature capable of killing Scotch broom on its own.

Chemical: 2,4-D, alone or mixed with other herbicides, triclopyr (Garlon) and imazapyr (Arsenal). Mixtures with 2,4-D may include triclopyr (Crossbow), diquat, picloram (Tordon), dicamba, and sodium chlorate. Triclopyr is superior to glyphosate and fosamine ammonium. Paraquat and diquat result in only short term (3-6 weeks) control of stump sprouting and seedlings. Spray when plants are in the seed head stage (late summer to early autumn). Spray with a backpack sprayer, tractor mounted broadcast or aerial spraying, or wipe each plant.

Manual: Hand pulling plants before they produce seeds (most easily done after a rain) that removes the entire rooting system can be effective, but time consuming. Prescribed fire can be a viable first treatment if done in late summer, when the plant is most stressed. Because burns also stimulate seed germination, burn every two years to first remove older plants and stimulate seed bank germination, then two years later to kill those seedlings before they mature. Combined with

limited spot uprooting/spraying/mowing, this may be sufficient to control broom and eliminate its seed bank. Goats may be used to destroy seedlings or plants up to four feet tall. If the broom is dense or providing significant erosion control, aggressively replant with a mixture of native grasses, sedges, rushes and sprouting shrubs such as willow and Cedar or hemlock trees.

Mechanical: Scotch broom may be cut or chopped back by tractor-mounted mowers or scythes. Plants usually require several cuttings before the underground parts exhaust their reserve food supply. The greatest success occurs in late summer (August and September). If only a single cutting can be made, do it when plants begin to flower. After cutting, broom may resprout from root crowns in greater density if not treated with herbicides.

CURRENT DISTRIBUTION

Scotch Broom was first seen in 1975. It is currently thinly scattered on the Intalco, Lake Terrell, Lummi Island and Tennant Lake units. This is a Class B noxious weed.

ACRES AFFECTED: 33	WEED DENSITY: Low
Goals:	Objectives:
-Control expanding populations	-Survey and map existing and treated populations
-Prevent new occurrences	-Calculate the acres affected by this weed
	-Treat 100% of infestations
	-Survey nearby units for pioneering infestations

ACTIONS PLANNED

Control on all units in 2006 will be essentially the same -- using mechanical and chemical herbicide control. In large infestations, Scotch Broom will be mowed with a tractor and mower. In more sensitive areas or in areas with low-density infestations, it will be sprayed only.

CONTROL SUMMARY AND TREND

Lummi – 2 acres sprayed in 2005 with Crossbow, got 20% control
 Intalco: 2003 – mowed 20 acres, got 40% control
 2004 – mowed and sprayed 20 acres, got 25% control
 2005 – sprayed 20 acres, got 90 % control
 Lake Terrell: 2005 – sprayed 10 acres, got 50% control
 Tennant Lake: 2005 – sprayed 1 acre, got 50% control

YELLOW FLAG IRIS CONTROL PLAN

Latin Name: *Iris pseudacorus*
Family: Iridaceae

Common Name: Yellow flag iris
Iris Family

DESCRIPTION: Yellow flag iris is a robust, clumping perennial herb growing about 4.5 feet tall. The erect, sword-like leaves radiate from the base like a fan and are 20-40 inches long. In late spring or early summer, one or more showy yellow flowers bloom on each stem. The fruit is a triangular, glossy green capsule about three inches long, with many flat brown seeds. This species also spreads by roots that can become shoots (rhizomes). Its roots extend four to 12 inches deep. Up to several hundred flowering plants may be connected by these rhizomes and grow tightly bunched together in dense horizontal mats. Rhizome fragments can form new plants if they break off and drift to suitable habitat. When not flowering, yellow flag iris may be confused with cattail (*Typha latifolia*) or broad-fruited burreed (*Sparganium eurycarpum*).

Habitat: Yellow flag is native to Europe, Great Britain, North Africa and the Mediterranean region. As a very popular ornamental, it has been introduced throughout the world. This iris can also control erosion, and takes up metals and nutrients in waste water treatment facilities. It is found in a variety of soil types—thin shingle layers of organic matter on gravel or sand to thick mucky gleys. This weed appears to be most common near developments in temperate wetlands and along lakes and slow-moving rivers. Typically found in very shallow water or mud, it will grow in water up to eight inches deep. Yellow flag tolerates sediment, some salinity and high soil acidity and does well in nutrient rich conditions. It prefers full sun to part shade.

Threat: Yellow flag iris is still sold as a garden ornamental, and continues to escape into new areas. Water is the primary dispersal agent for both seeds and rhizome fragments; the seeds can remain buoyant for at least seven months. Once established, this plant can colonize in large numbers and form dense single-species stands, outcompeting native wetland plants and excluding native animals. This species does not provide food for native wildlife and all parts of the plant are poisonous, especially the rhizomes.

MANAGEMENT INFORMATION:

Biological: There are currently no biological control agents available, although it is fed upon by several invertebrates and fungi.

Chemical: Applying an aquatic-labeled herbicide such as glyphosate (Rodeo, Aquamaster, Glypro) directly to foliage, or to freshly cut leaf and stem surfaces using a driplless wick/wiper applicator, or spraying can effectively kill yellow flag iris. Use a dye in the herbicide mix so you can watch for accidental contact or spill.

Manual: Manual methods that remove the entire rhizome mass can successfully control small, isolated patches, but they are very time and labor-intensive, since even small rhizome fragments can resprout. Additionally, digging disturbs the soil, may fragment rhizomes, and promote germination of this iris and other undesirable species from the soil seed bank. Pulling or cutting yellow flag iris plants may provide adequate control only if it is repeated every year for several years to weaken and eventually kill the plant. Dead-heading (removing the flowers and/or fruits)

from plants every year can prevent seed development and seed dispersal, but will not kill those plants. When pulling, cutting, or digging, resinous substances in the leaves and rhizomes can cause skin irritation.

Mechanical: Mechanical methods that remove the entire rhizome mass can successfully control small, isolated patches, but they are very time and labor-intensive, since even small rhizome fragments can resprout. Additionally, digging disturbs the soil, may fragment rhizomes, and promote germination of this iris and other undesirable species from the soil seed bank. Care must be taken to collect all fragments.

CURRENT DISTRIBUTION

Yellow flag iris was first seen here in 2003. Currently it is found on the Nooksack and Tennant Lake units in small discreet patches. This is a Class C weed species.

ACRES AFFECTED: <2	WEED DENSITY: Very low
Goals:	Objectives:
-Control expanding populations	-Survey and map existing populations
-Prevent new occurrences	-Calculate the acres affected by this weed
	-Monitor existing populations annually
	-Start manual control in 2006-07

ACTIONS PLANNED

Infested areas will be mapped and volunteer groups (Master Gardeners, Native Plant Stewards) will be organized in 2006-07 to start a manual control program (pulling plants by hand prior to seed stage).

CONTROL SUMMARY AND TREND

This is the first year this species will be controlled.

HIMALAYAN BLACKBERRY CONTROL PLAN

Scientific Name: *Rubus discolor/armeniacus*

Common Name: Himalayan blackberry

Updated: 2005

DESCRIPTION: Himalayan blackberry (HBB) is a robust, sprawling perennial, more or less evergreen, shrub. Leaves are large, round to oblong and toothed, and usually in groups of five. Stout, thick, arching stems (canes) have large, stiff thorns. Shrubs first appear as individual canes, then groups of canes, gradually increasing to become great mounds or banks, with individual canes reaching up to nine feet. The main cane grows up to 15 feet tall; trailing canes spread up to 20-40 feet, frequently taking root at the tips. Small white to pink flowers appear in spring and then roundish, black edible fruits form in mid-summer to early August. Individual canes live only two to three years, yet reach a density of 525 canes per square yard. Roots penetrate down about 3 feet, and can be 30 feet long. HBB also grows vegetatively by root and stem fragments. Seeds remain viable for several years.

Habitat: Native to Western Europe, this weed was probably first introduced to North America in 1885 as a cultivated crop. By 1945 it had naturalized along the West Coast. Himalayan blackberry tolerates a wide range of soils and moisture conditions, but not true wetland soils. It prefers full sun and well-drained soils. It is found in vacant lands, pastures, open forests, tree farms, roadsides, creek gullies, riparian areas, fence lines and right-of-way corridors.

Threat: Once it becomes well established, HBB out competes any low growing native vegetation and can prevent shade intolerant trees from growing, leading to permanent HBB thickets with little other vegetation present. These dense, impenetrable thickets limit the movement of large animals. When this species takes over entire stream channels and banks, it increases the possibility of flooding and erosion there.

MANAGEMENT INFORMATION:

Control is best done in two phases: 1) remove above ground vegetation, and 2) kill/remove root crowns and major side roots (not necessarily in that order).

Biological: The USDA has not supported the introduction of herbivorous insects to control HBB due to the risk these insects may pose to commercially important *Rubus* species. Research on this subject continues.

Chemical: Herbicides such as triclopyr (Garlon 3a and 4), glyphosate (Roundup, Rodeo) or 2,4-D with triclopyr (Crossbow) deliver effective control when applied to mature, uncut canes in late summer/fall or to cut/resprouted stems in fall. Picloram and 2,4,5-T are not considerably more effective than cane removal. All standing, dry, hard canes need to be removed for effective restoration.

Manual: Removing root crowns and major side roots by hand digging (claw mattock, pulaski/mattock) is a slow but sure way to destroy blackberry (especially small patches). You must be thorough and follow up because large root fragments left in soil may produce a new plant. Starting with lesser weed infestations and working towards the worst stands is effective at maximizing self-recovery of native vegetation. Or immediately seed with native grasses to reduce

invasion by other weeds and allow follow-up treatment of surviving HBB with broadleaf killing herbicides (if desired). Remove canes and fragments to prevent resprouting. Although fire alone doesn't control this weed, burning large infested areas will remove standing mature plants after a pre-spray of herbicide(s) to kill and desiccate aboveground portions. Planting fast-growing shrubs or trees or shade tolerant species may reduce or prevent HBB re-establishment, since the species is usually intolerant of shade. Grazing sheep and goats where mature plants have been removed has also controlled regrowth, but both are non-selective eaters.

Mechanical: Mowing and weed-whacking (blade better than string) can be very effective in controlling HBB. Several cuttings are required before the underground parts exhaust their reserve food supply. If only a single cutting can be made, do it when plants begin to flower. Debris may be fed through a mechanical chipper and used as mulch. Need to follow-up the next year, as HBB may resprout from root crowns in greater density (and overtop any planted vegetation).

CURRENT DISTRIBUTION

Himalayan blackberry is so widespread and rampant throughout Washington that it has not been added to the state's noxious weed list because control would be almost impossible at that scale. This weed is currently found on all units in small to large patches, and is thick along access roads and field edges.

ACRES AFFECTED: ~50	WEED DENSITY: High
Goals:	Objectives:
-Control expanding populations	-Calculate the acres affected by this weed
-Prevent new occurrences	-Monitor existing populations annually
	-Treat when budget allows

ACTIONS PLANNED

Himalayan blackberry, although not on the state or county noxious weed list, will continue to be monitored on an annual basis and treated as funding allows.

CONTROL SUMMARY AND TREND

For the past ten years, big patches (3-5 acres) on the Lake Terrell unit have been mowed with a tractor mower.

GENERAL WEEDS CONTROL PLAN

Scientific name: *Many*

Common name: General Weeds

DESCRIPTION: General weeds describe mixed vegetation that interferes with maintenance, agricultural, or restoration activities, where keying plants to individual species is not appropriate. Examples of general weeds may include vegetation occurring along roadsides, parking areas, trails and structures. General weeds may also occur in agricultural fields, or comprise the dominant vegetation at a site identified for habitat restoration and includes species like Himalayan blackberry, reed canarygrass, bindweed or thistle.

MANAGEMENT INFORMATION:

Herbicide can be an effective tool for control and applicators should refer to the Pacific Northwest Weed Management Handbook, or other reputable resources, for product recommendations and timing depending on the weed and desired management objectives. Mechanical weed control may include mowing, plowing or disking.

CURRENT DISTRIBUTION

All public accesses and roadsides on the Wildlife Area contain general weeds to varying degrees. Agricultural fields on several units also contain general weeds.

ACRES AFFECTED: ~2	WEED DENSITY: Very Low
Goals:	Objectives:
- Maintain public access	- Treat high public use areas with residual herbicide or mowing to prevent seed production

ACTIONS PLANNED

In the Spring of 2006, problematic portions of any roadsides, parking lots, access sites, and trailheads will be treated with a residual herbicide or mowed to eliminate the production and spread of weed seeds and improve appearance and public access for the entire season.

CONTROL SUMMARY AND TREND

2002 - Approximately 2 acres were treated
2003 - Approximately 2 acres were treated
2004 - Approximately 2 acres were treated
2005 - Approximately 2 acres were treated

Roadside and access management have required a consistent, yearly maintenance effort.

APPENDIX 3. WHATCOM WILDLIFE AREA FIRE CONTROL PLAN

Responsible Fire-Suppression Agencies

The Whatcom Wildlife Area and its satellite units fall under the jurisdiction of three local fire districts, all in Whatcom County (see Table 7). A small portion of some units, fall within the State Fire Protection Boundary, under the jurisdiction of the Department of Natural Resources (DNR). DNR also offers local fire districts support with fire protection and safety equipment requirements.

Table 7. County Fire Districts. In case of fire, Dial 911 FIRST

Unit Name	Fire District	Work Phone	City
BP	Whatcom Co. #7	360-384-0303	Ferndale
Intalco	Whatcom Co. #7	360-384-0303	Ferndale
Lake Terrell	Whatcom Co. #7	360-384-0303	Ferndale
Lummi Island	Whatcom Co. #11	360-758-2411	Lummi Island
Nooksack	Whatcom Co. #8	360-733-6612	Marietta
Pine/Cedar Lakes	Whatcom Co. #9	360-734-8575	Bellingham
Tennant Lake	Whatcom Co. #7	360-384-0303	Ferndale

Fires that occur within the local fire districts (non-timbered areas of the Wildlife Area) are the responsibility of the local fire districts, but in case of fire, dial 911 first. Fires that occur within the state fire protection boundary are the responsibility of the Department of Natural Resources and they need to be contacted first. Therefore, depending upon where the fire occurs, the appropriate agency must be contacted first, followed by an immediate call to other jurisdictions adjacent to the fire. In some cases, where there are multiple landowners or fire responders, fire suppression activities may involve two or more fire fighting agencies. The Washington Department of Fish and Wildlife currently has no contract with any Whatcom County Fire District.

Suppression on Washington Department of Fish and Wildlife forestlands within the state fire protection boundary is performed by the Department of Natural Resources. The Washington Department of Fish and Wildlife pays an assessment fee for each acre within the fire protection boundary for these services. In Western Washington, a parcel up to 50 acres pays the minimum assessment of \$14.40. For parcels over 50 acres, the minimum assessment is charged plus \$0.29 per acre for each acre over 50 (2004 rates). The Forest Fire Protection Assessment is levied on all forest and unimproved land. If a wildfire starts, Department of Natural Resources is there to suppress that fire at no additional cost to the landowner if negligence is not involved.

Department Fire Management Policy

It is the Department's policy that Wildlife Area staff are not firefighters and should not fight fires. While Wildlife Area staff are trained in fire fighting and fire behavior, they will only provide logistical support and information regarding access, water sources and critical habitat values to the Incident Commander of the responding fire agency.

Wildlife Habitat Concerns

The Whatcom Wildlife Area overall contains little sensitive or critical terrestrial habitat, except for one isolated unit that contains cliffs critical to the successful nesting and survival of falcons.

Aerial Support

The Department recommends that fire-fighting entities suppress fires on the Whatcom Wildlife Area as rapidly as possible. WDFW requests the Incident Commander to seek aerial support if needed to extinguish a fire on its land promptly. If, in the professional judgment of the Incident Commander, a fire on lands adjacent to the Whatcom Wildlife Area causes an immediate threat to the area, WDFW requests that he/she seeks aerial support as possible.

Reporting

Report any fire on or adjacent to all units of the Whatcom Wildlife Area by contacting the local fire district and the Department of Natural Resources Dispatch Office in Sedro Woolley (see Table 8 below). Contact the numbers listed below IN THE ORDER listed and request the Operations or Staff Coordinator. It is absolutely critical that any fire on the Whatcom Wildlife Area is fought as aggressively as possible during the initial attack.

Table 8. Department of Natural Resources Contacts

Name	Phone
DNR Dispatch	360-428-3293
DNR NW Regional Field office Sedro Woolley	360-856-3500

The following table (Table 9) provides telephone numbers IN PRIORITY ORDER of Department staff to be contacted in the event of a fire.

Table 9. Washington Department of Fish and Wildlife Contacts

Name/Position	Work Phone	Cell Phone	Home Phone
Shana Winegeart Whatcom W.A. Manager	360-384-4723	360-739-3404	360-312-0393
Ryan Vanentine Wildlife Agent, La Conner Area	State Patrol Dispatch	360-739-4532	360-671-0395
Bill Heinck Sergeant, La Conner Office	360-466-4345 (ext 221)	360-901-6587	360-445-3367
Regional Office, Mill Creek	425-775-1311	N/A	N/A
Lora Leschner Regional Wildlife Program Manager	425-775-1311 (ext 121)	425-231-7618	360-435-3158

APPENDIX 4. WHATCOM WILDLIFE AREA-WATER RIGHTS INVENTORY

File #	Cert #	Stat	Doc	Priority Datet	Purp*	Qi+	UOM	Qa+	Irrig Acres	WRIA	TRS	QQ/Q	Src's	1stSrc	Comments
R1-*09652CWRIS	4055	A	Cert	6/2/1950	FS, WL		CFS	5,600		1	39N 1E 16		1	Terrell Crk	LT unit, reservoir
G1-*02053PWRIS		I	Permit	7/30/1951	IR	160	GPM	30	20	1	39N 1E 21	NW/SW	1	Well	L T Unit
G1-*02083PWRIS		I	Permit	8/17/1951	IR	80	GPM	15	10	1	39N 1E 21	NE/SW	1	Well	L T Unit
G1-047898CL		A	Claim S		DG		GPM			1	39N 1E 21		1	Well	L T Unit
R1-*09652CWRIS	4055	A	Cert	6/2/1950	WL, FS		CFS	5,600		1	39N 1E 16		1	Terrell Crk	LT Unit
G1-161360 CL		A	Claim L		No ID'd	0.6	GPM	1		1	37N 1E 26		1		Lummi Is Unit
S1-161369CL		A	Claim L		No ID'd		CFS			1	37N 1E 26		1		Lummi Is Unit
G1-131358CL		A	Claim S		DG, ST		GPM			1	41N 3W 34		1		Pt Roberts Unit
G1-22732CWRIS	G1-22732 C	A	Cert	8/16/1976	FS	15	GPM	13		1	39N 1W 1	SE/SW	1	Well	BP Unit
G1-058783CL		A	Claim S		DG, ST		GPM			1	39N 1W 1		1		BP Unit
G1-045449CL		A	Claim S		DG		GPM			1	39N 1W 6		1		BP Unit
G1-032735CL		A	Claim L		DG		GPM			1	39N 1W 7		1	Well	BP Unit
G1-032736CL		A	Claim L		DG		GPM			1	39N 1W 18		1	Well	BP Unit
G1-032737CL		A	Claim L		DG		GPM			1	39N 1W 7		1	Well	BP Unit
S1-*16636PWRIS		I	Permit	4/18/1961	IR	0.2	CFS	40	20	1	39N 1W 6		1	Terrell Crk	BP Unit
R1-*16712AWRIS		I	New App	6/6/1961	IR		CFS	30		1	39N 1W 6		1	Terrell Crk	BP Unit
G1-076127CL		A	Claim S		DG, ST		GPM			1	39N 1W 06		1		BP Unit
G1-*01762CWRIS	1061	A	Cert	12/26/1950	DS, IR	45	GPM	10	5	1	39N 1W 06		1	Well	BP Unit
S1-*12547CWRIS	7336	A	Cert	9/1/1953	IR	0.6	CFS	120	60	1	39N 1W 06	W2/SW	1	Unnamed source	BP Unit
G1-*02888PWRIS		I	Permit	1/2/1953	DS, IR	200	GPM	40	20	1	39N 1W 18		1	Well	BP Unit

*CI=Commercial Industrial; DG=Domestic Ground; DS=Single Domestic; FS=Fish Stock; IR=Irrigation; SR=Storage; ST=Stock; WL= Wildlife
+Qa=Annual quantity; Qi=Instantaneous quantity

APPENDIX 5. MANAGEMENT PLAN COMMENTS & RESPONSES

Washington State Department of Fish and Wildlife, February 2008

The following individuals commented during the management plans public comment period.

Comment Author	Organization	Location
Will Maas	Local landowner	

Comments received on the Whatcom Wildlife Area Plan are presented below. A response for each comment is included. Where appropriate, changes were incorporated into the management plan to address public comments.

Commenter	Comment	Response
	General Support	
Will Maas	A local landowner expressed concerns over his hunting rights on the wildlife area.	<p>The Whatcom Wildlife Area falls entirely in GMU 407, and does not contain or manage lands in GMU 418.</p> <p>The Nooksack elk herd has stable to increasing numbers and a hunting season was opened in 2007. The Nooksack Tribe was instrumental in providing funding and staff to improve habitat and herd numbers.</p>

APPENDIX 6. WHATCOM WILDLIFE AREA BIRDS

COMMON NAME	SCIENTIFIC NAME
Snow Goose	<i>Chen caerulescens</i>
Brant	<i>Branta bernicla</i>
Canada Goose	<i>Branta canadensis</i>
Trumpeter Swan	<i>Cygnus buccinator</i>
Tundra Swan	<i>Cygnus columbianus</i>
Wood Duck	<i>Aix sponsa</i>
Gadwall	<i>Anas strepera</i>
American Wigeon	<i>Anas americana</i>
Mallard	<i>Anas platyrhynchos</i>
Blue-winged Teal	<i>Anas discors</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Northern Shoveler	<i>Anas clypeata</i>
Northern Pintail	<i>Anas acuta</i>
Green-winged Teal	<i>Anas crecca</i>
Canvasback	<i>Aythya valisineria</i>
Redhead	<i>Aythya americana</i>
Ring-necked Duck	<i>Aythya collaris</i>
Greater Scaup	<i>Aythya marila</i>
Lesser Scaup	<i>Aythya affinis</i>
Bufflehead	<i>Bucephala albeola</i>
Common Goldeneye	<i>Bucephala clangula</i>
Barrow's Goldeneye	<i>Bucephala islandica</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Common Merganser	<i>Mergus merganser</i>
Red-breasted Merganser	<i>Mergus serrator</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
Ruffed Grouse	<i>Bonasa umbellus</i>
Common Loon	<i>Gavia immer</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
Red-necked Grebe	<i>Podiceps grisegena</i>
Western Grebe	<i>Aechmophorus occidentalis</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
American Bittern	<i>Botaurus lentiginosus</i>
Great Blue Heron	<i>Ardea herodias</i>
Green Heron	<i>Butorides virescens</i>
Turkey Vulture	<i>Cathartes aura</i>
Osprey	<i>Pandion haliaetus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Northern Harrier	<i>Circus cyaneus</i>

Sharp-shinned Hawk	<i>Accipiter striatus</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Northern Goshawk	<i>Accipiter gentilis</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Rough-legged Hawk	<i>Buteo lagopus</i>
American Kestrel	<i>Falco sparverius</i>
Merlin	<i>Falco columbarius</i>
Gyr Falcon	<i>Falco rusticolus</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Virginia Rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
American Coot	<i>Fulica americana</i>
Killdeer	<i>Charadrius vociferus</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Spotted Sandpiper	<i>Actitis macularius</i>
Western Sandpiper	<i>Calidris mauri</i>
Least Sandpiper	<i>Calidris minutilla</i>
Dunlin	<i>Calidris alpina</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Bonaparte's Gull	<i>Larus philadelphia</i>
Mew Gull	<i>Larus canus</i>
Ring-billed Gull	<i>Larus delawarensis</i>
California Gull	<i>Larus californicus</i>
Herring Gull	<i>Larus argentatus</i>
Thayer's Gull	<i>Larus thayeri</i>
Glaucous-winged Gull	<i>Larus glaucescens</i>
Common Tern	<i>Sterna hirundo</i>
Rock Pigeon	<i>Columba livia</i>
Band-tailed Pigeon	<i>Patagioenas fasciata</i>
Mourning Dove	<i>Zenaida macroura</i>
Barn Owl	<i>Tyto alba</i>
Western Screech-Owl	<i>Megascops kennicottii</i>
Great Horned Owl	<i>Bubo virginianus</i>
Snowy Owl	<i>Bubo scandiacus</i>
Long-eared Owl	<i>Asio otus</i>
Short-eared Owl	<i>Asio flammeus</i>
Northern Saw-whet Owl	<i>Aegolius acadicus</i>
Common Nighthawk	<i>Chordeiles minor</i>
Black Swift	<i>Cypseloides niger</i>
Vaux's Swift	<i>Chaetura vauxi</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>

Downy Woodpecker	<i>Picoides pubescens</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Northern Flicker	<i>Colaptes auratus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Western Wood-Pewee	<i>Contopus sordidulus</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Hammond's Flycatcher	<i>Empidonax hammondi</i>
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Northern Shrike	<i>Lanius excubitor</i>
Solitary Vireo	<i>Vireo solitarius</i>
Hutton's Vireo	<i>Vireo huttoni</i>
Warbling Vireo	<i>Vireo gilvus</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>
Steller's Jay	<i>Cyanocitta stelleri</i>
American Crow	<i>Corvus brachyrhynchos</i>
Common Raven	<i>Corvus corax</i>
Horned Lark	<i>Eremophila alpestris</i>
Purple Martin	<i>Progne subis</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Poecile atricapilla</i>
Chestnut-backed Chickadee	<i>Poecile rufescens</i>
Bushtit	<i>Psaltriparus minimus</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Brown Creeper	<i>Certhia americana</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
House Wren	<i>Troglodytes aedon</i>
Winter Wren	<i>Troglodytes troglodytes</i>
Marsh Wren	<i>Cistothorus palustris</i>
Golden-crowned Kinglet	<i>Regulus satrapa</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Townsend's Solitaire	<i>Myadestes townsendi</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
Hermit Thrush	<i>Catharus guttatus</i>
American Robin	<i>Turdus migratorius</i>
Varied Thrush	<i>Ixoreus naevius</i>
European Starling	<i>Sturnus vulgaris</i>
American Pipit	<i>Anthus rubescens</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>

Orange-crowned Warbler	<i>Vermivora celata</i>
Nashville Warbler	<i>Vermivora ruficapilla</i>
Yellow Warbler	<i>Dendroica petechia</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>
Townsend's Warbler	<i>Dendroica townsendi</i>
MacGillivray's Warbler	<i>Oporornis tolmiei</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
Western Tanager	<i>Piranga ludoviciana</i>
Rufus-sided Towhee	<i>Pipilo erythrophthalmus</i>
American Tree Sparrow	<i>Spizella arborea</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Fox Sparrow	<i>Passerella iliaca</i>
Song Sparrow	<i>Melospiza melodia</i>
Lincoln's Sparrow	<i>Melospiza lincolni</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Bullock's Oriole	<i>Icterus bullockii</i>
Purple Finch	<i>Carpodacus purpureus</i>
House Finch	<i>Carpodacus mexicanus</i>
Pine Siskin	<i>Carduelis pinus</i>
American Goldfinch	<i>Carduelis tristis</i>
Evening Grosbeak	<i>Coccothraustes vespertinus</i>
House Sparrow	<i>Passer domesticus</i>

APPENDIX 7. WHATCOM WILDLIFE AREA FISH

Salmon, Trout, Char

Coastal cutthroat trout, *Salmo clarki clarki*

Rainbow trout, *Salmo gairdneri*

Suckers

Largescale sucker, *Catostomus macrocheilus*

Catfish

Brown bullhead, *Ictalurus nebulosa*

Channel catfish, *Ictalurus punctatus*

Sticklebacks

Threespine stickleback, *Gasterosteus aculeatus*

Sunfish

Largemouth bass, *Micropterus salmoides*

Pumpkinseed, *Lepomis gibbosus*

Black crappie, *Pomoxis nigromaculatus*

Bluegill, *Lepomis macrochirus* Rafinesque

Perches

Yellow perch, *Perca flavescens*

APPENDIX 8. WHATCOM WILDLIFE AREA MAMMALS

Shrews (4)

Masked Shrew, *Sorex cinereus*

Trowbridge's Shrew, *Sorex trowbridgii*

Vagrant Shrew, *Sorex vagrans*

*Pacific Water Shrew, *Sorex bendirii*

Moles (3)

Shrew-mole, *Neurotrichus gibbsii*

Pacific Mole, *Scapanus orarius*

Townsend's Mole, *Scapanus townsendii*

Bats (10)

Little Brown Myotis, *Myotis lucifugus*

*Long-eared Myotis, *Myotis evotis*

*California Myotis, *Myotis californicus*

Yuma Myotis, *Myotis yumanensis*

*Long-legged Myotis, *Myotis volans*

*Silver-haired Bat, *Lasionycteris noctivagans*

*Red Bat, *Lasiurus borealis*

Big Brown Bat, *Eptesicus fuscus*

*Hoary Bat, *Lasiurus cinereus*

Western Big-eared Bat, *Plecotus townsendii*

Weasels, skunks (6)

Short-tailed Weasel (Ermine), *Mustela erminea*

Long-tailed Weasel, *Mustela frenata*

Western Spotted Skunk, *Spilogale gracilis*

Mink, *Mustela vison*

Striped Skunk, *Mephitis mephitis*

River Otter, *Lontra canadensis*

Dogs and Foxes (3)

Coyote, *Canis latrans*

Red Fox, *Vulpes vulpes*

Bobcat, *Lynx rufus*

Squirrels (3)

Townsend's Chipmunk, *Tamias townsendii*

Douglas Squirrel, *Tamiasciurus douglasii*

Northern Flying Squirrel, *Glaucomys sabrinus*

Mice, rats, voles (9)

Deer mouse, *Peromyscus maniculatus*

Bushy-tailed Woodrat, *Neotoma cinerea*

Townsend's vole, *Microtus townsendii*
Creeping Vole, *Microtus oregoni*
Muskrat, *Ondatra zibethicus*
House Mouse, *Mus musculus*
Norway Rat, *Rattus norvegicus*
Black Rat, *Rattus rattus*
Pacific Jumping Mouse, *Zapus trinotatus*

Others (8)

Common Opossum, *Didelphis virginiana*
Raccoon, *Procyon lotor*
Beaver, *Castor canadensis*
Mountain Beaver, *Aplodontia rufa*
Porcupine, *Erethizon dorsatum*
Eastern Cottontail, *Sylvilagus floridanus*
Mule Deer/Black-tailed Deer, *Odocoileus hemionus*
*Black Bear, *Ursus americanus*

*Has not been recorded but should be present

APPENDIX 9. WHATCOM WILDLIFE AREA REPTILES AND AMPHIBIANS

Reptiles

Common garter snake (Puget Sound subspecies), *Thamnophis sirtalis pickeringi*

Western terrestrial garter snake, *Thamnophis elegans*

Northwestern garter snake, *Thamnophis ordinoides*

Amphibians

Northwestern salamander (Brown subspecies), *Ambystoma gracile subspecies gracile*

*Long-toed salamander, *Ambystoma macrodactylum*

Rough-skinned newt, *Taricha granulosa*

Western toad, *Bufo boreas*

Pacific treefrog, *Hyla (Pseudacris) regilla*

Northern red-legged frog, [*Rana aurora*](#)

Bullfrog, *Rana catesbeiana*, (introduced)

*Has not been recorded but should be present

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