

OLYMPIC-WILLAPA HILLS WILDLIFE AREA MANAGEMENT PLAN

Washington Department of Fish and Wildlife



Prepared by Wildlife Area Manager, Jim Gerchak



2006

STATE OF WASHINGTON
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Washington State Wildlife Area Plan

OLYMPIC-WILLAPA HILLS WILDLIFE AREA

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

Washington State Wildlife Area Plan

Olympic-Willapa Hills Wildlife Area

Washington Department of Fish and Wildlife
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Olympia, WA 98501-1091

Prepared by:
Jim Gerchak

November 2006



Director, Washington Department of Fish and Wildlife

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EXECUTIVE SUMMARY

The Olympic–Willapa Hills Wildlife Area encompasses a total of 23 satellite units comprising of approximately 10,430 acres. Individual units were acquired, dating back to the early 1950’s, for their specific benefit for fish and wildlife diversity and recreational significance. These lands include a wide range of important fish and wildlife habitats including riparian, estuarine, freshwater wetland, old-growth/mature forest, upland meadow, and coastal prairie systems. Focus units include Olympic, Wynoochee, John’s River, Chinook, and Chehalis/Hoxit. The primary habitat and recreational management emphasis for each of these units is listed in the table below.

Wildlife Area Unit	Management Emphasis
Olympic	Elk winter forage, reduce elk damage in the lower valley
Wynoochee	Habitat mitigation, elk winter forage
John’s River	Estuary restoration, waterfowl habitat, benefits to wildlife and habitat
Chinook	Waterfowl habitat, elk winter forage, restore fish passage
Chehalis/Hoxit	Waterfowl habitat and recreation

The primary management concerns and public issues identified in the wildlife are plan are:

- Improving and expanding the amount of quality winter forage available for elk
- Improving and maintaining fish populations
- Managing for waterfowl and species diversity
- Protecting and restoring riparian buffer habitat
- Protecting and restoring estuary and freshwater wetland habitats
- Providing recreational access that is compatible with fish, wildlife, and habitat protection
- Controlling noxious weeds
- Providing habitat management consistent with T&E listed species
- Managing for upland birds (pheasant release program)

In 2006 WDFW continued its effort to provide quality winter forage for elk. This included mowing approximately 485 acres, fertilizing 400 acres and reseeding 45 acres. These activities occurred at the Olympic, Wynoochee, Anderson Homestead and Chinook units. An additional 20-acre parcel was acquired adjacent to the Anderson Homestead unit in 2006, which will provide critical elk winter forage. Approximately 210 acres received a fall clipping that will provide enhanced migratory waterfowl habitat. This occurred at the John’s River, Chehalis/Hoxit units, and most recent the Chinook unit. Additionally, 90 and 5 acres were disced for waterfowl habitat at the Chinook and Hoxit units respectively. A series of four ditch plugs were installed at the Chinook unit, which will expand the habitat that is available to migratory waterfowl and shorebirds.

The cross dike at Willapa Wetlands (Potters Slough) was completed in late October and the ring dike will be breached in the summer of 2007, re-introducing approximately 300 acres to tidal fluctuation. This project will have significant benefits for salmon, waterfowl, shorebirds, and marine invertebrates. Construction of the freshwater wetlands on the west side of the highway is also planned to occur during the summer of 2007.

A Wetland Reserve Program (WRP) cost share agreement was submitted for estuary restoration for the John’s River Unit. This project would restore approximately 185 acres of critical salmonid habitat. A capitol-funding request was also submitted for biennium 2007-09 for removing fish passage barriers at John’s River.

A new “fish friendly” water control structure was installed at the Hoxit unit and a new management regime was created for the enhancement of this freshwater wetland. Three new parking areas were constructed to improve access to the Willapa Wetlands (Potters Slough) and Chinook units. The local user group has embraced the restoration activities and increased access at the Chinook unit.

Efforts to improve winter forage for elk will continue in 2007 along with the enhancement and restoration of waterfowl habitat throughout the wildlife area. Fish habitat will be improved through barrier removal and estuary restoration projects located at John’s River and Chinook units. Riparian buffer restoration will occur at the Chehalis and Chinook Units covering approximately 83 acres and 43,000 native plants.

CHAPTER I. INTRODUCTION

This plan provides management direction for the Olympic–Willapa Hills Wildlife Area. This plan will be updated annually to maintain its value as a flexible working document. It identifies needs and guides activities on the area based on the agency mission and statewide goals and objectives applied to local conditions.

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 and wildlife-related recreational and commercial opportunities.

1.2 Agency Goals and Objectives

The underlined goals and objectives directly apply to the management of WDFW wildlife areas. These goals and objectives are in the Agency’s Strategic Plan.

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

- Objective 1: Develop, integrate and disseminate sound fish, wildlife and habitat science.
- 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.

Goal II: 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.
- Objective 7: Improve the economic well being of Washington by providing diverse, high quality recreational and commercial opportunities.

Goal III: Operational Excellence and Professional Service

- Objective 11: 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 Olympic–Willapa Hills Wildlife Area Goals

Management goals for the Olympic–Willapa Hills Wildlife Area should reflect the diversity of acquisitions to preserve habitat and species diversity for both 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. Public participation, in the form of a Citizens Advisory Group (CAG), will be encouraged as a means to identify social, cultural, and economic issues important to the people of western Washington and influential in the management of this Wildlife Area. Specific management goals and objectives for the Olympic-Willapa Hills Wildlife Area can be found in Chapter 3.

1.5 Planning Process

Statewide goals and objectives listed above shape management priorities on wildlife areas. Individual wildlife area information including why the area was purchased, habitat conditions, species present, and public issues and concerns are evaluated to identify specific wildlife area activities or tasks.

A Citizens Advisory Group (CAG) has been established to bring public input, ideas and concerns to wildlife area management. CAG participation in planning will add credibility and support for land management practices and help build constituencies for wildlife areas. The CAG is made up of one representative for each interest group/entity. CAG members are spokespersons for their interest groups.

Olympic – Willapa Hills Wildlife Area Citizens Advisory Group Representation

Dean Swickerath - Grays Harbor Audubon Society
Janet Strong - Grays Harbor Audubon Society
Ivars Matisons - Professional Forester
Jamie Glasgow - Washington Trout (NS)
Jon Lewis - GH Trout Unlimited (NS)
Patricia Cruise – Discovery Coast Audubon
Joanne Jambor – Discovery Coast Audubon
Dave Sievers - Waterfowl Advisory Group
Bill Brackus - Small Landowner (elk damage)
Kevin Hatton - Ocean Spray Cranberry
Bob Mayton, Jr. - Grays Harbor Bowmen
Bob Waite - Grays Harbor Poggies
Jim Pekola - Adjacent Landowner
Debra and Kandi Steiner - Eyes in the Woods Organization
Mike Wilson - Grays Harbor County Commissioners

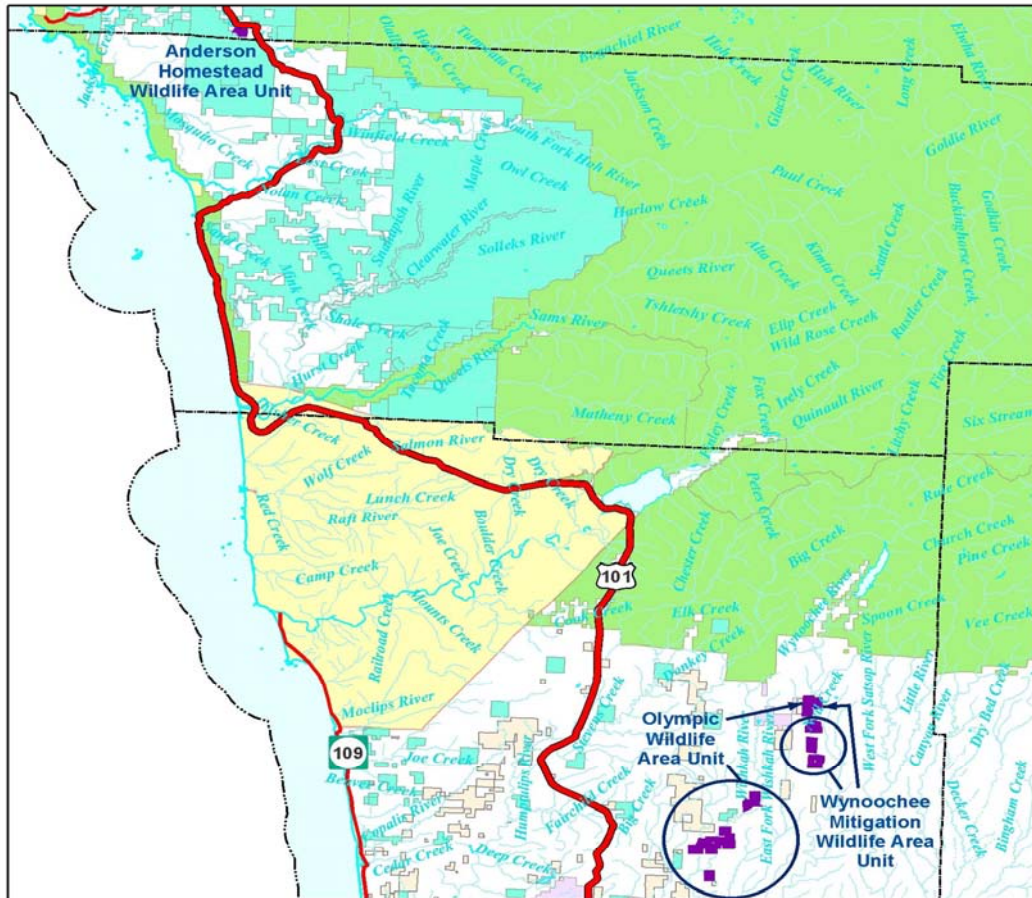
Plans will incorporate cross-program input and review at the regional and headquarters level by the habitat program, wildlife program, enforcement program, and fish program. Pertinent information from existing species plans, habitat recommendations, watershed plans, ecoregional assessments, etc will be used to identify local issues and needs and ensure that the specific Wildlife Area Plan is consistent with WDFW statewide and regional priorities.

The Olympic–Willapa Hills plan will be reviewed annually with additional input from the CAG 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

The Olympic–Willapa Hills Wildlife Area is made up of multiple parcels of land owned and/or maintained by WDFW (Figures 1-3). These parcels include the following satellite areas: Cedar River, Chinook, Oregon Silverspot Butterfly Habitat, Ocean Park, Nemah River/Estuary, Palix, Willapa Wetlands (Potter Slough), Willapa Estuary (Willapa Slough), Smith Creek/North River, Chehalis, Hoxit, Ferbache, Satsop, John’s River, South Grays Harbor, Elk River, Oyhut, Humptulips/Grass Creek, Failor Lake, Olympic, Pinkney (no map available), Anderson Homestead and Wynoochee Mitigation. The purchase History and purpose of purchase (2.1), ownership/use of adjacent lands (2.2), property location (2.3) and purchase funding (2.4) is outlined in Table 1.

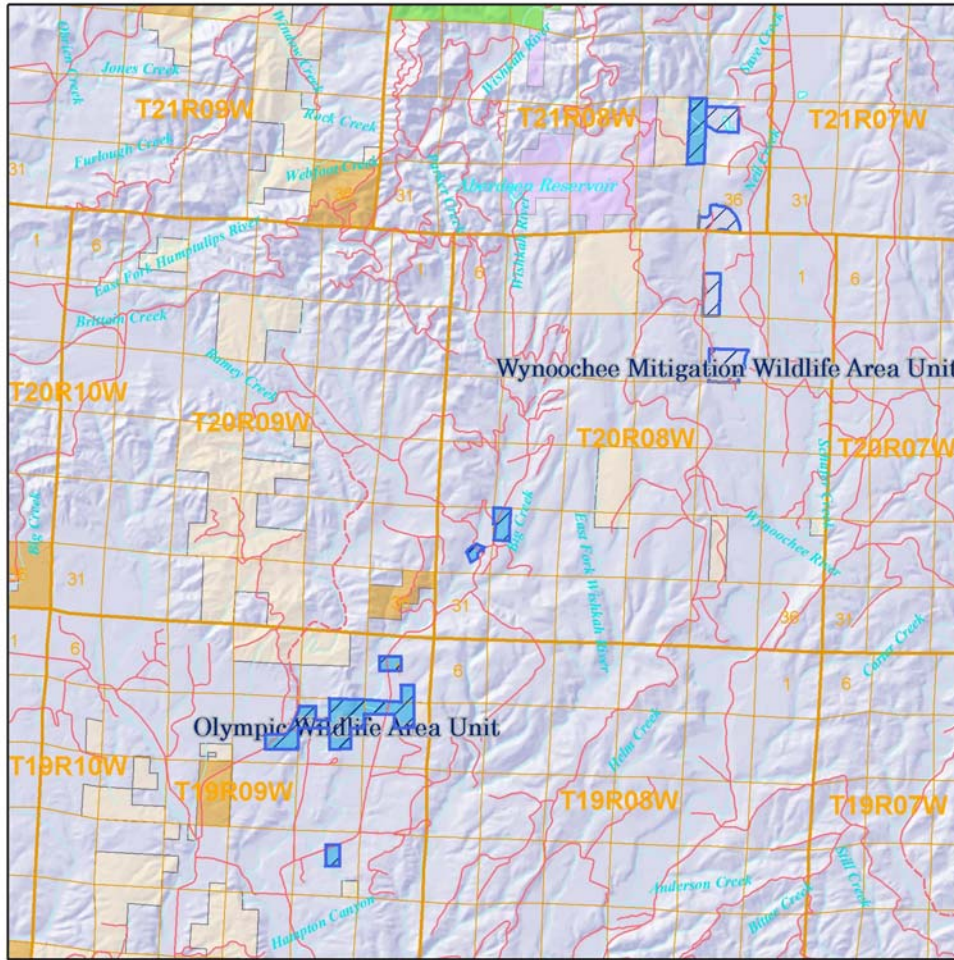
Figure 1. Map of Olympic-Willapa Hills Wildlife Area



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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Olympic-Willapa Hills Wildlife Area WA Dept of Fish and Wildlife Owned Land <p>Other Major Public Lands (DNR Compiled)</p> <ul style="list-style-type: none"> Federal Land Other State Land County Land City Land Tribal Land | <p>Transportation Network</p> <ul style="list-style-type: none"> Interstate Highway US Highway State Route <p>Hydrography</p> <ul style="list-style-type: none"> Annual Stream or River Intermittent Stream Canal Shoreline Lake or Wide River | <p>Administrative Boundaries</p> <ul style="list-style-type: none"> Shore Line County Line State Line International Border City or Town Limits |
|--|--|---|



Figure 1a. Olympic Unit



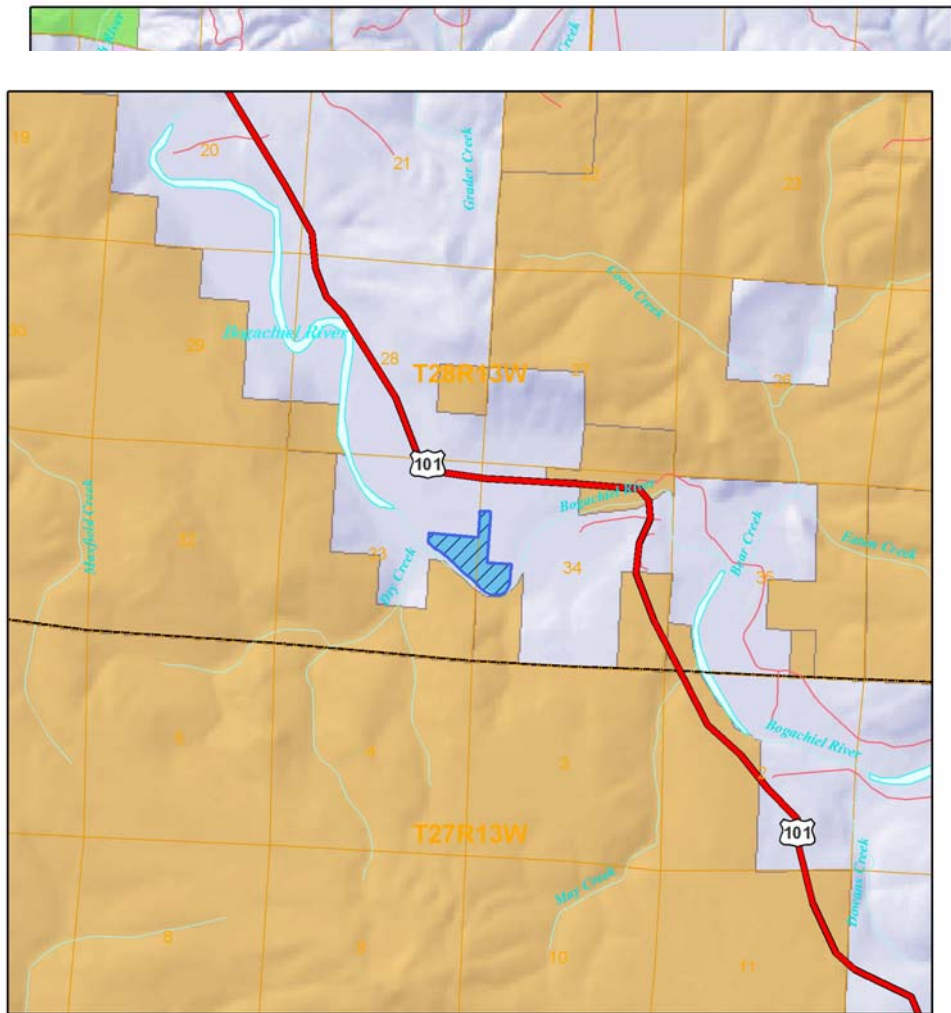
- Major Public Lands**
 Washington Department of Fish and Wildlife Lands
 [Blue box] Olympic Wildlife Area Unit
 [Blue box] WA Dept of Fish and Wildlife Owned Land
 [Red box] Conservation Easement
 Other Major Public Land Ownership
 [Green box] Federal Land
 [Orange box] Other State Land
 [Yellow box] County Land
 [Purple box] City Land
 [Light Yellow box] Tribal Land

- Administrative Boundaries**
 [Thick yellow line] Township Line
 [Thin yellow line] Section Line
 [Cyan line] Shore Line
 [Black line] County Line
 [Dashed black line] State Line
 [Dotted black line] International Border
 [Dashed black line] City or Town Limits

- Transportation Network**
 [Thick red line] Interstate Highway
 [Red line] US Highway
 [Red line] State Route
 [Red line] Secondary Road
 [Red line] Trail
Hydrography
 [Blue line] Annual Stream or River
 [Blue line] Intermittent Stream
 [Blue line] Canal
 [Blue line] Shoreline
 [Blue line] Lake or Wide River



Figure 1b. Wynoochee Unit



- | | | | |
|--|--|--|--|
| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Anderson Homestead 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 |
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1 inch equals 0.79 miles

Figure 1c. Anderson Homestead Unit

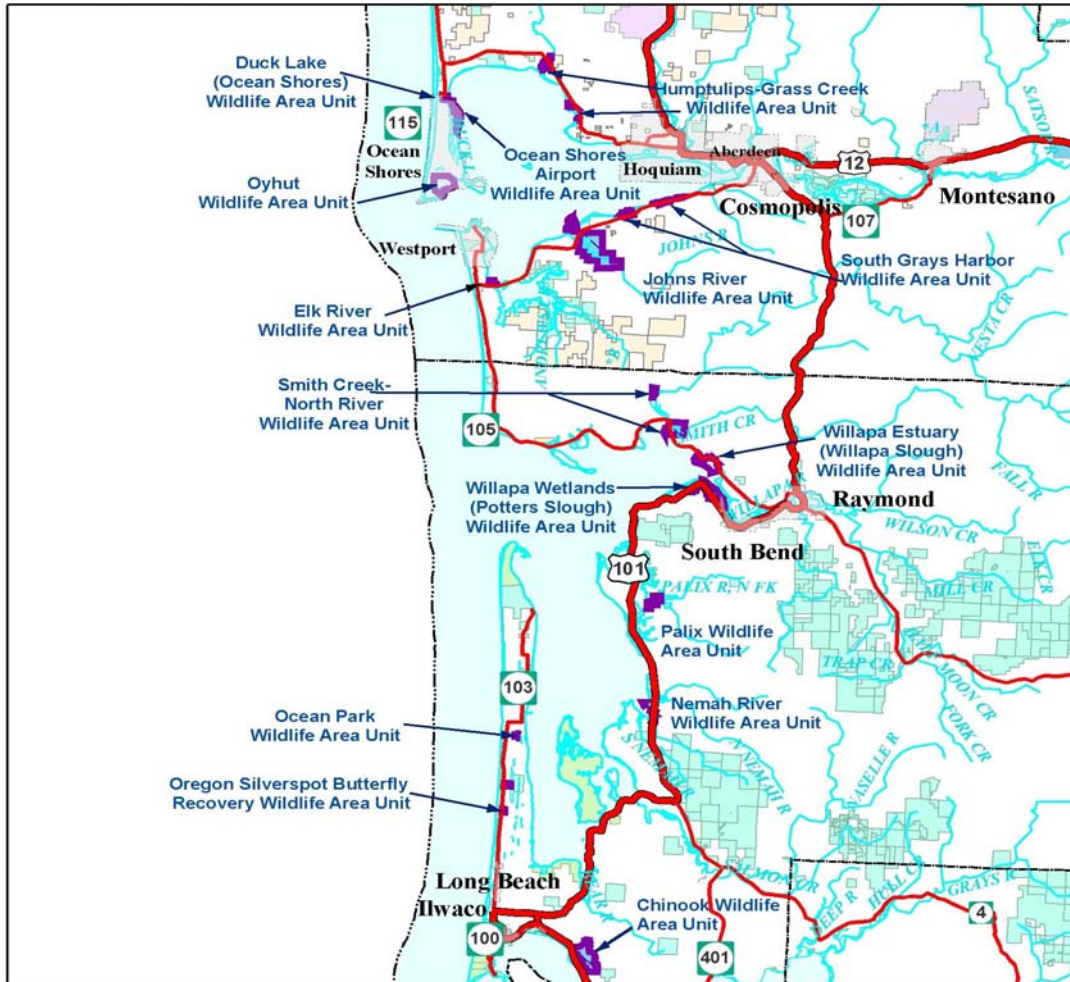


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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Anderson Homestead Wildlife Area Unit Conservation Easement WA Dept of Fish and Wildlife Owned Land <p>Major Public Land Ownership</p> <ul style="list-style-type: 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 |
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1 inch equals 0.79 miles

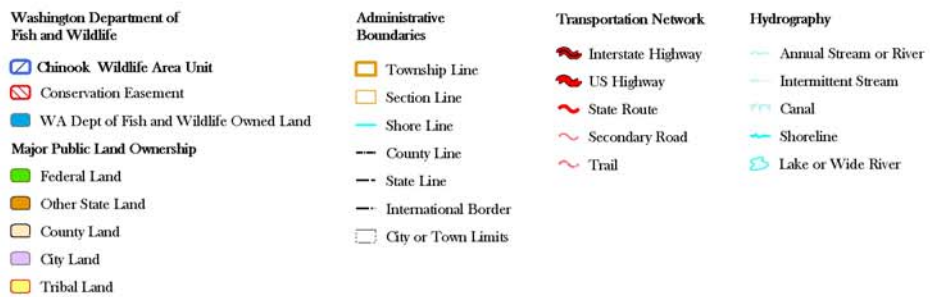
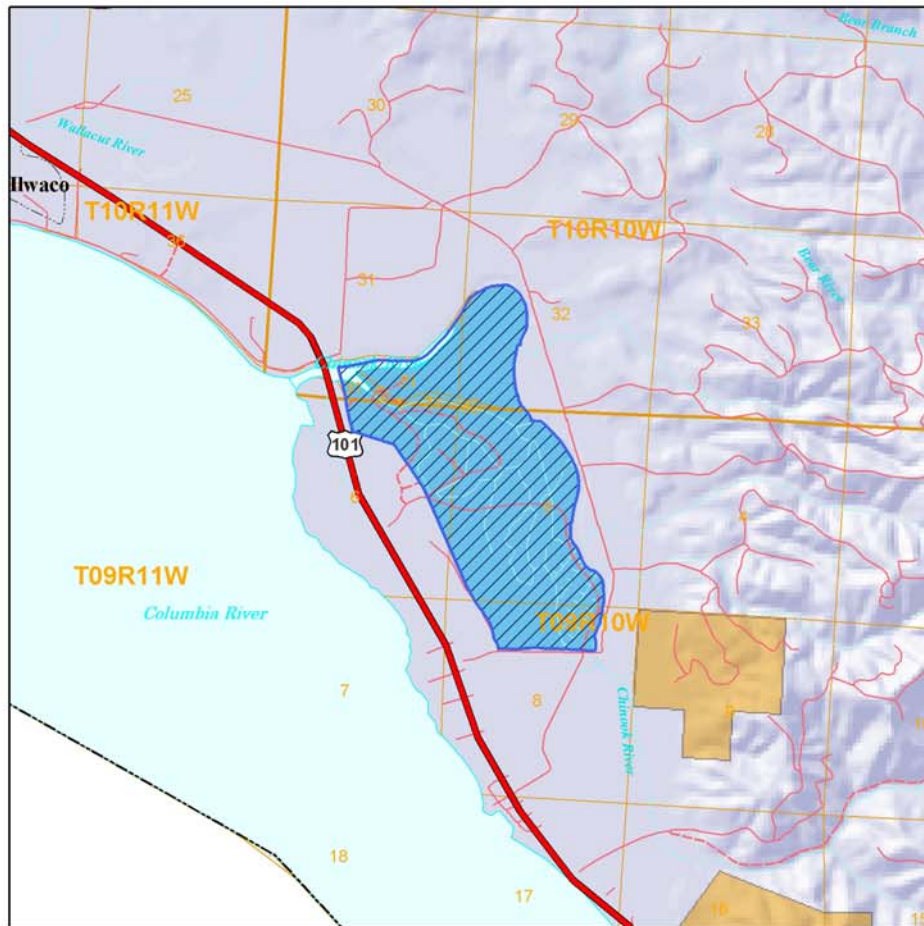
Figure 2. Map of Olympic-Willapa Hill Wildlife Area – Continued



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|--|---|---|
| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Olympic-Willapa Hills Wildlife Area WA Dept of Fish and Wildlife Owned Land <p>Other Major Public Lands (DNR Compiled)</p> <ul style="list-style-type: none"> Federal Land Other State Land County Land City Land Tribal Land | <p>Transportation Network</p> <ul style="list-style-type: none"> Interstate Highway US Highway State Route <p>Hydrography</p> <ul style="list-style-type: none"> Waterways Lake or Wide River | <p>Administrative Boundaries</p> <ul style="list-style-type: none"> Shore Line County Line State Line International Border City or Town Limits |
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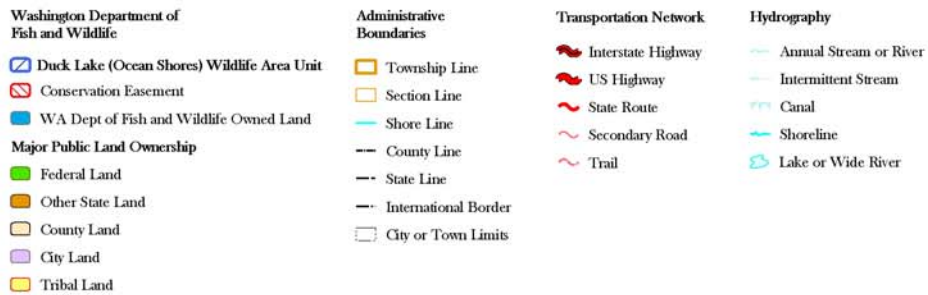
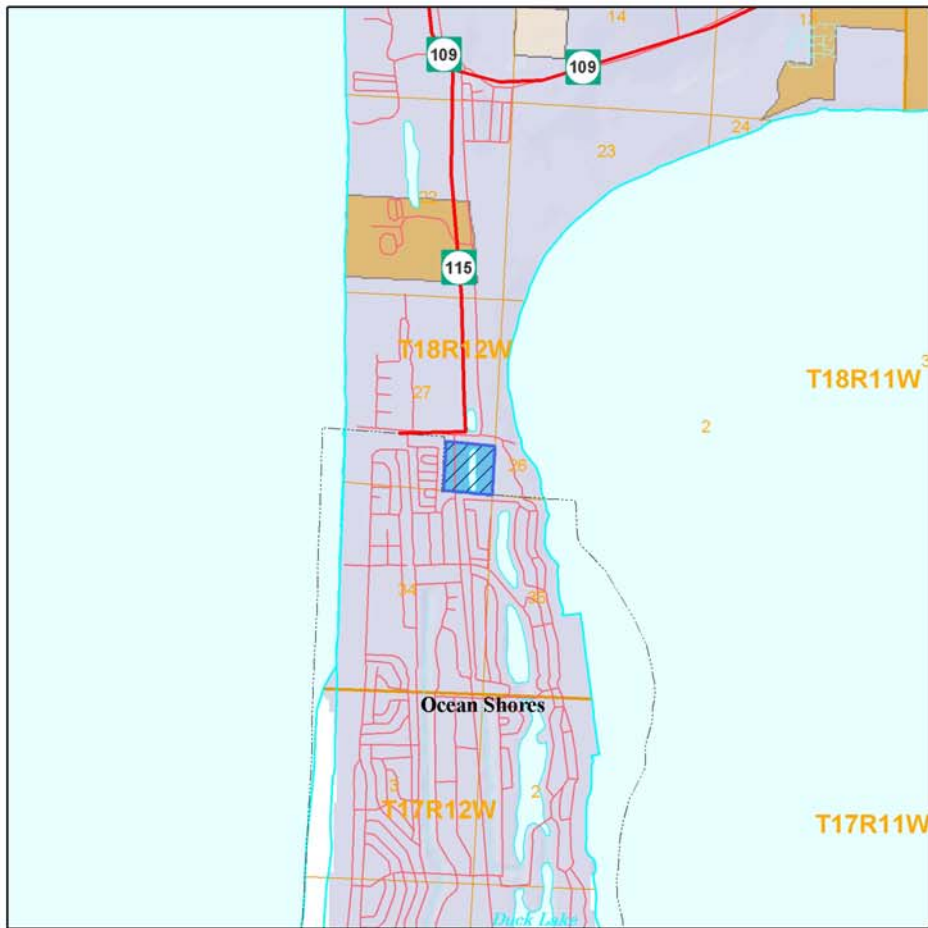
Figure 2a. Chinook Unit



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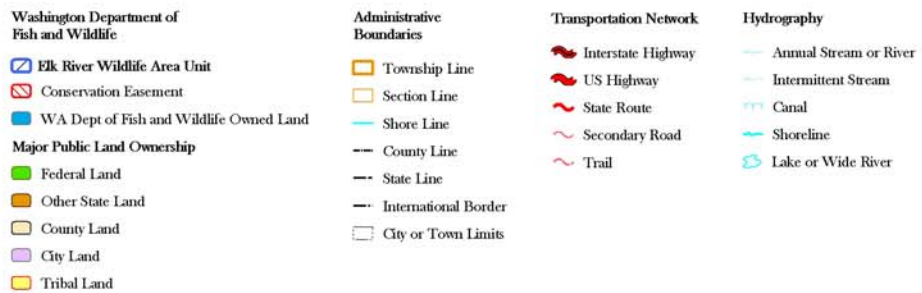
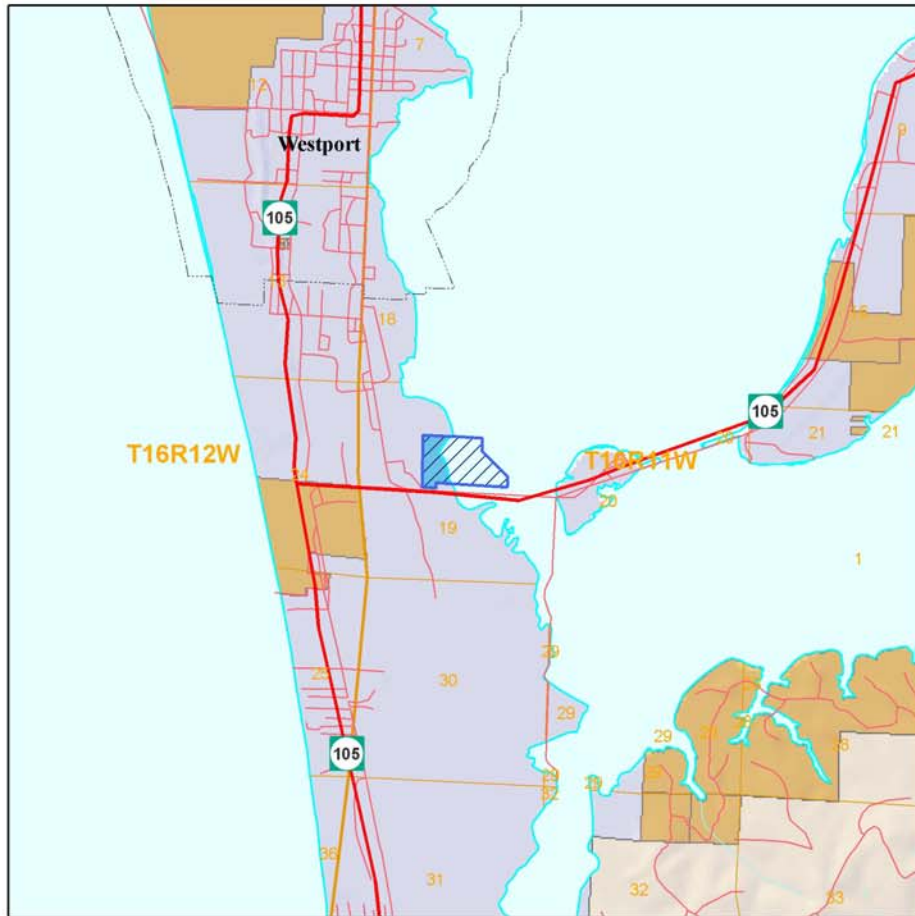
1 inch equals 0.79 miles

Figure 2b. Duck Lake Unit



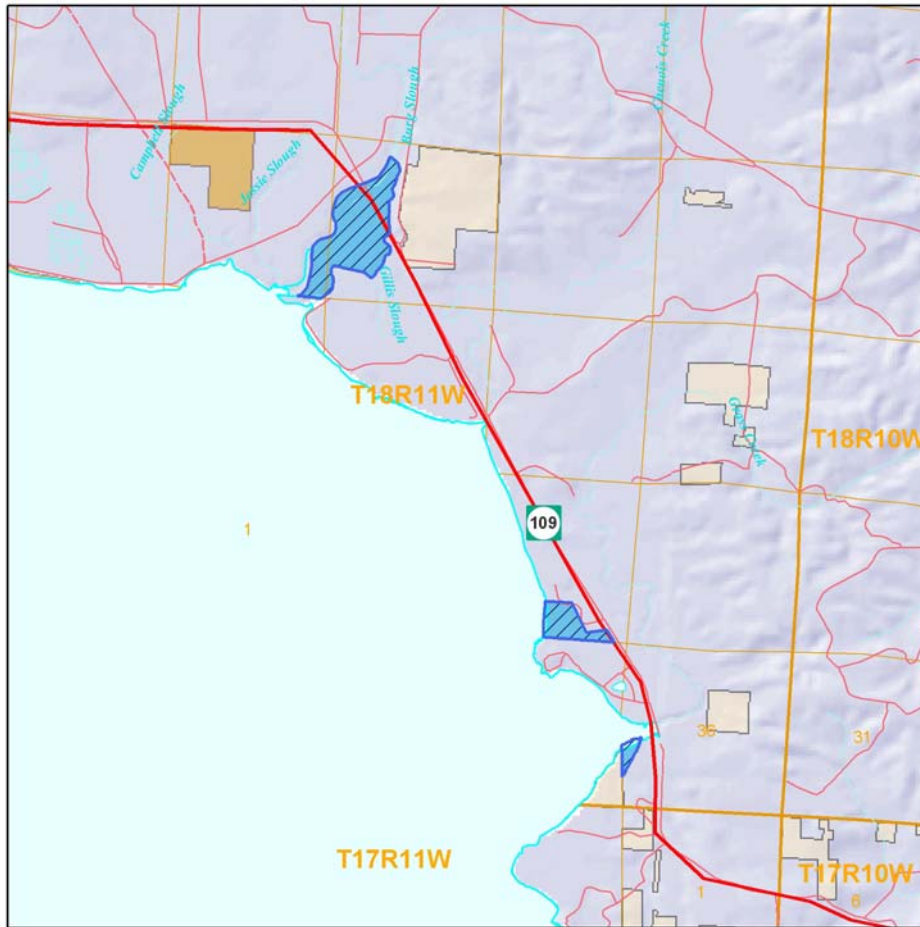
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1 inch equals 0.79 miles

Figure 2c. Elk River Unit



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1 inch equals 0.79 miles

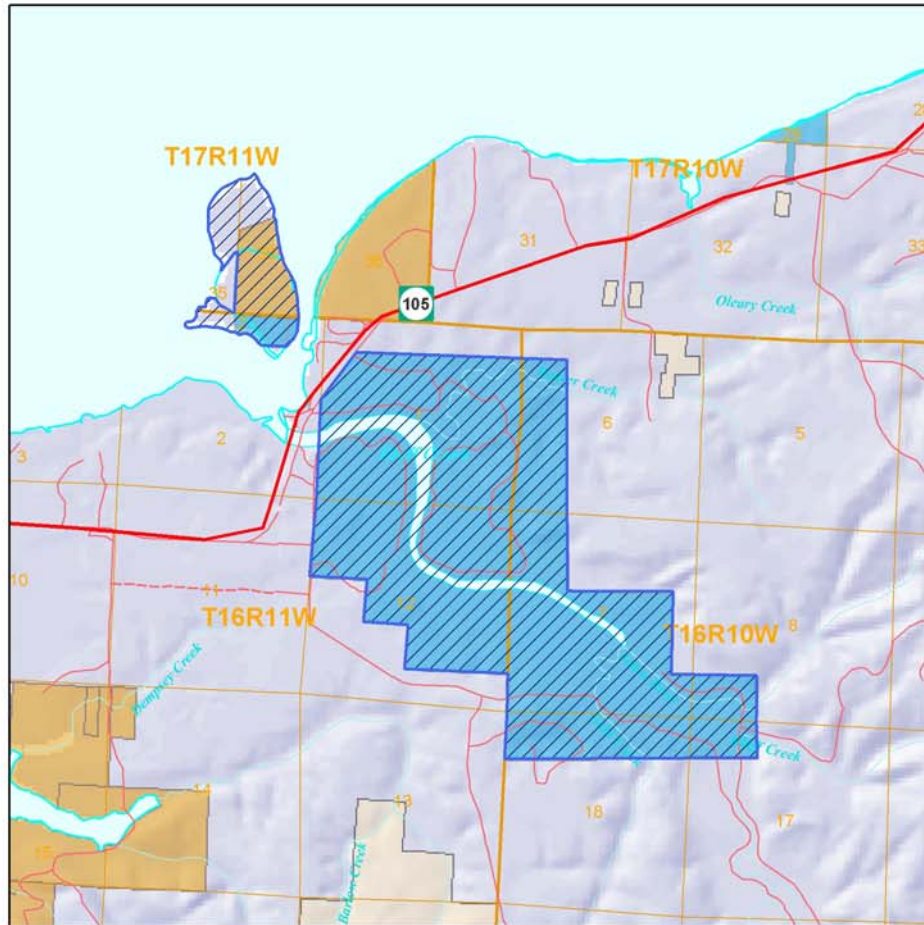
Figure 2d. Humtulpis-Grass Creek Unit



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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Humtulpis-Grass Creek 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 |
|---|--|--|--|

1:60,000
1 inch equals 0.95 miles

Figure 2e. Johns River Unit

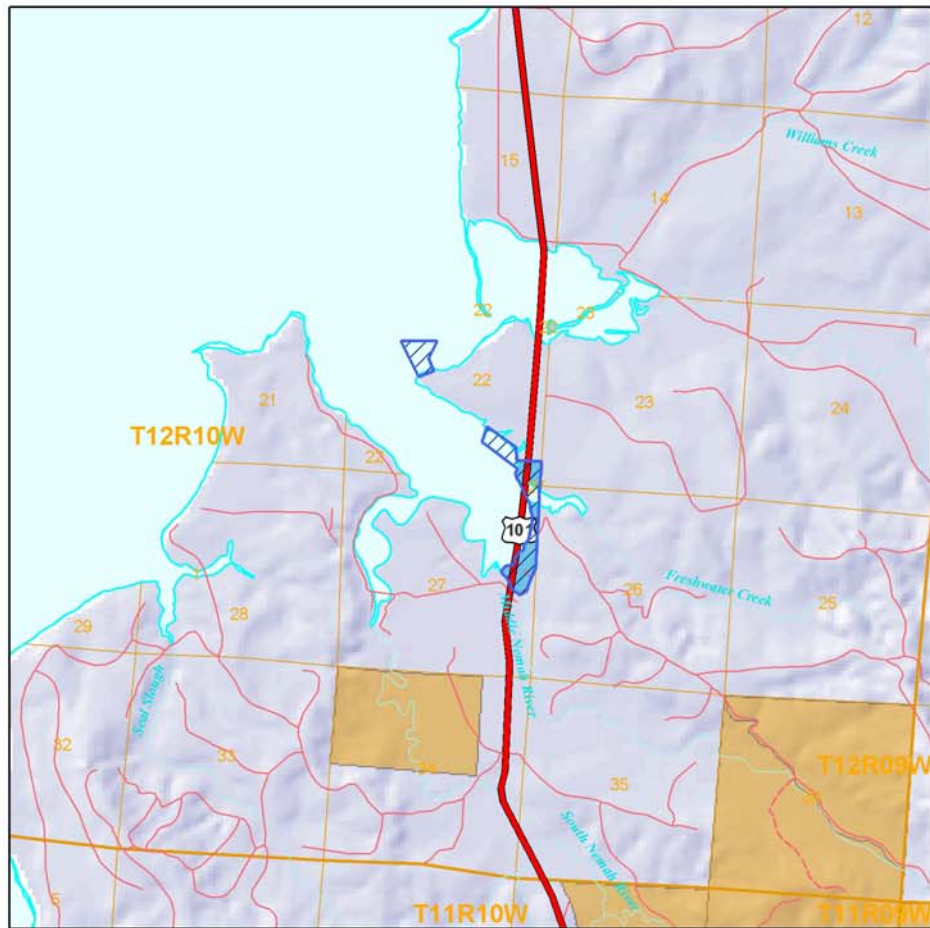


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|---|----------------------------------|-------------------------------|------------------------|
| Washington Department of Fish and Wildlife | Administrative Boundaries | Transportation Network | Hydrography |
| Johns River Wildlife Area Unit | Township Line | Interstate Highway | Annual Stream or River |
| Conservation Easement | Section Line | US Highway | Intermittent Stream |
| WA Dept of Fish and Wildlife Owned Land | Shore Line | State Route | Canal |
| Major Public Land Ownership | County Line | Secondary Road | Shoreline |
| Federal Land | State Line | Trail | Lake or Wide River |
| Other State Land | International Border | | |
| County Land | City or Town Limits | | |
| City Land | | | |
| Tribal Land | | | |

1:50,000

1 inch equals 0.79 miles

Figure 2f. Nemah River Unit



Washington Department of Fish and Wildlife

- Nemah River Wildlife Area Unit
 - Conservation Easement
 - WA Dept of Fish and Wildlife Owned Land
- Major Public Land Ownership**
- Federal Land
 - Other State Land
 - County Land
 - City Land
 - Tribal Land

Administrative Boundaries

- Township Line
- Section Line
- Shore Line
- County Line
- State Line
- International Border
- City or Town Limits

Transportation Network

- Interstate Highway
- US Highway
- State Route
- Secondary Road
- Trail

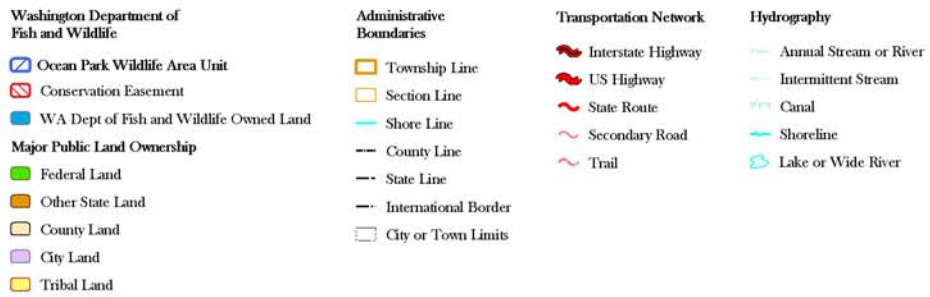
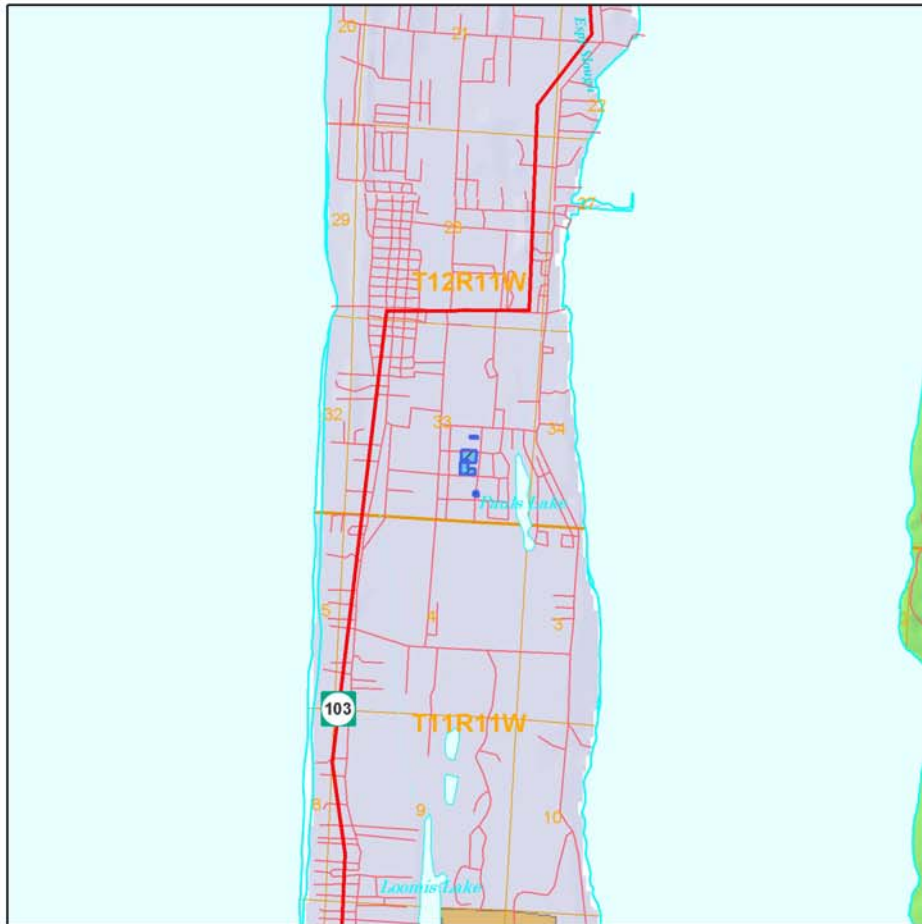
Hydrography

- Annual Stream or River
- Intermittent Stream
- Canal
- Shoreline
- Lake or Wide River

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1 inch equals 0.79 miles

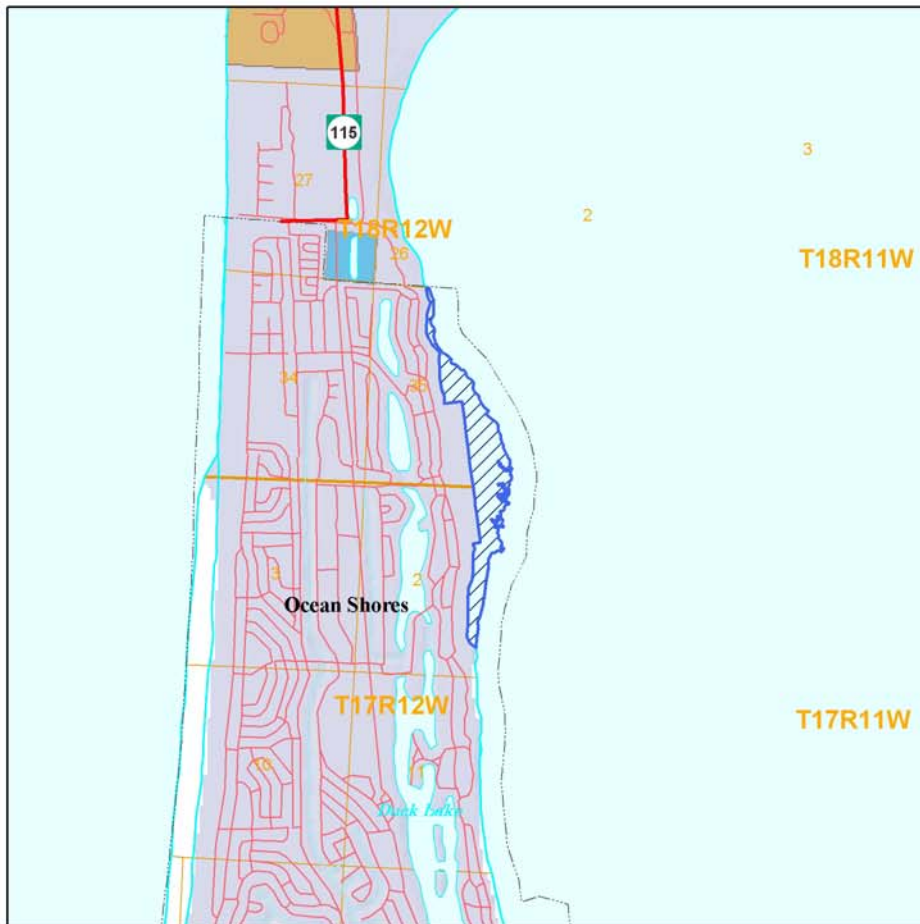
Figure 2g. Ocean Park Unit



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1 inch equals 0.79 miles

Figure 2h. Ocean Shores Airport Unit

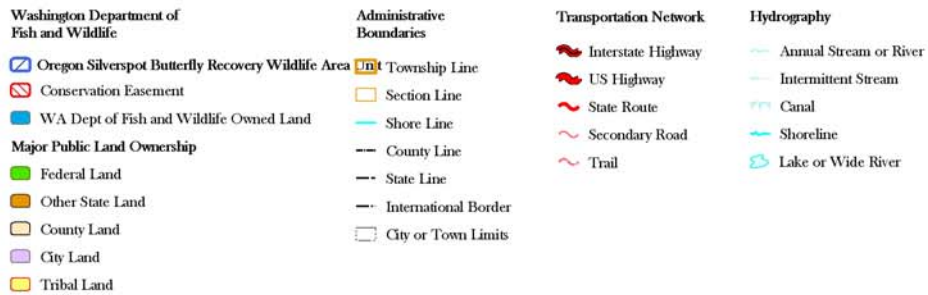
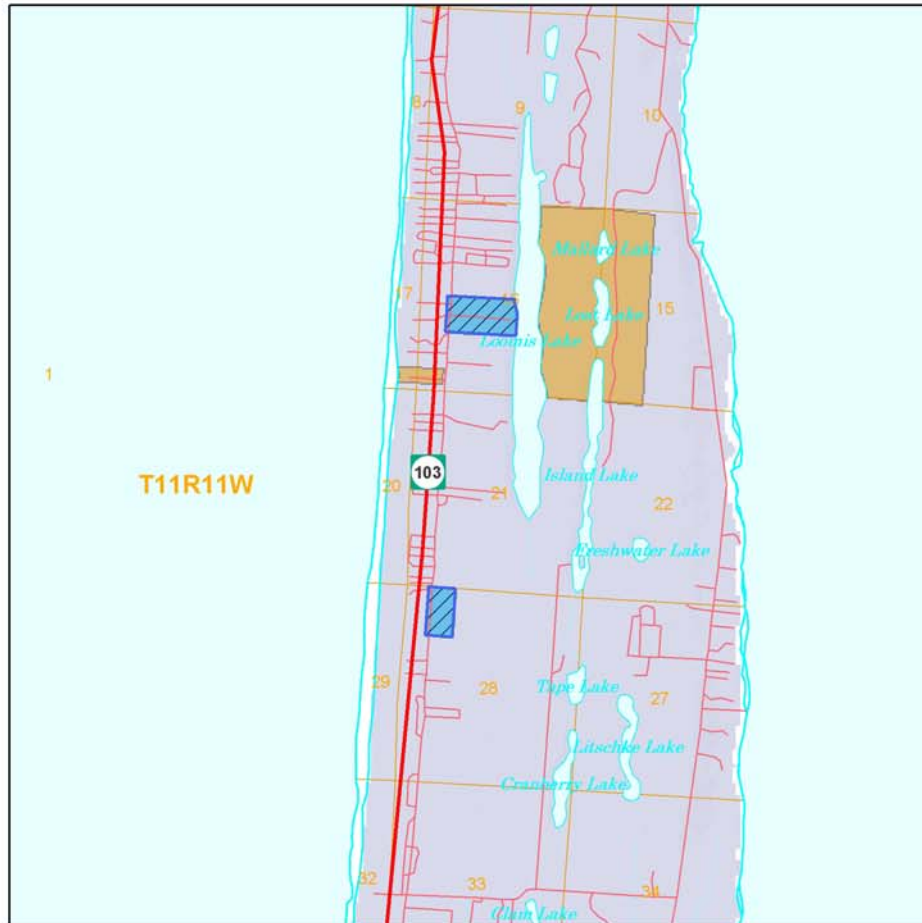


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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Ocean Shores Airport Wildlife Area Unit Conservation Easement WA Dept of Fish and Wildlife Owned Land <p>Major Public Land Ownership</p> <ul style="list-style-type: 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 |
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1:50,000

1 inch equals 0.79 miles

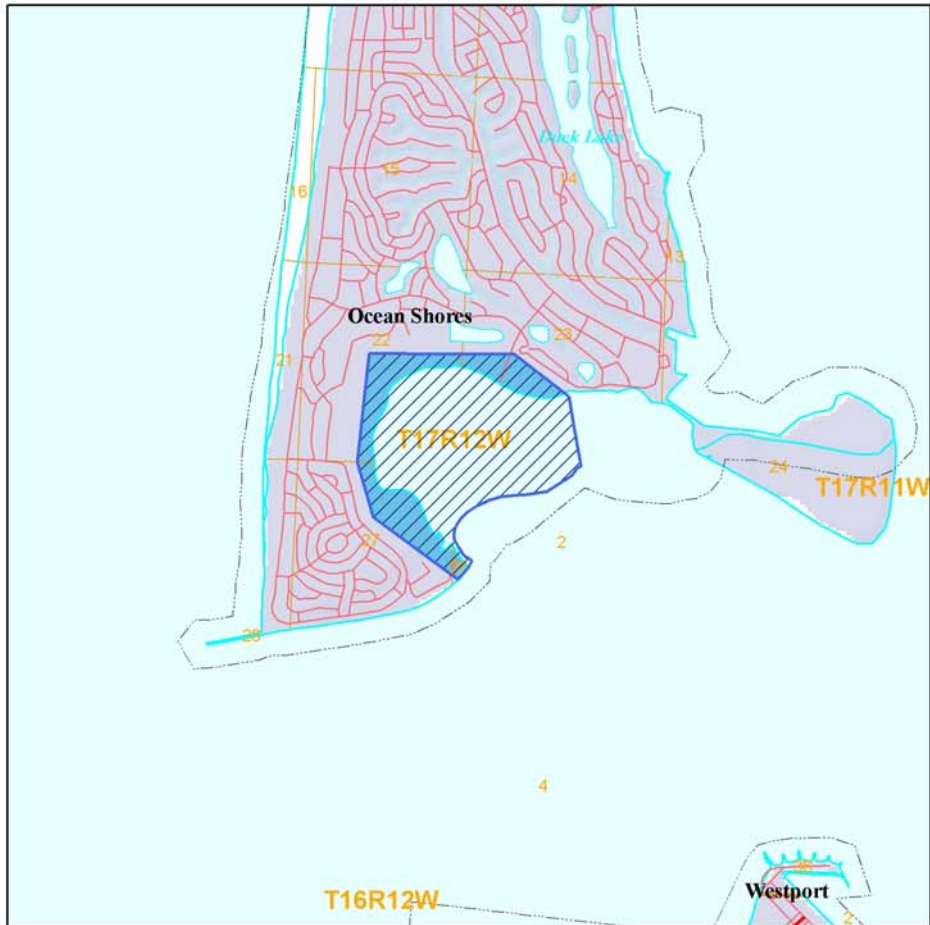
Figure 2i. Oregon Silverspot Butterfly Recovery Unit



1:50,000

1 inch equals 0.79 miles

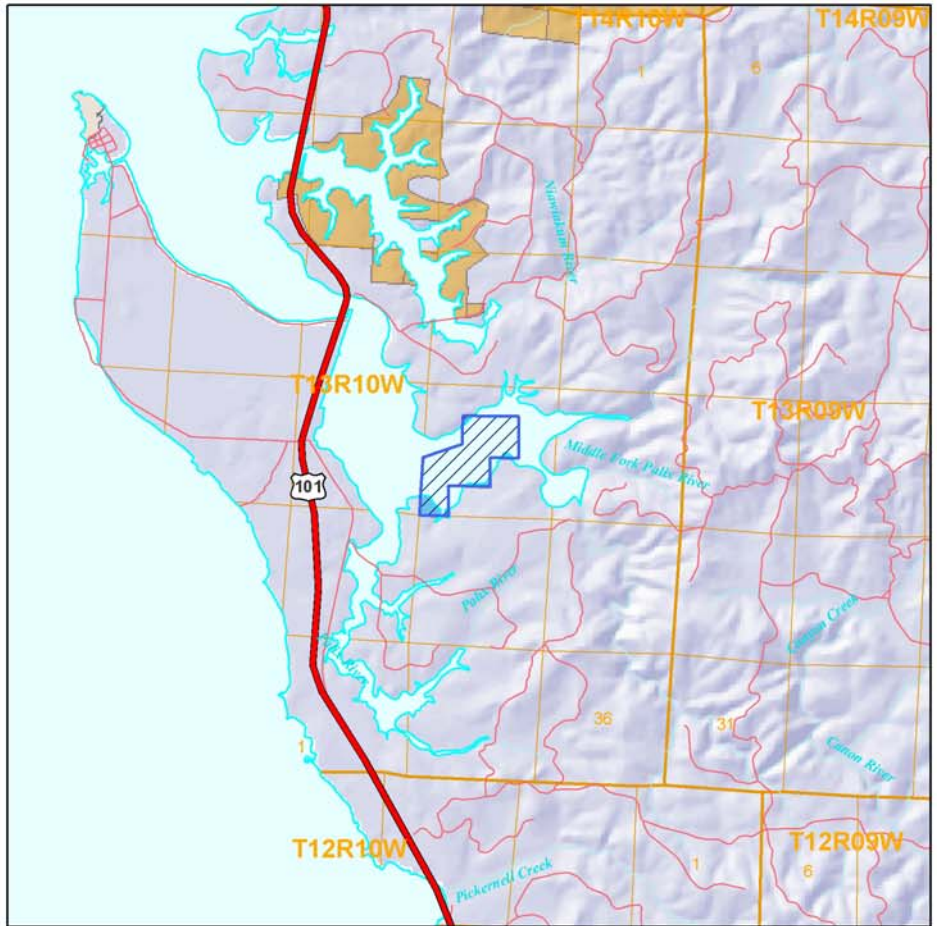
Figure 2j. Oyhut Unit



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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Oyhut 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 |
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1 inch equals 0.79 miles

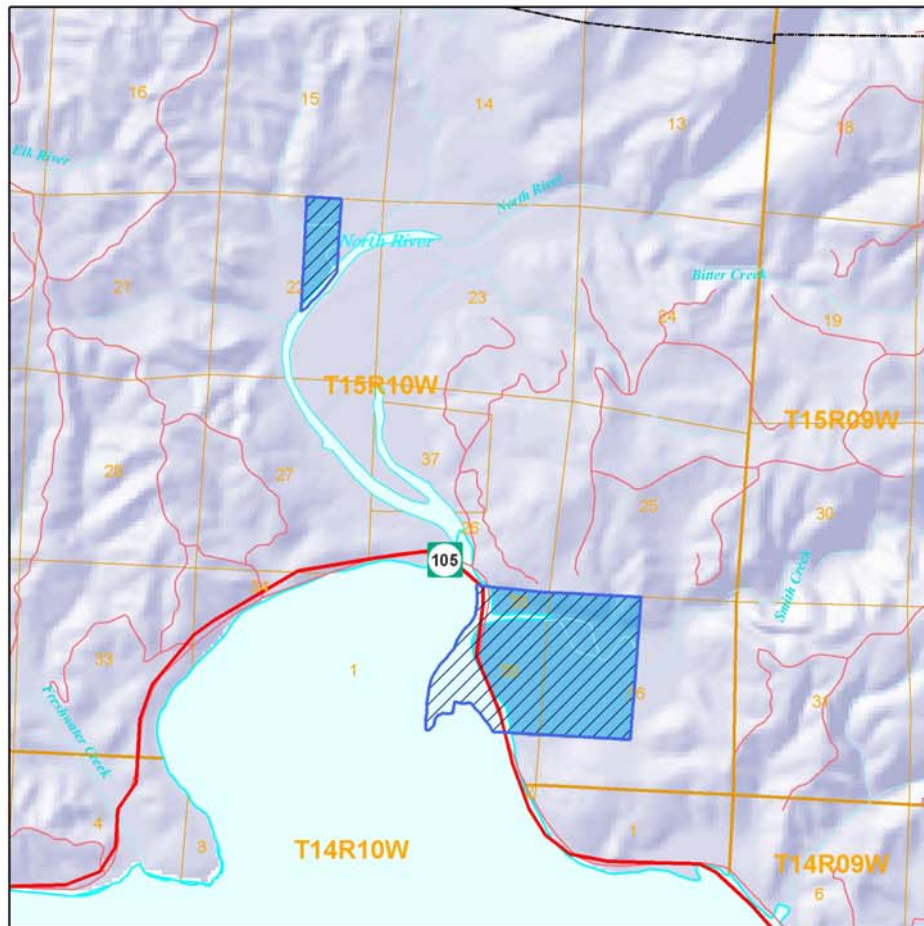
Figure 2k. Palix Unit



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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Palix 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 |
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1:75,000
1 inch equals 1.2 miles

Figure 2l. Smith Creek-North River Unit

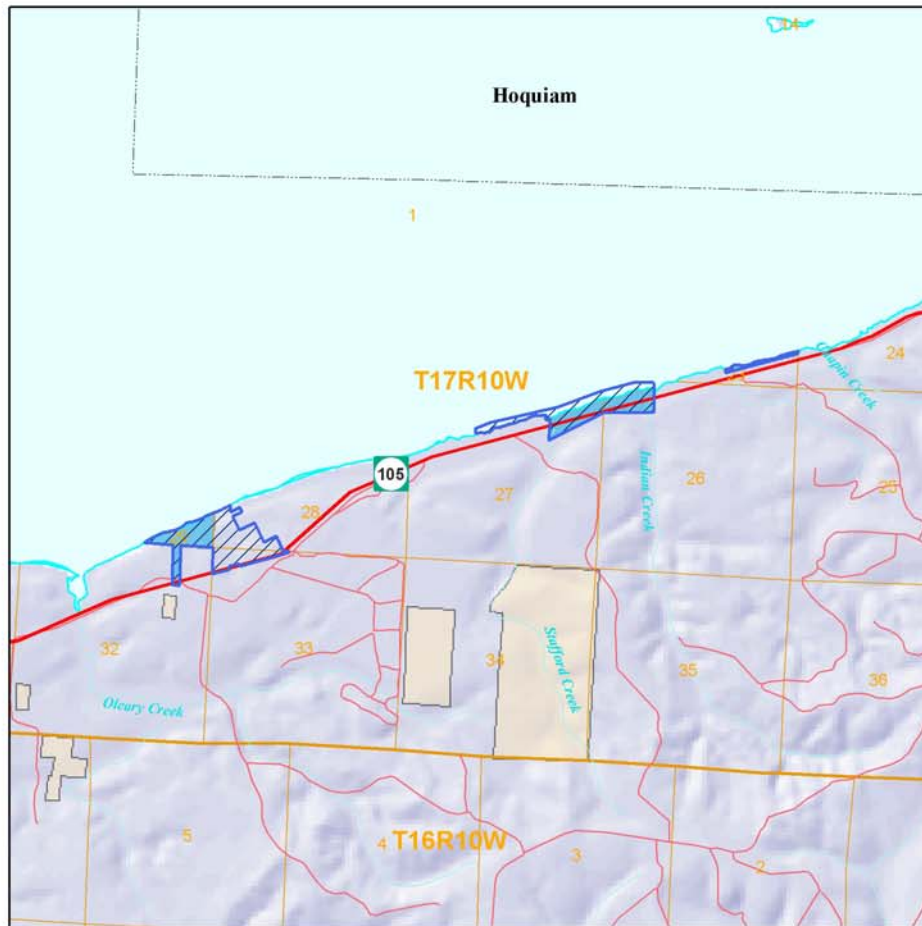


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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Smith Creek-North River Wildlife Area Unit Conservation Easement WA Dept of Fish and Wildlife Owned Land <p>Major Public Land Ownership</p> <ul style="list-style-type: 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 |
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1:50,000

1 inch equals 0.79 miles

Figure 2m. South Grays Harbor Unit



Washington Department of Fish and Wildlife

- South Grays Harbor Wildlife Area Unit
 - Conservation Easement
 - WA Dept of Fish and Wildlife Owned Land
- Major Public Land Ownership**
- Federal Land
 - Other State Land
 - County Land
 - City Land
 - Tribal Land

Administrative Boundaries

- Township Line
- Section Line
- Shore Line
- County Line
- State Line
- International Border
- City or Town Limits

Transportation Network

- Interstate Highway
- US Highway
- State Route
- Secondary Road
- Trail

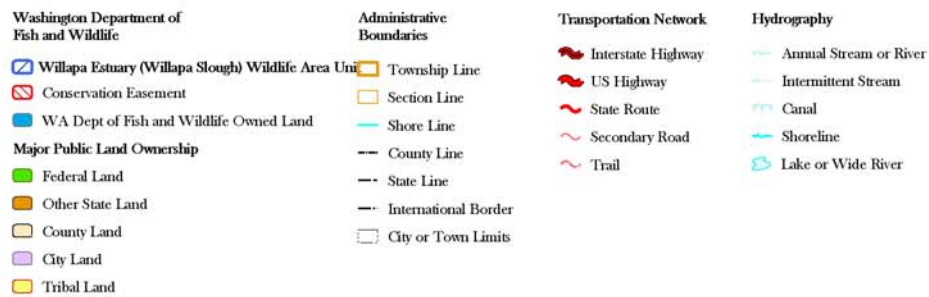
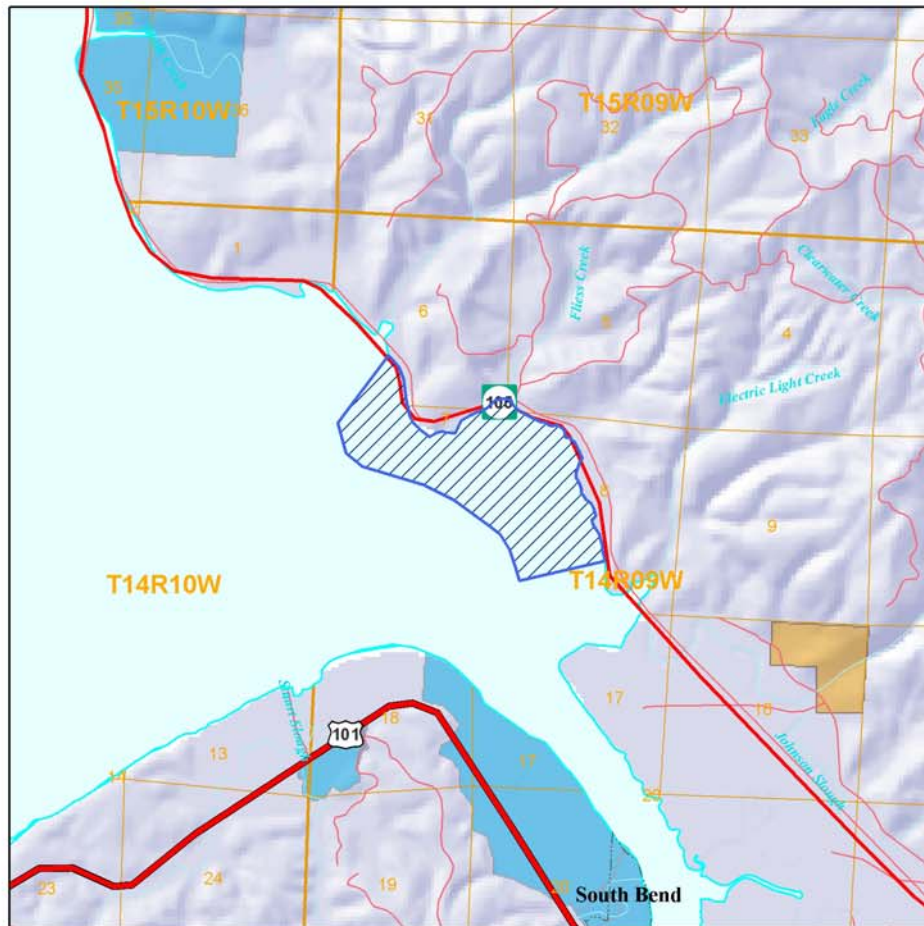
Hydrography

- Annual Stream or River
- Intermittent Stream
- Canal
- Shoreline
- Lake or Wide River

1:50,000

1 inch equals 0.79 miles

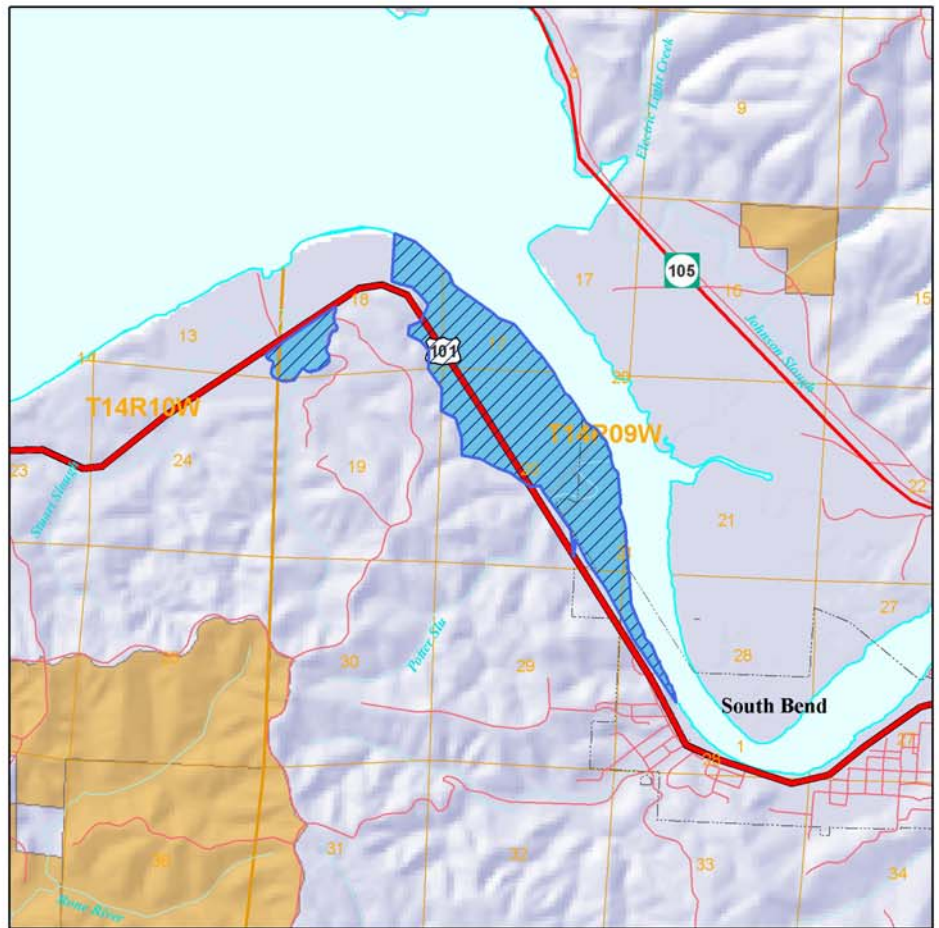
Figure 2n. Willapa Estuary (Willapa Slough) Unit



1:50,000

1 inch equals 0.79 miles

Figure 2o. Willapa Wetlands (Potters Slough) Unit



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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Willapa Wetlands (Potters Slough) 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 |
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1 inch equals 0.79 miles

Figure 3. Olympic-Willapa Hills Wildlife Area- Continued

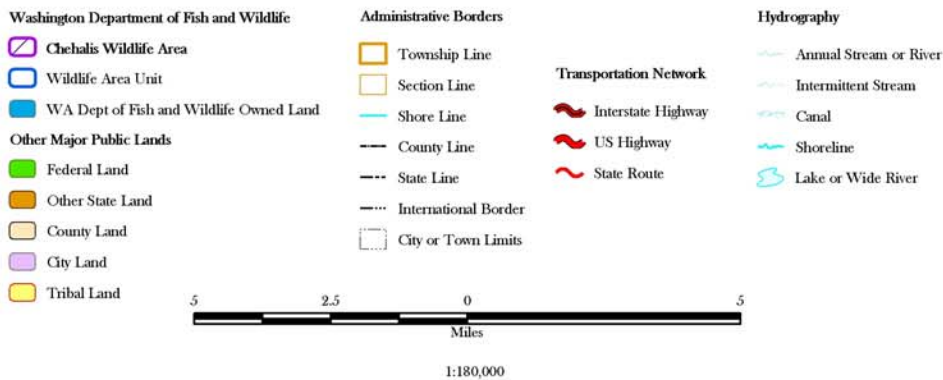
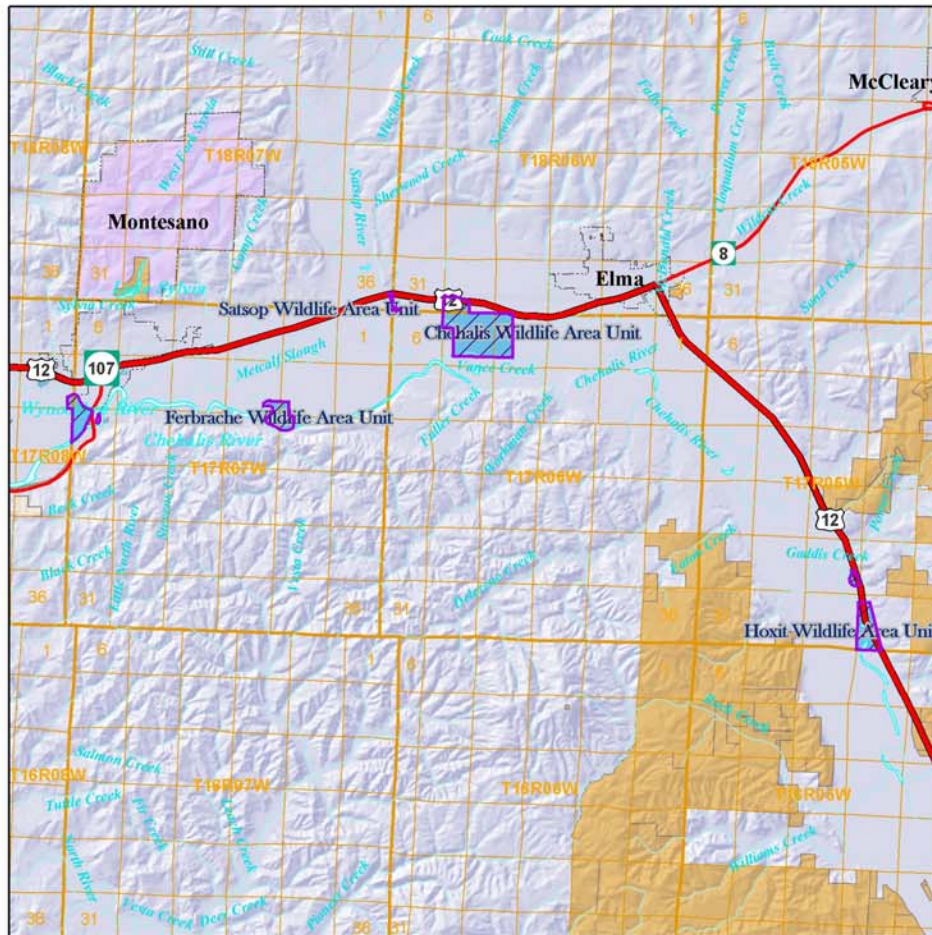
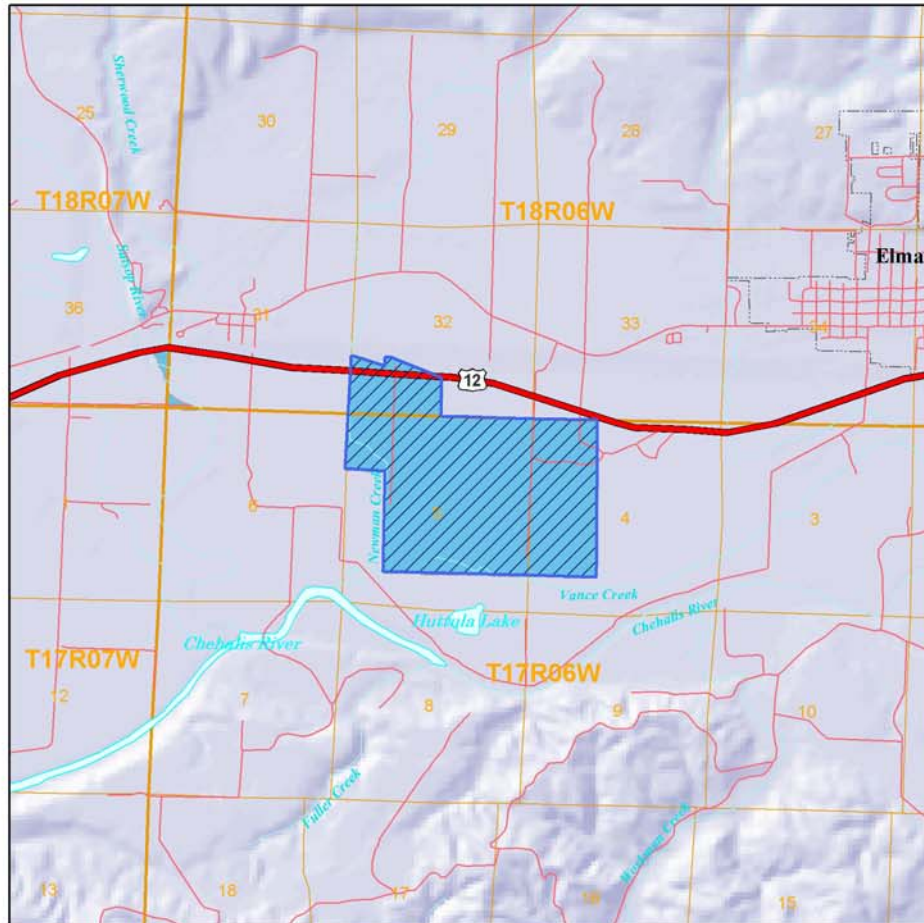


Figure 3a. Chehalis Unit

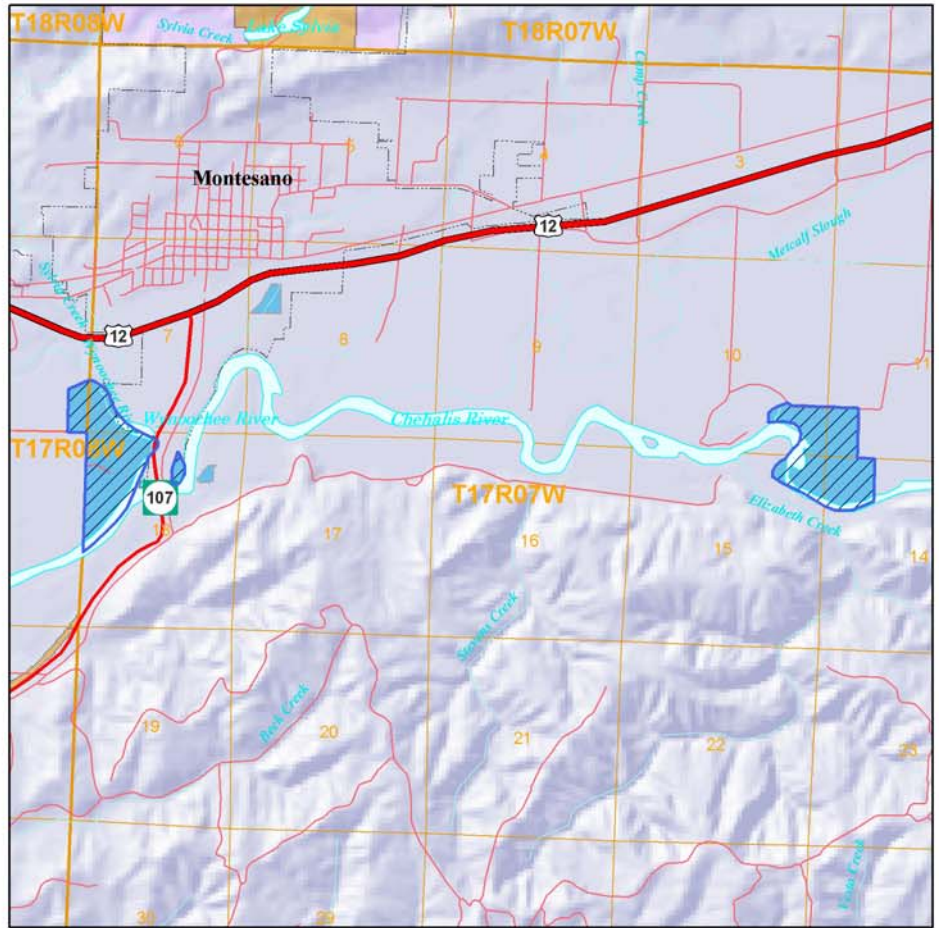


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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Chehalis Wildlife Area Unit Conservation Easement WA Dept of Fish and Wildlife Owned Land <p>Major Public Land Ownership</p> <ul style="list-style-type: none"> Federal 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 |
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1 inch equals 0.79 miles

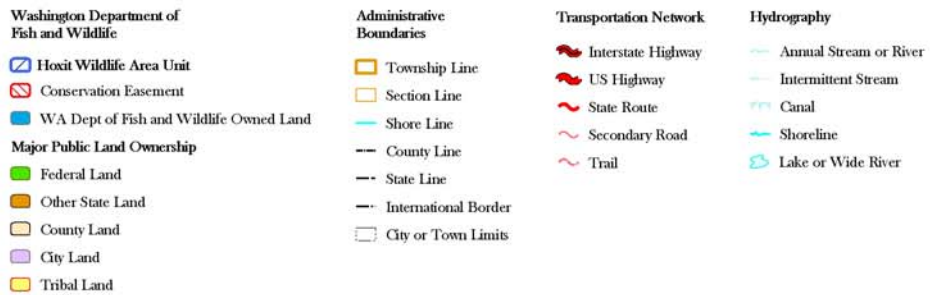
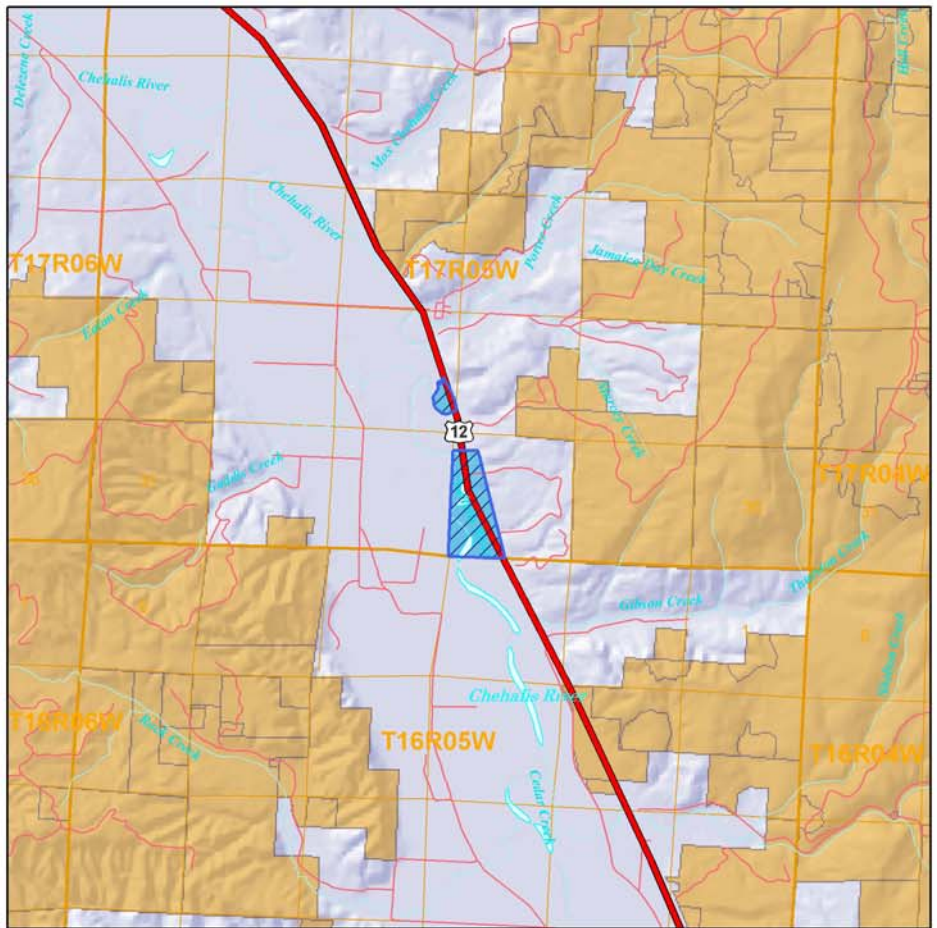
Figure 3b. Ferbrache Unit



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| <p>Washington Department of Fish and Wildlife</p> <ul style="list-style-type: none"> Ferbrache 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 |
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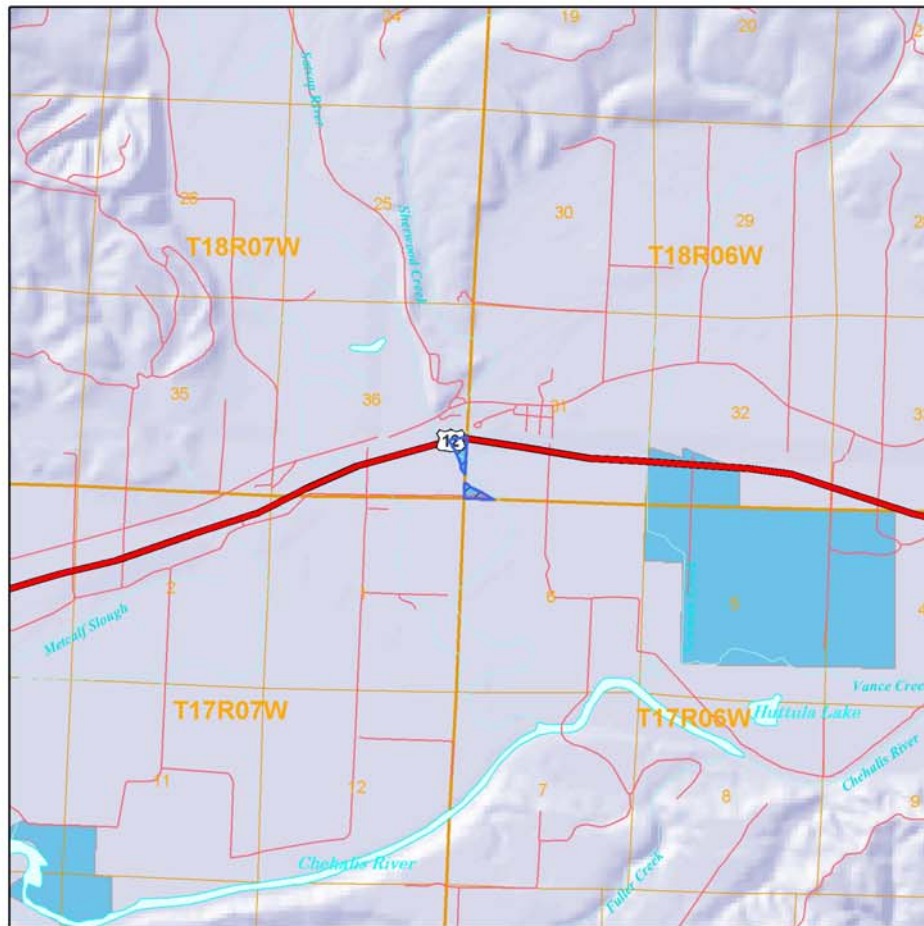
1:50,000
1 inch equals 0.79 miles

Figure 3c. Hoxit Unit



1:80,000
1 inch equals 1.3 miles

Figure 3d. Satsop Unit



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|---|----------------------------------|-------------------------------|------------------------|
| Washington Department of Fish and Wildlife | Administrative Boundaries | Transportation Network | Hydrography |
| Satsop Wildlife Area Unit | Township Line | Interstate Highway | Annual Stream or River |
| Conservation Easement | Section Line | US Highway | Intermittent Stream |
| WA Dept of Fish and Wildlife Owned Land | Shore Line | State Route | Canal |
| Major Public Land Ownership | County Line | Secondary Road | Shoreline |
| Federal Land | State Line | Trail | Lake or Wide River |
| Other State Land | International Border | | |
| County Land | City or Town Limits | | |
| City Land | | | |
| Tribal Land | | | |

1:50,000

1 inch equals 0.79 miles

2.1 Property Location and Size

2.2 Purchase History and Purpose

2.3 Ownership and Use of Adjacent Lands

NAME	LOCATION	ACQUISITION	FUNDING	PURPOSE	ADJACENT PROPERTY
Cedar River	3 mi. N of Tokeland, N of SR-105; Pacific County	475 acres pending	Acquired by Cascade Land Conservancy and USFWS-Coastal Wetlands grant	Estuary protection	Timber land
Chinook (Lower Columbia River Estuary)	East of Ilwaco, near mouth of Columbia River; Pacific County	850 acres: 2001	Columbia Land Trust purchased then donated to WDFW	Estuary Restoration	Private Residential/agricultural
Oregon Silverspot Butterfly	2 mi. S of Klipsan Beach/adjacent to Loomis Lake, W side; Pacific County	50.4 ac: 2 parcels – 1990, 1991	\$430,000 IAC-WWRC	Habitat preservation for T&E species.	Vacant land, designated rural residential; private
Ocean Park	Bismark St. and Peninsula St. in Ocean Park on the Long Beach Peninsula; Pacific County	2 ac: 4 parcels – 1982, 1984, 1985, 1998	All Land Donated	Coastal Wetland preservation, waterfowl	Private Residential, Loomis Lake, OR Silverspot Butterfly NA
Nemah River/ Estuary (Nemah)	15.5 mi. SSW of South Bend, west of SR-101; Pacific County	144.1 acres: 1999 73.6 acres: 2001	\$35,000 donation; \$257,700 USFWS – Coastal Wetlands Grant	Protection of habitat (tidelands, estuary wetlands and salt marsh) for salmon, migratory waterfowl, and birds of prey	Private oyster beds, some undeveloped upland and timber, estuary wetland, tide lands, mudflat, salt marsh
Palix	5 mi. SW of South Bend, E of SR-101; Pacific County	160 acres: 1967 80 acres: 1970	Partial: \$42,200 IAC	Estuary Protection, waterfowl hunting and fishing access	Tidelands

Willapa Wetlands (Potter Slough)	2 mi. W of South Bend, adjacent to Willapa River, S side; Pacific County	574.5 acres: 2000-2001/2004 4.5 ac: 2003	\$354,938 IAC – SRFB/USFWS – NCWCG 4.5 ac. Land exchange	Estuary restoration; reversal of freshwater enhancement	Timber land, private residential or farmland
Willapa Estuary (Willapa Slough)	5 mi. W of Raymond, Adjacent to Willapa River, N side; Pacific County	740 acres: 1997	\$239,000 value land donated	Spartina control, bird hunting, shellfish recreation	Timber land, private residential or farmland
Smith Creek/North River	10 mi. NW of Raymond, N of SR-105; Pacific County	646 acres: 1968	\$80,000 IAC funding	Recreation and tidelands	Timber land, pasture land
Chehalis	2 mi. SW of Elma, S of Hwy 12, N of Vance Creek, E of Newman Creek; Grays Harbor County	23.4 acres: 1967 167.8 acres: 1986 300 acres: 1989 20 acres: 1991 20 acres: 1993	\$464,000+ Partnership funding between Ducks Unlimited, Duck Stamp Funds and WDFW; 20 acres donated by Lagergren and 20 acres donated by Friend/Rikalo	Waterfowl habitat and associated recreation	Gravel pit, private agricultural land
Hoxit	1.5 mi. S of Porter, W of Hwy 12; Grays Harbor County	80 acres: 1989	Donation	Winter waterfowl habitat	Private residential, agricultural, Chehalis River, BNSF railroad line, Hwy 12
Ferbache	2.5 mi SW of Brady, 5 mi. SE of Montesano, S of Hwy 12 off Brady Loop Road, N of Chehalis River; Grays Harbor County	90.1 acres: 1969 24.2 acres: 1975		Fishing access, pheasant release site, wintering waterfowl forage	Chehalis River, Private residences, agricultural land
Satsop	2 mi. SE of Brady near the	132 ac: 2003	Donation – Williams	Floodplain restoration	Private agricultural

	confluence of the Satsop River and Chehalis River, S of Hwy 12; Grays Harbor County		Pipeline Mitigation	to mitigate for gas pipeline work	
John's River	10 mi. SW of Aberdeen, near Markham E of SR 105; Grays Harbor County	Total=1501 ac. 971.5 ac: 1950s 166 ac: 1960s 298.5 ac: 1970s 65 ac: 1991	Partial: PR funding	Waterfowl habitat, benefits to wildlife & habitat, compatible recreation & education	Private tree farm, DNR land, Ocean Spray Cranberry Plant
South Grays Harbor	SW of Aberdeen between SR-105 and South Shore; Grays Harbor County	63 ac: 2003-present; 800 acres pending	\$154,000 NAWCA grant; Cascade Land Conservancy, Audubon, Wildlife Forever, City of Aberdeen	Protect critical shoreline, estuary preservation	Private residential, county and private tree farm.
Elk River	Estuary land on South side of Grays Harbor 3 mi. S of Westport, N side of SR-105, SE corner of Westport Peninsula; Grays Harbor County	39.4 + 17 ac: 1983	39.4 ac – \$47,400 Ocean Park Mitigation; 17 ac – \$21,500 ITT Rayonier Mitigation;	56.4 ac. Mitigation habitat to replace wetlands lost to Ocean Shores airport development – salt marsh restoration;	Grays Harbor tidal flats, salt marsh estuary, SR-105, diked agricultural land, riparian forest
Ocean Shores Airport	N side of Grays Harbor, E side of Ocean Shores Peninsula, E of Olympic View Way; Grays Harbor County	185 ac: 1983	185 ac – \$71,300 Ocean Shores Airport Mitigation	Maintained in natural state; hunting access	Private residential, Duck Lake, Tidelands
Oyhut	S end of Ocean Shores Peninsula adjacent to the	Total 683 ac: 1964-1965	Partial: Land transfer	Waterfowl habitat and associated recreation	City of Ocean Shores, Saltwater

	City of Ocean Shores; Grays Harbor County				intrusion sand dunes, N jetty of Grays Harbor
Humptulips/ Grass Creek	North Bay at Confluence of Humptulips River, Grass Creek and Grays Harbor off SR-109, 5.5 mi. NW of Hoquiam; Grays Harbor County	Humptulips: 835 acres: 1974 Grass Creek: 55.4 acres: 2003	Grass Creek: \$190,000 USFWS-NCWCG & IAC-SRFB	Tidal channel and estuary preservation in North Bay, Salmon recovery, waterfowl habitat	DNR, Audubon, Cascade Land Conservancy – Natural Area Preserve, private residential or agricultural
Failor Lake	10 mi NNW of Hoquiam, 3 mi W of Hwy-101; Grays Harbor County	360 ac: 1955/1957	Grays Harbor County and WA Dept. of Game	Fishing opportunity	Timber land, Transfer to access program
Olympic	15 mi. N of Aberdeen, multiple parcels throughout the Wishkah River valley; Grays Harbor County	Multiple parcels totaling 963 ac: 1950-1956	Partial: PR	Elk winter forage, reduce elk damage in lower valley	Private residential, agricultural or timber lands, Wishkah River
Pinkney	25 mi. N of Montesano, Adjacent to Wynoochee River on W side; Grays Harbor County		Partial: PR	Elk habitat & winter forage	Private timber lands, Wynoochee Mitigation land, Wynoochee River
Anderson Homestead	5 mi. S of Forks, S of Hwy 101 at the end of Fuhrman Road; Clallam County	40.7 ac: 1998	Land Donated	Elk habitat & winter forage; Riparian	Bogachiel River, Private residential, Dahlia farm
Wynoochee Mitigation	25 mi. N of Montesano, W of FS road-22 adjacent to Wynoochee River; Grays Harbor County	1,030 ac: 1972	Owned by Tacoma Power – Operation & Maintenance by WDFW since 1992	Mitigation for loss of habitat from dam and reservoir, provide elk winter forage	Timber lands, Wynoochee River

2.4 Funding

Current Funding sources for the Olympic–Willapa Hills Wildlife Area:

Portions of four staff positions are supported including:

1.0 FTE Wildlife Area Manager (Fish & Wildlife Biologist 3)

1-month Wynoochee mitigation, 11 months state/PR

1.0 FTE Assistant Wildlife Area Manager (Habitat Technician 2)

9 months Wynoochee mitigation, 3 months state/PR

0.5 FTE Habitat Technician 1, state/PR and Wynoochee Mitigation

0.25 FTE Scientific Technician 1, Wynoochee Mitigation

Wynoochee Mitigation, Operation and Maintenance, costs are funded annually by Tacoma Power.

John's River and Olympic Units (including Pinkney and Anderson Homestead) budget is \$107,500 for operation provided by PR funds (67%), non-PR funds (10%) and state funds (23%).

Chehalis and Hoxit Operating costs are \$10,000 funded by biennial Duck Stamp approval.

Ferbache Unit is leased with a sharecropper to plant cereal grain for waterfowl.

Satsop is currently under management by the Habitat Program..

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

2.5 Climate

The Pacific Ocean, westerly winds and the Olympic Mountains largely influence the regions climate. The region generally experiences a maritime climate characterized by mild temperatures with prolonged cloudy periods; wet, mild winters, cool, relatively dry summers; and heavy precipitation, averaging 84 in annually. Variations in precipitation occur, ranging from 24 in (NE peninsula) to 118 in (mountain interior), as a result of the coastal mountains, which create rain shadows in the Puget trough region. The majority of precipitation falls between October and March, primarily as rain with small amounts of snow in the Olympic Mountains. Average winter and spring temperatures range from 34°F to 75°F.

2.6 Soils and Geology (Franklin and Dyrness 1973)

The Olympic Peninsula region is comprised of a central core of rugged Olympic Mountains surrounded by almost level lowlands that extend south to the Willapa Hills. Glacial river valleys are broad and U-shaped and end as marine terraces or glacial outwash fans to the west and south and as glacial drift, sandstone or siltstone to the north. The mountainous portions are made up of volcanic belts encircling a large interior of sedimentary rocks. Forested soils consist of a dark grayish-brown silt loam surface and dark yellowish-brown sandy clay substrate. Deeper, well-developed soils from basalt consist of a reddish-brown silt loam or silty clay loam surface with a silty clay loam or silty clay subsoil. In estuary and wetland communities soils are poorly drained and contain considerable amounts of organic matter. The sandstone region along the north consists of moderately deep soils with thick, dark-colored silt loam or silty clay loam and silty clay loam or silty clay subsoil. Upland soils derived from glacial till are characterized by a loam surface and gravelly sandy loam substratum. Soils of till or glacial outwash on terraces range from gravelly silt loam to clay loam or silty clay loam and often have a gravelly, cemented layer at 1 meter. Alluvial soils of terraces along west-flowing rivers consist of deep silt loam to very fine sandy loam soils.

2.7 Hydrology and Watersheds



Mouth of the Nemah River

The wildlife areas outlined in this management plan occur throughout Pacific, Grays Harbor, Jefferson and Clallam counties in areas effected by major rivers and tributaries that flow into the Pacific Ocean, Grays Harbor or Willapa Bay. These wildlife areas are maintained within the following Water Resource Inventory Areas (WRIA): Soleduck-Hoh (WRIA 20), Queets-Quinault (WRIA 21), Lower Chehalis (WRIA 22) and Willapa (WRIA 24).

2.8 Fire/Flood History

Fire history is limited in western Washington due to the high amount of rainfall received annually. Fire has not significantly impacted the management strategies of wildlife areas today.

The flood history of western Washington is more extensive than fire history and includes areas along many rivers and streams as well as shorelines of Grays Harbor, Willapa Bay and the Pacific Coast. Seasonal flooding is one characteristic that defines the purpose of several wildlife areas in this region. Many parcels acquired by WDFW had dike systems or other land alterations in place, inhibiting natural flooding processes. A majority of these areas have been returned to their natural systems, which benefit multiple species of fish and wildlife.

2.9 Vegetation Characterization

The region encompasses multiple habitat types with various vegetation characteristics.

Characteristics of specific habitat types are listed here and management strategies concerning these habitats will be highlighted as appropriate per individual unit.

Forested – Primary conifer species typically consist of Douglas fir, Western red cedar, Sitka spruce, and Western hemlock, primary deciduous species typically include red alder, black cottonwood and big leaf maple.

Riparian forest - dense stands of trees and/or shrubs provide hiding, escape and thermal cover, shade, foraging and nesting sites, perches, and water sources. Often these highly productive communities contain both plant and wildlife species that are endangered or threatened. Common overstory trees in riparian zones include big leaf maple or black cottonwood, while the understory vegetation is composed of many hydrophytic shrub species such as alder or willow.

Riparian shrub wetland – shrubs or small trees growing in soil, which is seasonally or permanently flooded, vegetation may consist of cascara, crabapple, willow, red alder, and Douglas spirea.

Marsh wetland – adjacent to riparian wetlands and characterized, typically, by permanent water depths of between 1-3 feet, vegetation may consist of cattails, sedges, rushes, reed canary grass, Douglas spirea, and willow.

Forested wetland – many layers of plant growth where the upper layers consists of deciduous, evergreen or mixed tree types and the lower layers consist of shrubs and herbaceous plants, the

upper canopy may consist of red alder, black cottonwood, Oregon ash, Sitka spruce, western red cedar, Douglas fir and big leaf maple, the shrub layer below canopy may consist of cascara, salmonberry, snowberry, red elderberry and crabapple, and the herbaceous plants may include lady fern, skunk cabbage, and water parsley.

Wet upland meadows – flood seasonally with water run-off and have varying depths of standing water during the fall, winter and spring, vegetation typically includes grasses, sedges and rushes.

Upland – dry throughout the year and used as farmland, planted crops previously consisted of grasses, clover, barley, peas, millet, winter wheat or cereal grain.

Open water – average water depth of over three feet, vegetation may consist of water milfoil, pond lily, cattails, and duckweeds for freshwater systems, and eelgrass, sedges, or rushes for saltwater systems.

Mixed Shrub – occur in uplands and where mounds of gravel or rocks are present, vegetation may include thick clumps of willow, wood rose, evergreen blackberry, and Scot's broom.

Estuary – occur along the coast as well as in Grays Harbor and Willapa Bay and include deep water tidal habitats and adjacent tidal wetlands semi-enclosed by land but with access to the open ocean and where ocean water is diluted by freshwater runoff. Typically contains mudflats or salt-tolerant vegetation such as eelgrass, rushes or sedges.

Marine/Estuarine Shorelines – include the intertidal and subtidal zones of beaches and may include the backshore and adjacent components of the terrestrial landscape, such as cliffs or dunes that contribute to shoreline function.

2.10 Important Habitats

Riparian – Area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems, which mutually influence each other. The terrestrial element provides shade, fine or large woody material, nutrients, organic and inorganic debris, terrestrial insects, or habitat for riparian-associated wildlife. The aquatic element includes vegetation adapted to wet conditions and provides thermal cover, creates stream channel features such as pools, and maintains stream bank stability, primary factors influencing the quality and health of fish habitat. Units of the Coastal Wildlife Area with riparian habitat include the following: Oregon Silverspot Butterfly, Smith Creek/North River, Chehalis, Hoxit, Ferbrache, John's River, Olympic, Pinkney, Anderson Homestead, Wynoochee, Humptulips, Grass Creek, Satsop and Failor Lake.

Estuary – Deep water tidal habitats and adjacent tidal wetlands, semi-enclosed by land but with access to the open ocean, and where ocean water is diluted by freshwater runoff. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5% during the period of average annual low flow. These areas provide high fish and wildlife density and species diversity, important breeding



Estuary Habitat

habitat and important fish and wildlife seasonal ranges and movement corridors. Estuaries are limited in availability and are highly vulnerable to habitat alteration. Units with estuary habitat include the following: Cedar River, Chinook, Nemah, Palix, Willapa, North River/Smith Creek, John's River, South Shore Grays Harbor, Elk River, Oyhut, Humptulips and Grass Creek.

Wetland – Lands transitional between terrestrial and aquatic systems where water table is usually at or near the surface or the land is covered by shallow water. The land supports predominantly hydrophytic plants, substrate is predominantly undrained hydric soils, and/or substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. These areas support relatively high fish and wildlife density, high fish and wildlife species diversity, important fish and wildlife breeding habitat and important fish and wildlife seasonal ranges. Units with wetland habitat include the following: Oregon Silverspot Butterfly, Ocean Park, Nemah, Willapa, Chehalis, Hoxit, John's River, Elk River, Olympic and Satsop.

Old Growth/Mature Forests – Stands of at least two tree species forming a multi-layered canopy with occasional small openings, including trees over 200 years old or at least 32in in diameter, some large snags and numerous downed logs. Mature forests are between 80-200 years old. These areas support high densities of fish and wildlife as well as high species diversity including some threatened, endangered or sensitive species. These forests are a high priority due to their limited availability and high vulnerability to habitat alteration. Units with old growth/mature forest habitats include the following: John's River and Olympic.

Oregon Silverspot Butterfly Habitat – Includes level, stable dune topography, which supports the early blue violet providing nectar and important habitat for the larval stage of this species. Second growth dune forests and coastal dunes provide a travel corridor.

2.11 Fish and Wildlife



River Otters

bobcat, coyote, hare, raccoon, river otter, beaver, muskrat, small rodents, shrews, hawks, owls, ducks, geese, swallows, red-winged blackbird, killdeer, woodpeckers and a variety of

Fish and wildlife diversity is of primary importance to the goals and strategies guiding WDFW's management efforts. The Olympic-Willapa Hills units contain many estuary and wetland dependent species, big game and small game species of wildlife as well as native fish populations, some federally endangered. Each unit provides habitat for many common species found throughout western Washington such as deer, elk, fox,



Killdeer

shorebirds and song birds. In addition to the common species, units are managed either for recreation associated with fish and wildlife or for the protection of specific species and their habitats. Unique species, species of interest or primary management species occurring on individual units are outlined below.

Estuary and riparian protection provides critical habitat for many salmon species such as coho, chinook, chum and cutthroat trout. Units supporting these species and their habitats as well as providing recreational fishing opportunities include the Chinook, Nemah, Willapa, Palix, Smith Creek, North River, Chehalis, Ferbrache and John's River. Many of the coastal units were purchased with the intent to manage for waterfowl species providing wintering and foraging habitat as well as allowing for recreational hunting opportunities. Waterfowl management occurs on the Willapa, Palix, Smith Creek, North River, Chehalis, Hoxit, John's River, Elk River and Oyhut Units. The Olympic, Pinkney, Anderson Homestead, John's River and Wynoochee Mitigation Units are managed for big game, primarily winter forage and habitat and allow recreational hunting of deer and elk. There are limited resources for upland birds and game in the coastal units due to the abundance of wetland and estuary habitat conditions. However, the Chehalis, Ferbrache, and Johns River Units provide some upland habitat that supports species such as pheasant and grouse. The Oregon Silverspot Butterfly Unit preserves unique



*Pileated
Woodpecker*

critical habitat and supports this endangered species in all its life stages. The Chehalis Unit, in proximity to many agricultural fields, will occasionally provide escape and resting habitat for trumpeter swans. Chehalis and John's River units provide forage and resting areas for great blue herons and bald eagles. John's River also provides habitats that support wood duck and pileated woodpeckers.

2.12 Cultural Resources.

Cultural, geological, and other non-renewable resources are protected, and may not be removed unless such removal is beneficial to wildlife, habitat, or the Wildlife Area, or for scientific or educational purposes. WDFW will coordinate with the appropriate agency of jurisdiction for the protection of such resources. Past issues have included the removal of various rock formations, Native American artifacts, plants, seeds, and other items by members of the public.

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 tasks. *Public issues from past planning efforts and the Citizens Advisory Group are noted in italics and are captured in Appendix 1.*

Objectives and associated tasks specific to the Olympic–Willapa Hills Wildlife Area are listed where appropriate under applicable agency objectives. Unfunded needs are underlined.

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

1. Maintain big game populations

The Olympic unit and Anderson Homestead are managed to provide high quantities and high quality winter elk forage. The Olympic units were purchased to help prevent damage to private land in the lower valleys. The Wynoochee mitigation fields were established to provide replacement elk habitat and winter forage lost through construction of Wynoochee dam. The Game Management Plan calls for an increase in the Olympic elk herd, and the efforts to provide alternate habitat and quality winter forage may help. *Public concerns include elk damage to private lands and the use of grazing on the wildlife area.*

A. Strategy: Maintain 200 acres of elk forage areas on Olympic Unit (*Annual, 2006*).

B. Strategy: Reseed 30-50 acres of forage areas on Olympic Unit (*May through September 2006*).

C. Strategy: Mow and fertilize 150-170 acres on Olympic Unit (*July through October 2006*).

D. Strategy: Brush field edges and brush piles on 30-50 acres of elk forage areas on Olympic Unit (*April through June 2006*).

E. Strategy: Kill all existing vegetation on area to be reseeded with herbicide application and/or cultivation on Olympic Unit (*April/May 2006*).

F. Strategy: Take soil samples on elk forage areas for fertilizer analysis on Olympic Unit (*April 2006*).

G. Strategy: Mow and fertilize 40 acres for elk winter forage on John's River Unit (*June through October 2006*).

H. Strategy: Soil sample areas to be fertilized on John's River Unit (*April or May 2006*).

I. Strategy: Purchase 40 acres adjacent uplands at John's River Unit, Clear and plant for elk winter forage displaced by potential fish enhancement on Watson property (*Terry Legg, TAPPS mitigation, timeframe unknown*).

J. Strategy: Maintain 20 acres of elk forage on Anderson Homestead Unit (*Annual, 2006*).

K. Strategy: Mow and fertilize Anderson Homestead Unit (*July through October 2006*).

L. Strategy: Brush field edges and brush piles as needed on Anderson Homestead Unit (*Annual, 2006*).

M. Strategy: Anderson Homestead Unit, kill all existing vegetation on elk forage area and reseed every five years using herbicide application and/or cultivation.

N. Strategy: Purchase adjacent 20-40 acres at Anderson Homestead Unit and reseed forage areas (*Wynn property*).

O. Strategy: Manage 1030 acres of wildlife mitigation land, 250 acres in elk forage and 780 acres in buffers and escapement cover on Wynoochee Mitigation Unit as described in contract and mitigation plan (*Annual, 2006*).

P. Strategy: Manage elk forage according to Olympic Unit and Army Corps of Engineers O&M manual under contract with the city of Tacoma and WDFW (*Annual, 2006*).

Q. Strategy: Monitor elk forage areas for preferred vegetation (red clover, orchard grass, ryegrass) on Olympic, John's River, Wynoochee Mitigation and Anderson Homestead Units (*Annual, 2006*).

R. Strategy: Begin forest thinning planning and permit process at Johns River Unit (*Management Team Decision made to maintain public access across Beaver Creek, We would like to start forest management planning in 2006 but timeline dependant on when TAPPS completes restoration projects on Beaver Creek and John's River salt marsh restoration*).

2. Improve and maintain fish populations

Estuary and Riparian habitats provide high fish and wildlife density and species diversity; and important resting, rearing and transitional habitat. Protection of these areas is necessary for many native and critical fish stocks.

A. Strategy: Maintain water control structures for fish use at Hoxit Unit (*Annual, 2006*).

B. Strategy: Continue estuary restoration at Chinook, John's River, Willapa Units to increase salmon rearing habitat (*Annual, 2006*).

C. Strategy: Preservation of existing estuary habitat to provide important salmon foraging, resting and rearing habitat (*Annual, 2006*).

D. Strategy: Remove culverts and/or fish passage barriers on Olympic, Palix Units, and Beaver Creek at Johns River Unit.

E. Strategy: Work with Green Diamond Resource and Tacoma Power to address fish passage barriers on Wynoochee Unit.

F. Strategy: Plan estuary restoration or other action to address failing water control structure at Johns River Unit (*Annual, 2006; Tapps given go ahead to proceed on estuary restoration first phase, permitting; Engineering planning for emergency tide gate repair and replacement*).

G. Strategy: Maintain Riparian Fish buffer along Chehalis River on the Hoxit unit (*Annual, 2006*).

3. Manage for upland birds

There are limited resources for upland birds in the Olympic–Willapa Hills units due to the abundance of wetland habitat and moisture conditions. Upland birds provide recreational opportunities where pheasants are released at several sites in western Washington.

A. Strategy: Continue pheasant release program on Ferbrache Unit and maintain release site (*Annual, Fall, 2006*).

B. Strategy: Manage uplands on John's River Unit for wildlife habitats (*Annual, 2006*).

4. Manage for waterfowl/wetlands

Many of the Olympic–Willapa Hills units were purchased with the intent to manage for waterfowl species providing wintering and foraging habitat as well as allowing for recreational hunting opportunities.

- A.** Strategy: Maintain water control structures on the west side of the river for waterfowl and shorebird habitat and to control reed canary grass on John's River Unit (*Annual, 2006*).
- B.** Strategy: Maintain three dikes to control water in forage areas behind dikes on John's River Unit (Pending TAPPS completion of restoration plan that can be permitted, satisfying flood control for SR 105, Ocean Spray Cranberry Plant, and adjacent landowners). *Emergency repairs are necessary this year (2006)*.
- C.** Strategy: Mow and fertilize for waterfowl forage on John's River Unit (*July through October 2006*).
- D.** Strategy: Disc 2-5 acres prior to flooding to control reed canary grass and encourage smartweed on John's River Unit (*July/August 2006*).
- E.** Strategy: Control reed canary grass on uplands by mowing and/or herbicide application on 50-80 acres to promote smartweed on Chehalis Unit (*July through September, 2006*).
- F.** Strategy: Maintain open water on wetlands at 50% or more by harvesting aquatic vegetation, harvest when below 30% open water on Chehalis Unit.
- G.** Strategy: Monitor for preferred vegetation on John's River, Chehalis, and Hoxit Units by established reference vegetation surveys (Schirato, *April through October 2006*).
- H.** Strategy: Maintain water control structures for waterfowl and fish (including salmon habitats) and control of reed canary grass on Hoxit Unit (*Annual, 2006*).
- I.** Strategy: Mow 10-20 acres to control reed canary grass and enhance waterfowl forage and sheet water on Hoxit Unit (*July through September, 2006*).
- J.** Strategy: Disc 1-2 acres and flood to control reed canary grass and promote growth of smartweed on Hoxit Unit.
- K.** Strategy: Monitor sharecrops agreement for waterfowl plantings on Ferbrache Unit (*Annual, 2006*).
- L.** Strategy: Manage 3 new wetland cells created by NRCS at Seal Slough on Willapa Estuary Unit.

5. Manage for species diversity

Old Growth habitat is limited and has declined due to its high vulnerability to habitat alteration. These habitats support high fish and wildlife density and species diversity and provide important breeding, movement and cover habitat for many species.

- A.** Strategy: Maintain or enhance old growth/mature forest characteristics for marbled murrelet habitat and special needs of elk, grouse, pigeons, invertebrates, etc. (this strategy dependant on Tapps action to implement (Management Team Decision made to maintain public access across Beaver Creek, We would like to start forest management planning in 2006 but timeline dependant on when TAPPS completes restoration projects on Beaver Creek and John's River salt marsh restoration).

6. Protect and restore riparian habitat

Riparian and wetland habitats have been identified as priorities for management and protection due to their importance to many species, both fish and wildlife.

- A. Strategy: Monitor spruce seedling trees planted in 2003 for survival on Anderson Homestead Unit (*Annual, 2006*).
- B. Strategy: Plant buffer along Newman Creek on Chehalis Unit as outside funding becomes available.
- C. Strategy: Shrub and tree plantings along riparian area of Hoxit Unit. *Completed 2005.*
- D. Strategy: Secure funding to initiate design and permitting of Satsop Unit riparian restoration (Habitat Program developing restoration).

7. Protect and restore estuary habitat

Estuaries are important for many species and are a priority for migratory shorebirds along the Pacific flyway and provide forage and resting areas for waterfowl. Estuaries are productive environments and provide salmon with transitional habitat and forage opportunities.

- A. Strategy: Monitor breached dike for conversion to salt marsh habitat on John's River Unit.
- B. Strategy: Monitor breached dike for saltwater conversion on Elk River and Palix Units.
- C. Strategy: Maintain protection/preservation of saltwater estuary on Nemah, North River, Smith Creek, Oyhut, South Grays Harbor, Willapa, Humptulips and Grass Creek Units (*Annual, 2006*).
- D. Strategy: Participate in planning estuary restoration activities at Willapa Wetlands (Potter Slough) and Chinook Units (*Annual, 2006*).

8. Protect and manage other species

(Explain the significance of a particular species including T, E&S, etc.)

- A. Strategy: Monitor osprey nesting site on Chehalis Unit (*March through September*).
- B. Strategy: Manage forested areas for fish and wildlife habitats on all units. Investigate use of variable density thinning to enhance wildlife habitats (e.g., elk, owls, murrelets).
- C. Strategy: Continue efforts of Oregon silverspot butterfly (OSB) recovery plan on OSB Unit (Dave Hays, Appendix?) (*Annual, 2006*).
- D. Strategy: Continue efforts of snowy plover recovery plan at Oyhut Unit.

Agency Objective: Provide Sustainable Fish and Wildlife-Related Recreational and Commercial Opportunities Compatible with Maintaining Healthy Fish and Wildlife Populations and Habitats. Improve the Economic Well Being of Washington by Providing Diverse, High Quality Recreational and Commercial Opportunities.

1. Provide public access compatible with fish, wildlife and habitat protection.

Access for hunting, fishing, wildlife viewing and other activities is an agency priority. However, access and recreation must be controlled to protect fish and wildlife resources and to comply with federal and state regulations. *Public input clearly emphasizes the importance of providing recreational access with protections for the resource.*

- A. Strategy: Maintain non-vehicle access to elk forage areas and monitor for non-compliance (NO VEHICLES BEYOND THIS POINT) (*Annual, 2006*).

- B.** Strategy: Maintain and/or post informational signs explaining any access or hunting restrictions on all units (*Annual, 2006*).
- C.** Strategy: Maintain Biggs parking area at Polson Hopper road closure access at Olympic Unit (*Annual, 2006*).
- D.** Strategy: Maintain non-vehicle access on service roads and dikes at John's River Unit; and enforce compliance (*Annual, 2006*).
- E.** Strategy: Maintain parking areas, boat launch and ADA loading facilities at John's River Unit (*Annual, 2006*).
- F.** Strategy: Maintain paved ADA trail on dike and viewing blind at John's River unit.
- G.** Strategy: Provide overflow parking in field area for fishers during peak fishing season at John's River Unit (*September through November 2006*).
- H.** Strategy: Add additional hunting blinds at John's River Unit.
- I.** Strategy: Maintain non-vehicle access to Anderson Homestead Unit via roads and trails to Bogachiel River (*Annual, 2006*).
- J.** Strategy: Maintain non-vehicle access to Chehalis and Hoxit Units and monitor for non-compliance (*Annual, 2006*).
- K.** Strategy: Maintain all parking areas at Chehalis and Hoxit Units (*Annual, 2006*).
- L.** Strategy: Maintain ADA paved trail and blind at Chehalis Unit (*Annual, 2006*).
- M.** Strategy: Provide access to boat launch on Chehalis Unit *during waterfowl season*.
- N.** Strategy: Add additional hunting blinds at Chehalis Unit.
- O.** Strategy: Maintain non-vehicle access on Wynoochee Mitigation Unit for hunting, fishing, hiking, etc. and monitor for non-compliance (*Annual, 2006*).
- P.** Strategy: Maintain non-vehicle access to wetland for hunting, fishing, etc. on Nemah Unit.
- Q.** Strategy: Maintain public access at North River/Smith Creek Unit (*Annual, 2006*).
- R.** Strategy: Maintain non-vehicle public access at Oyhut Unit (*Annual, 2006*).
- S.** Strategy: Maintain and/or close parking area at Vortex site of Oyhut Unit (Terry Legg).
- T.** Strategy: Develop parking area at South Shore Grays Harbor Unit and post property. (Volunteer waterfowl hunter providing equipment, materials, and labor) (*Annual, 2006*).
- U.** Strategy: Continue pheasant release efforts and maintain public access on Ferbrache Unit (*Annual, 2006*).
- V.** Strategy: Monitor all areas for non-compatible use (*Annual, 2006*).
- W.** Strategy: Develop parking area and interpretive site at Willapa Wetlands (Potter Slough) under contract to DOT.
- X.** Strategy: Assist South Bend and Salmon Enhancement Group planning and development of trail from Willapa Boat Launch to Willapa Wetlands (Potter Slough) (*Annual, 2006*).
- Y.** Strategy: Assist in planning for interpretive sign and pullout at Cedar River Unit.
- Z.** Strategy: Transfer Failor Lake property to Access Program (*Annual, 2006*).
- AA.** Strategy: Post WDFW property at Ocean Shores Airport (currently posted by volunteer) (*Annual, 2006*).

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 weeds consistent with state and county rules and to protect and recover fish and wildlife and their habitats

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.

Cooperative weed efforts are encouraged to improve efficacy and to minimize impacts on adjacent landowners as part of the agencies good-neighbor priority.

A. Strategy: Monitor for noxious weeds and control Canada thistle and tansy ragwort on Olympic, John's River, Anderson Homestead, Chehalis, Hoxit and Wynoochee Mitigation Units (*May through September, 2006*).

B. Strategy: Clear and control encroaching vegetation in elk forage areas on Olympic, Anderson Homestead and Wynoochee Mitigation Units (*May through September, 2006*).

C. Strategy: Monitor for noxious weeds and control purple loosestrife at John's River, Chehalis and Hoxit Units (*May through September, 2006*). Dave Heimer

D. Strategy: Monitor for noxious weeds and control spartina at John's River and Willapa Units (*May through September, 2006*). Dave Heimer

E. Strategy: Monitor for noxious weeds and control spartina at John's River and Willapa Units (*May through September, 2006*). Dave Heimer

2. 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.

A. Strategy: Protect buffers adjacent to wetlands and riparian habitat according to project design criteria (*May through September, 2006*).

B. Strategy: See Agency Objective Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 2.

C. Strategy: Monitor service roads to forage areas for new forest standards and make repairs as per RMAP on Olympic, John's River and Chehalis Units.

D. Strategy: Maintain access road per forest standards on Anderson Homestead Unit (*Annual, 2006*).

E. Strategy: Monitor old orphan road abandonment for illegal ATV use to ensure re-vegetation and seedling tree plantings survive (Anderson Homestead, Olympic, and John's River) (*Annual, 2006*).

F. Strategy: Resolve easement dispute on Lynn access road at Olympic Unit and upgrade road to forest standards.

3. Provide fire control 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.

A. Strategy: Contract with local, state or federal entities to provide fire suppression support on the Wildlife Area (*Annual, 2006*).

B. Strategy: Provide fire training for wildlife area manager and assistant manager. Develop a list of fire responsible individuals (*Annual, 2006*).

4. 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: Assess cultural resource value (historic and archaeological) of all structures before renovation or removal

B. Strategy: Perform cultural resource survey and assessment before digging-including posts for new fence line, parking lots, toilets, buildings, new agricultural fields, etc.

C. Strategy: Assess historical and cultural value of maintaining pioneer cemetery on John's River with respect to public access.

5. Pay county PILT and assessment obligations

State law requires the agency to pay PILT and county assessments.

A. Strategy: Pay PILT and assessments to counties (*Annual, 2006*).

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

1. Maintain facilities to achieve safe, efficient and effective management of the wildlife area.

A. Strategy: Maintain headquarters including residence, shop, office, storage sheds and equipment storage lot (*Annual, 2006*).

B. Strategy: Maintain boundaries including signs, fences and vegetation for visual screening and survey corners (*Annual, 2006*).

2. Maintain other structures and physical improvements

A. Strategy: Maintain all signs, gates, culverts, water structures and access roads to perform operation and maintenance of area (*Annual, 2006*).

B. Strategy: Replace/install new boundary and unit signs where needed (*Annual, 2006*).

3. Maintain equipment

A. Strategy: Service all equipment including trucks, tractor and implements, weed sprayers, trailers, etc. Request replacement equipment when needed. (*Annual, 2006*)

B. Strategy: Rent equipment when it is more efficient to do so or when needed. (*Annual, 2006*)

C. Strategy: Schedule equipment for use on all wildlife area projects. (*Annual, 2006*)

4. Pursue funding opportunities

A. Strategy: Apply for grants and other funding opportunities consistent with planned priorities to supplement funding (*Annual, 2006*).

B. Strategy: Enroll lands in CRP and other federal programs to generate revenue and accomplish desired habitat conditions (*Annual, 2006*).

C. Strategy: Establish sharecropping agreements with neighbors to address artificial cultivation needs and generate additional revenue to support enhanced O&M

5. Assess forest conditions with regard to catastrophic fire, insect and disease risks

The history of fire suppression in many cases has resulted in forest tree densities far greater than historic levels. Dense forest stands may create fire safety issues and risk to the spread of detrimental forest insects and disease.

A. Strategy: Assess timber-thinning project to reduce potential insect and fire danger and create forest conditions more suitable to a diversity of species.

6. Perform administrative responsibilities

A. Strategy: Develop and monitor budgets (*Annual, 2006*).

B. Strategy: Supervise employees (*Annual, 2006*).

7. Protect and apply water rights for best use

Water rights can impact wildlife area operations including food plots, restoration projects, etc. Water use can also reduce in stream volumes for fish and other animals.

A. Strategy: Identify and record all water rights and uses of water (*Annual, 2006*).

B. Strategy: Move all unneeded water rights permanently or temporarily into the State Trust Water Rights Program.

CHAPTER IV. PERFORMANCE MEASURES, EVALUATIONS AND UPDATES TO THE OLYMPIC-WILLAPA HILLS WILDLIFE AREA PLAN

Wildlife area plan performance measures are listed below. Accomplishments and desired outcomes will be evaluated to produce an annual performance report. The 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 Olympic-Willapa Hills Wildlife Area Performance Measures for 2006 Include:

- Maintain 500 acres of elk forage
- Reseed 30-50 acres with elk forage
- Mow and fertilize 400 acres of elk forage
- Remove brush around the perimeter of 50-70 acres elk forage areas
- Test 10-20 soil samples
- Develop 40+ new acres of elk forage (John's River Mitigation)
- Release pheasants at Furbache Tract
- Maintain 4 water control structures for waterfowl habitat (three at John's River until fish enhancement project implemented, one at Hoxitt).
- Plant 2000 lineal feet of riparian buffer Along Newman Creek, Chehalis Unit
- Plant 1000 lineal feet of riparian buffer along Chehalis River Tributaries
- Remove or replace 9 fish passage barriers/culverts (rmap on John's river and Olympic)
- Restore 400 acres of estuary habitat
- Provide 3 new access/parking areas (Chinook, Potter Slough)
- Redevelop Capitol Budget Request for Chermack Trail (Potter Slough)
- Transfer 360 acres to Access Program (Failor Lake)
- Document contacts/violations of land use rules on Wildlife Areas (e.g. ORV use, Access Decals, Vehicle closures.)
- 1 Emphasis Patrol on Wildlife Area for illegal ORV use
- Investigate and take appropriate action on trespass tree cutting and habitat damage on Ocean Shores Airport Mitigation Unit.

2. Annual Evaluation of Performance.

Evaluate performance measures and produce an annual report. At the beginning of each calendar year, the manager will convene the CAG and district team to assess wildlife area specific performance measures and accomplishments that will be used to develop the annual plan update. This update will be an attachment to the plan.

3. Annual Plan Update.

As projects are completed and new issues arise, this plan will be updated, without needing to be re-written. With CAG and District Team input, the plan will continually reflect the strategies, goals and objectives of the current year.

APPENDIX 1. CITIZENS ADVISORY GROUP (CAG) AND DISTRICT TEAM (DT) ISSUES AND CONCERNS

Olympic-Willapa Wildlife Areas
December 30, 2005

The purpose of meeting with the CAG and DT was to obtain input to help guide management actions on the wildlife area. A draft of the introduction and history of the wildlife area and copies of the Agency's goals and objectives were distributed for review and discussion. Below is a list of issues and concerns identified by the CAG and DT.

This input will assist in developing strategies to implement management goals and objectives. Underlined statements below indicate that the input was received from the DT. Issues that are not underlined originated from the CAG.

1. Discussions about what elk do in high winds. Heavy thinning in some areas – Influence of high winds. Elk into younger age classes, especially “dog hair.” This comment seemed to be designed to support clearcutting. Jim Pekola reported a bull caught under a mudslide some years ago because small trees were growing out of the material over the elk. Somewhere on the peninsula, not specifically the Wishkah Valley. No real issue here.
2. Q. Do we have to do intensive management? Intensive forage management? A. Wynoochee forage fields Other WA forage fields are diverse habitats, interspersed with wetlands, riparian protection zones, brush piles, visual barrier strips. Need to point out that it is only a small percentage of the total acreage that is “intensively managed”. On the Olympic Wildlife Area, the forage fields constitute 14% of the Wildlife Area. Other parcels are managed even less intensively, e.g. Palix, Nemah, and Smith Creek. What would this land be if not purchased in the 50's? Land Use in the surrounding area would indicate that it would be mixed urban/suburban developed, and intensively managed(clear cut) forest land with very little public access.
3. Elk numbers up in Wishkah Valley? – Some people felt that way, WDFW has not harvested cow elk for years since 1996 (although the tribes have been harvesting some cow elk) other possible factors are urban/suburban sprawl, and forest practices in adjacent areas that have matured into more restrictive forage producing stages. Some landowners feel it's time for some cow seasons. Too many elk using their property. This will be considered in another forum, in development of 3 year hunting seasons package later this year.
4. Variable density thinning? Discussion of benefits of this forest practice. Where applied, can have positive fish/wildlife benefits for a wide variety of species from salmon to elk to owls and murrelets. Variable density thinning in John's River timberlands for old forest. So this all hinges on decisions about how we will proceed on John's River because those timber stands are prime age class for commercial thinning practices. The Objective would be to develop older forest characteristics like multi level canopy, much sooner than not managing the stand. Would require a timber cruise and a habitat evaluation for old forest species.
5. Hoppers fields, 6 acres being farmed for elk forage. This is a positive deal for elk. Need access agreement for the cooperative road closure on this area. Also need a cooperative agreement for the habitat improvements where we share the costs with the landowner.
6. “Oat fields” on the east fork of the Wishkah which were lost to maintenance of elk forage production in the change of ownership – now owned by Weyco and Green

- Diamond – 5 acres west side, 3 acres east side. Previously owned by Hancock Insurance, managed by The Campbell Group. Interest is for us to manage elk forage here again. New owners have not responded to date.(Managers comment)
7. Forage dev. In the forested 80 acres across from Jim Pekola's ownership. Forage development here might take some of the pressure off private ownership. Would require a timber cruise and a habitat evaluation for old forest species.
 8. Jim Gerchak and crew doing excellent job – producing elk and waterfowl. Meeting forest practices and wetland management best practices. Acknowledged by district team.
 9. Need to highlight protections for wetlands, riparian buffers, estuary's → Looking for balance → Plan gives the impression that all the land is intensively farmed, etc. where most is actually in a "natural" category that emphasizes protection of wetlands, riparian buffers, and estuarine habitats like salt marshes, tideflats, etc. Some intensive management like Spartina control needs to be highlighted in weed control plan. Beaver Creek crossing and road reconstruction issue on John's River WA is a good example of the difficulty in attaining a balance between competing and even compatible issues in a wildlife area planning process. Having said this, the decision has been made by others that we want the road on John's River property, and the fish passage needs to be provided in the most economical way.
 10. Watchable wildlife – Encourage youth oriented activities. Acknowledged.
 11. Encourage Festivals like the shorebird festival. Acknowledged.
 12. Palix dike? Is restoration possible? Look at this property. Dave King asked if we need to open the existing breach more. Response was that this would probably do more harm than good because getting equipment out there on a dike that was built by horse and slip (like a drag line bucket that hooks to the horse) would require rebuilding the dike to the point of the breach. The breach has widened over the years to a point providing adequate hydraulic exchange. The salt marsh and natural drainage are restoring themselves.
 13. Elk R. 3.1.7 Airport mitigation – finish the breaching of the dikes near the Ocosta School. Is this physically possible? Necessary? Does Habitat Program know where funding is for this or is the mitigation final? Response was that this may do more harm than good because getting equipment out will cause some impact. The breach has widened over the years to a point providing some hydraulic exchange. The salt marsh and natural drainage are restoring themselves gradually. We need to investigate this further including a survey or other way of determining our ownership. Different maps?
 14. Should we do a forest inventory of other lands? Would require a timber cruise and a habitat evaluation for old forest species.
 15. Spartina → Les Holcomb – Palix Block need detail on what has been treated on our lands and what is planned to be treated. Is there a document we can attach as an appendix, which shows this? Dave Heimer has the records and is putting a report together summarizing what has been done. Les Holcomb could answer this question. Acknowledged.
 16. Enforcement of habitat damage to Wildlife Area lands needs to be emphasized. Instances of damage need to be investigated by enforcement and a case report written which recommends action. Strong input from the CAG that they would like to see us take stronger action to enforce these trespass and habitat damage situations. Example cited was the Ocean Shores Airport mitigation property where large swaths of timber and other woody vegetation were cut and left apparently to improve the view for an adjacent property owner.

17. Need decision before next biennium starts on a water control structure at John's river dike on the old Watson property across from the Ocean Spray Cranberry Plant(east side of river). It will fail and we will be forced to do emergency repair if it isn't fixed. Wildlife Program recommendation is to design a fish passage friendly structure that allows water level control for active management of the area behind the dike for fish, elk, waterfowl, and shorebirds.
18. Focus of our discussion on timber and forest management was on John's River and Olympic wildlife area units. This discussion should be broadened in the plan to include other units. Many of the other units don't have forest resources, those that do would not allow timber harvest activities because they are forested wetlands or riparian forests that are protected under current rules. We have asked TAPPS to continue planning for project to permitting stage. Wildlife Program will apply for a Capital Project to do an emergency repair, if necessary. Manager has sent email to TAPPS to continue design of project and bring it to permitting.
19. See Agency Objective Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 2. Replace or Remove culverts and /or fish passage barriers on North River, Smith Creek, Olympic, Palix units, and Beaver Creek at Johns River Unit. District Team decision is that there will be road access at Beaver Creek and TAPPS needs to move to another option(besides pulling the road out) and develop an option that meets their needs but provides road access across Beaver Creek. Wildlife Program(Brittell) and Regional Director Sue Patnude have made the decision that there will be road access to the wildlife area across Beaver Creek on our property. Decision was based on maintaining public access to the wildlife area and doing forest management of timber for T&E species and other resources. TAPPS said North River and Smith Creek culverts are not a problem. RMAP proposals for John's River need to be implemented. Engineering has done elevations, culverts need to be replaced "Git er done!" Lonnie(RMAP) needs to proceed with culvert replacement/removal on all Olympic Wildlife Area Units except Lynn unit where there is unresolved easement issue.

APPENDIX 2. OLYMPIC-WILLAPA 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, B-Designate, and county listed 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), defined as 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 accomplish weed control. The elements of IPM 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, the distribution and the relative density on the management 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 value of invaded habitat, the feasibility of control, the legal status of the weed, past control efforts, and available budget.

Treatment- Treatment of a weeds using biological, cultural, mechanical, and chemical control serves to eradicate pioneering infestations, reduce established weed populations below densities that impact management objectives for the site, or otherwise diminish their impacts. The method used for control 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 management 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 Olympic-Willapa WLA

Weeds of concern on the **Olympic-Willapa** include Tansy Ragwort (*Senecio jacobaea*), Canadian thistle (*Cirsium arvense*), Japanese Knotweed (*Polygonum cuspidatum*), Spartina (*Spartina alterniflora*)*, Purple Loosestrife (*Lythrum salicaria*)*, Eurasian Milfoil (*Myriophyllum spicatum*)*, Scotch Broom (*Cytisus scoparius*) and Reed Canarygrass (*Phalaris arundinacea*). Aquatic species designated with asterisk are controlled by central weed control crew. This list is based on species that have been documented on the wildlife area (Table 1).

Table 1. Olympic-Willapa Wildlife Areas Weeds Including the State and County Weed Class Listing and Acres Treated.

Weed Species	2005 State Weed Class	2005 County Weed Class	Wildlife Unit(s)	2005 Treated Acres
Tansy Ragwort	B-Designate	B-Designate	Olympic, Wynoochee, John's river, Chehalis, Hoxitt, Anderson homestead, Pinkney	Spot spray and hand pull 380 in conjunction with mowing operations on forage areas
Canadian thistle	C	R & S	Olympic, Wynoochee, John's river, Chehalis, Hoxitt, Anderson homestead, Pinkney Chinook	110
Japanese Knotweed	B	R & S	Olympic, Wynoochee, Anderson homestead,	NRCS controlling - 0
Spartina*	B		Palix, John's River, Oyehut, Smith Creek, North River, Cedar River	* Spartina Crew
General Weeds			All	250
Purple Loostrife*	B	R & S	Chehalis	* Spartina Crew
Eurasian Watermilfoil*		New Invader	Hoxitt, Chehalis	0
Scotch Broom	B	R & S	Olympic, John's River	1
Reed Canarygrass	C	R & S	John's River, Chehalis, Hoxit, Chinook,	Mechanical control 680-700
Gorse	B-Designate	B-Designate	Potter Slough	Spot spray 2-3

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

New Invader is not an official state classification, but indicates the county reserves the right to implement control.

R&S (Reduction and Suppression) Weeds are of wide distribution. Control along transportation corridors is recommended

* Aquatic species designated with asterisk are controlled by central weed control crew(Dave Heimer/Les Holcomb).

Management for individual weed species can be found in the following “Weed Species Control Plan” (WSCP) sections.

TANSY RAGWORT CONTROL PLAN

Common Name: Tansy Ragwort **Latin Name:** (*Senecio jacobaea* L.) **Family:** Asteraceae
Updated: 2006

DESCRIPTION: Tansy ragwort is classified as a biennial herb. It can complete its life cycle as a winter annual and occasionally as a perennial, depending on environmental conditions. As a biennial, tansy ragwort spends the first year in the rosette stage, with petiolate (stalked) dark green, basal leaves. The leaf underside is somewhat hairy, and appears whitish. The overall rosette has a ruffled appearance, due to deeply indented and blunt toothed lobes of the leaves. The basal leaves are often deciduous. The size of the rosette may indicate the potential for flowering, with larger rosettes producing more flowers. During the second year, one or several flowering stems bolt, with the overall plant being one to four feet high. The leaves found on the flowering stem are alternate, and sessile. The flower heads are in flat topped clusters. Each flower head is composed of yellow, daisy-like flowers. Each flower head is a composite of many disc flowers surrounded by (usually) 13 ray flowers. A distinguishing characteristic is the 13 'petals', which are ray flowers. Tansy ragwort has a taproot, and often a large woody rootstock. Initial infestation is by seed.

The estimated number of species in the genus *Senecio* range from 1,000 to 3,000. The United States Department of Agriculture lists 112 species of this genus in the United States. Only seven of these species are toxic to livestock, and *Senecio jacobaea* is responsible for the majority of livestock poisoning (Hitchcock et al. 1969; Correll and Johnston 1970, USDA 1982 as cited in Sharrow et al. 1988).

Economic Importance: Detrimental: Tansy ragwort is toxic, and can be lethal to cattle and horses, to a lesser extent goats, and seldom sheep and presumably to wild ruminants like elk and deer. These toxic properties remain in cut plants found in hay. The toxic properties are also a threat to humans, as a possible contaminant to the human food chain (Howatt 1989). Herbal remedies, contaminated flour, milk, or honey are potential sources, with long term consumption being a concern (Watt 1987 as cited in Howatt 1989). All plant parts are toxic, with the highest amount of alkaloids in the flowers, followed by the leaves, roots, and stems. Tansy ragwort contains several alkaloids, which themselves are not toxic. However, these alkaloids are broken down by liver enzymes during metabolism and they are then considered to be toxic and potentially carcinogenic (Turner and Szczawinski 1991). Chronic, cumulative poisoning, and irreversible liver damage, including cirrhosis of the liver are the results of ragwort poisoning. Beneficial: None known.
Habitat: Tansy ragwort will establish in disturbed sites that includes roadsides, pastures, and forested areas recently harvested for timber (Sweeney et al. 1992).

Tansy ragwort does not show a preference for soil texture or acidity. Soil moisture may play a role in the distribution of this species. (Harper 1958 as cited in Sharrow et al. 1988). In Britain and Western Europe tansy ragwort is considered a climax species in coastal sand dune communities.

However, the major distribution of tansy ragwort is as a pioneer to mid seral species to newly disturbed sites. (Harper and Wood 1957 as cited in Sharrow et al. 1988).
Geographic Distribution: Tansy ragwort is native to Europe and western Asia, ranging from Norway through Asia Minor, and from Great Britain to Siberia. (McEvoy, 1985 as cited in Sweeney et al. 1992). Tansy ragwort is found throughout Europe, with worldwide distribution following European settlement to new areas. Tansy ragwort is now found on the east and west coasts of the United States, and it is also found in Canada, New Zealand, Australia, Argentina, and South Africa (Sharrow et al. 1988).

History: The first recorded site of tansy ragwort in western North America was on Vancouver Island in 1913 and in Oregon in 1922. Tansy ragwort is now found from northwestern California to British Columbia, from coastal areas continuing east of the Cascade Mountains (Sweeney et al. 1991). The economic impact of tansy ragwort in Oregon during the 1970's included: more than \$4

million a year lost in livestock poisoning; the loss of five to ten percent of cattle herds and dairies were forced to close (Rees et al. 1996).

Growth and Development: As a biennial, most tansy ragwort seeds germinate in the fall. The first year is spent in the rosette stage with dark green and ruffled basal leaves. The flowering stalk bolts during the second year. Flowers are produced from late summer into the fall. After seed production, individual plants generally die. However, the crown and the root system from a flowering plant can produce new rosettes (Forbes 1977, McEvoy 1984c as cited in Sharrow et al. 1988).

While a biennial life cycle is typical, tansy ragwort will behave as a perennial if the flowering stalk is cut, mowed, trampled, or mechanically injured in any way while flowering. Vegetative regeneration can then occur from crown buds, root fragments or intact roots (Baker-Kratz and Macquire 1984; Black 1976). When flowers are removed prior to seed set, the plant is able to reflower later in the same season. Defoliated rosettes will continue to grow indefinitely as vegetative perennials (Forbes 1977 and McEvoy 1984c; Harper 1958 as cited in Sharrow et al. 1988). Seeds require light for germination, but they can remain viable in soils for 10 - 16 years (Thompson and Makepeace 1983 as cited in Sharrow et al. 1988).

Reproduction: The number of seeds per plant can range from 5,000 to 200,000 (Cameron 1935 as cited in Sharrow et al. 1988). Tansy ragwort flowers from July through September, and the seed matures and disperses during the flowering season. Pioneer invasion is by seed. Tansy ragwort patches can establish when root and crown sprouts vegetatively produce new rosettes. **Response to Herbicides:** Chemical control is effective against tansy ragwort. 2,4-D is effective when applied to rosettes in the spring, or applied to the new growth initiated after fall rains. Dicamba is effective on plants with large rosettes or flowering stalks. Tordon controls scattered populations. Glyphosate is also used for effective control (Sweeney et al. 1992).

Response to Cultural Methods: Tansy ragwort requires sunlight and a disturbed site to establish. Pasture management will minimize potential infestations (Bedell et al. 1981 as cited in Sweeney et al. 1992). Tansy ragwort seedling mortality may be high where there is competition from established or vigorous grass stands (Sharrow et al. 1988). Sheep are resistant to the toxic properties of tansy ragwort, and they prefer tansy ragwort to forage material that has dried out during the summer. Grazing sheep will prevent the production of flowers and seeds. However, overgrazing that creates disturbed soils and a loss of native vegetation will cause reinfestation when the sheep are removed. (Bedell et al. 1981 and Macdonald 1983 as cited in Sweeney et al. 1992). Heavily infested sites that support all growth stages of tansy ragwort, as well as a seed bank, make control impossible when only one stage of the plant is targeted (Black 1976). **Response to Mechanical Methods:** Hand pulling is effective on small infestation sites of tansy ragwort. Pulling when the soil is moist will help to remove the whole root, as tansy ragwort will resprout from root fragments. Covering the site with mulch will help prevent new germination from the disturbed site. (Sweeney et al. 1992). Mowing is not recommended. Mowing will prevent seed production, however, any damage to the flowering stalk will force tansy ragwort to keep growing as a perennial (Harper 1958 as cited in Black 1976). Established vegetative plants remain as low growing rosettes, which can prevent desirable vegetation from establishing on a site. (McEvoy 1984c and cited in Sharrow et al. 1988).

Biocontrol Potentials: In its native habitat, tansy ragwort is controlled by over 60 species of natural enemies that feed on this species. (Cameron 1935 as cited in Sweeney et al. 1992). Three natural enemies of tansy ragwort were introduced in California between 1959 and 1966. The ragwort flea beetle (*Longitarsus jacobaeae*), the ragwort seed fly (*Pegohylemyia seneciella*), and the cinnabar moth (*Tyria jacobaeae*) are the biological agents effectively used to control tansy ragwort in Oregon, California, and Washington. The cinnabar moth and the ragwort flea beetle are unable to establish east of the Cascade Mountains (Rees et al. 1996). **Rationale for Listing:** The impacts

caused by tansy ragwort infestations include loss of livestock and loss of desirable vegetation in pastures and rangelands. Tansy ragwort is toxic and can be fatal to cattle and horses. It has the potential to cause human poisonings. The toxic properties are not lost when this plant is cut and left to dry in a pasture or when it is baled in hay. Tansy ragwort is invasive and aggressive and will quickly establish in newly disturbed sites, which include poorly managed pastures and recently logged forest areas. Tansy ragwort is also a prolific seed producer. It is often found on roadsides, contributing to the spread of new infestations. Control is difficult, since tansy ragwort has the ability to live as an annual, biennial, or perennial, depending on environmental conditions. As a Class B noxious weed in Washington state, control is required where populations are limited or non-existent, preventing the spread to new locations.

MANAGEMENT INFORMATION:

Intensive clean cultivation can effectively control tansy Ragwort. Other control can be achieved now with hand pulling along roads and edges of forage fields, and with herbicide spot spraying in brush piles.

Herbicide can be an effective tool for control and applicators should refer to the PNW Weed Management Handbook, or other reputable resources, for product recommendations and timing.

Cinebar Moth larve(*Tyria jacobaeae*), a defoliating moth, is well-established in Washington and provides good control

CURRENT DISTRIBUTION

Because of 20 years of ongoing control efforts, this weed occurs sporadically on affected sites.

ACRES AFFECTED BY WEED: ~750
Scattered)

WEED DENSITY: Low (Widely

GOALS

Control expanding populations

OBJECTIVES

Survey new acquisitions for populations

Spray brush piles and hand pull occasional plants along roads and in fields

ACTIONS PLANNED

Spray brush piles and hand pull occasional plants along roads and in fields in affected units

Survey the Chinook Unit for occurrence and control needs

Monitoring will continue on an annual basis

CONTROL SUMMARY AND TREND

Over the last twenty years, control effort varied widely based on soil moisture conditions. There is no trend to acreage treated all affected areas are covered. An annual maintenance effort is required with other ongoing operations.

Control is slowly reducing the density on affected units. The weed density in the affected area is mostly controlled by the moisture conditions of the particular growing year. Biocontrol agents used in the past appear on most plants on all units monitored.

GORSE WEED SPECIES CONTROL PLAN

Latin name: *Ulex europaeus* L

Common name: Gorse

DESCRIPTION: Gorse is a perennial, evergreen shrub ranging from 3 feet to over 10 feet tall. Seedlings are compact, with trifoliolate leaves and thin expanded leaflets typical of legumes. With plant maturity, the leaves develop an awl-shape (spinelike). Well-developed branch spines also grow in the leaf axils. Overall, gorse plants are shrubby with stout and erect spreading branches with angular stems and a terminal thorn. Branches mature from green to brown. The plant habit is dense, sometimes 30 feet in diameter with a center of dead foliage. The shiny yellow, pea-like flowers are $\frac{1}{2}$ to $\frac{3}{4}$ inch long, with an ovate banner (upper petal), oblong wings (lateral petals) and keel (lower, united petals). The wings are larger than the keel. The calyx is pubescent and deeply two-lipped. The upper lip is 2-toothed and the lower lip is 3-toothed. The ten stamens are monadelphous. The flowers are solitary or racemous, and clustered at branch tips. The seed pods are hairy, $\frac{1}{2}$ to $\frac{3}{4}$ inch long, and brown when ripe. The pods burst and scatter seeds for several feet. The seeds are smooth and shiny, olive to brownish. The root system consists of a taproot, lateral roots and adventitious roots (Hoshovsky 1989; Parker and Burrill 1991).

Gorse is native to western and central Europe, where it is cultivated for hedgerows. Gorse is a weeding more than 30 countries. In the United States, gorse is found on the east coast from Virginia to Massachusetts (Hermann and Newton 1968 as cited in King et al. 1996). On the west coast gorse is found from California to British Columbia, and in the Hawaiian Islands. Gorse was introduced as an ornamental to Oregon when seeds were brought from Ireland, prior to 1894. Gorse was brought to California before 1912 as "a bit of ol' Ireland" (Pryor and Dana 1952 as cited in Hoshovsky 1989). By the 1950's, CA reported over 15,000 acres of gorse along the coastline from Santa Cruz to Del Norte, and OR reported over 25,000 acres (as cited in Hoshovsky 1989). In Washington gorse is reported from 11 counties west of the Cascade Mountains, with an estimated 800 acres in Pacific Co. Gorse is a Class B noxious weed in WA, and it is also a quarantine species – it is illegal to buy or sell this species.

Plants grow outward, leaving a center of dry, dead vegetation. Individual plants can be up to 30 feet in diameter (Boyd 1984 as cited in Hoshovsky 1989), forming dense, impenetrable thickets. The combination of dead plant matter and a high oil content create a fire hazard. The root system consists of a tap root, lateral roots and adventitious roots. Extensive lateral roots are found a couple of inches below the surface. A mat of adventitious roots descending from procumbent branches support the lateral roots (Chater 1931; MacCarter and Gaynor 1980 as cited in Hoshovsky 1989). Nitrogen-fixing bacteria are located in the root nodules of gorse, and they thrive under aerobic conditions, and this fixating metabolism slows if the roots are flooded (Zabkiewicz 1976). Fire plays a role in the ecology of gorse, and it has been described as a 'fireweed'. Fire cracks the hard and waxy, impermeable seed coat and fire also removes the heavy litter associated with mature plants. This opens an area of light and moisture for seedlings. Plants recover quickly after fire, with regrowth from the stems or from the root crown. While gorse prefers cool, moist habitat, this plant has characteristics that allow it to occupy areas of drought or sites that are sunny, exposed and dry.

MANAGEMENT INFORMATION:

"Control of gorse can be considered in two stages. First is the control of established plants. Second is the control of new plants emerging from seeds that may last more than 30 years in the soil. The most effective control program usually includes a combination of herbicides, burning and cultivation or mowing. Establishing competitive pasture species, forest trees or other crops helps resist gorse invasion as well as other weeds. When using herbicides, it is crucial to thoroughly wet the foliage. The best time to apply herbicides is after bloom drop, but applications at other times usually give good control also." (William et al., 2000 ,from the 2000 PNW Weed Control Handbook).

Response to Herbicide: Several herbicides are recommended for gorse control, including glyphosate, Crossbow, Tordon, Escort and Banvil, to name a few. For site specific control recommendations, please refer to the most recent version of the PNW Weed Control Handbook referenced in the bibliography (Williams et al. 2000). Response to Mechanical Methods: Hand pulling - effective on seedlings and plants up to 1 meter or so tall, and before seed production. Seedlings are easiest to remove after rain, when the whole root system is removed. Hand hoeing – effective when gorse is growing with beneficial vegetation nearby. Hoeing, and cutting off the top of plants will expose them to the sun, drying them out. Cutting – before seed production will prevent further dispersal, but the plants will resprout from the stump. Cutting is a necessary step when working with large plants, to remove the above ground portion. Hand-digging – effective on small infestations, is one way to control a plant the capability to resprout from the roots. Chopping, Cutting or Mowing – an option for flat areas. Several mowings may be necessary to deplete root reserves; if only one cut, it is recommended to use before flower production. Cutting is recommended before herbicide application. A cut gorse plant will resprout from the crown in greater density if herbicides are not applied. (Hoshovsky 1989). The plant is not salt tolerant and will be eradicated by estuarine flooding.

CURRENT DISTRIBUTION

Our only known site is on the Potter Slough property in Pacific County.

ACRES AFFECTED BY WEED: ~1/4

WEED DENSITY: High

GOALS

Eradicate with estuarine flooding

Prevent new occurrences by urging the county and city of South Bend to remove it from their property.

OBJECTIVES

Natural control by estuarine flooding

Continue herbicide application tests(back pack sprayer)

Monitor upland areas in Pacific County for new infestations

ACTIONS PLANNED

Continue herbicide application tests(back pack sprayer). Eradication is expected with completion of the estuarine enhancement of the Potter Slough site.

CONTROL SUMMARY AND TREND

2005-Approximately 1/4 acre treated with herbicide

JAPANESE KNOTWEED CONTROL PLAN

Latin name: *Polygonum cuspidatum* Sieb & Zucc **Common name:** Japanese knotweed
Family name: Polygonaceae

DESCRIPTION: Description and Variation: Japanese knotweed is a perennial species with spreading rhizomes and numerous reddish-brown, freely branched stems. The plant can reach four to eight feet in height and is often shrubby. The petioled leaves are four to six inches long and generally ovate with an abrupt point. The whitish flowers are borne in open, drooping panicles. The plant is dioecious, so male and female versions of the inconspicuous flowers are produced on separate plants. The approximately 1/8 inch long fruits are brown, shiny, triangular achenes, (Hitchcock and Cronquist 1964; Hickman 1993).

Economic Importance: Detrimental - Japanese knotweed is a very aggressive species (Hitchcock and Cronquist 1964) that is capable of crowding out all other vegetation (Ahrens 1975). Hickman (1993) lists the species as a noxious weed. In addition, the plant can create a fire hazard in the dormant season (Ahrens 1975). Beneficial - The plant is sometimes grown as an ornamental (Hitchcock and Cronquist 1964; Muenscher 1955).

Geographic Distribution: As its name indicates, Japanese knotweed is a native of Japan (Hickman 1993). However, it has become naturalized in North America, where it is found from Newfoundland and many parts of the northeastern United States (Muenscher 1955), west to California (Hickman 1993), and the Pacific Northwest (Hitchcock and Cronquist 1964).

Habitat: An escaped ornamental, Japanese knotweed is often found in waste places, neglected gardens, roadsides, and along streambanks (Muenscher 1955; Figueroa 1989).

History: A native of Asia, this species was introduced to England in 1825 for use as an ornamental plant (Patterson 1976). Japanese knotweed was subsequently introduced to the United States for use in ornamental hedges and for erosion control (Pridham and Bing 1975).

Growth and Development: Japanese knotweed is a perennial species.

Reproduction: This species spreads by seed and by long, stout rhizomes (Muenscher 1955). However, colonies rarely establish from seed. Primary spread of the species is reported to be through mechanical movement of plant parts (Figueroa 1989).

MANAGEMENT INFORMATION:

Response to Herbicides: Glyphosate has been shown to be effective in controlling Japanese knotweed under certain conditions (Ahrens 1975; Figueroa 1989). However, dust on plants along roadways may reduce the herbicide's effectiveness (Figueroa 1989).

Response to Cultural Methods: Frequent cultivation to grub out rhizomes may be effective (Muenscher 1955).

Response to Mechanical Methods: The plants are extremely difficult to dig up due to their high rhizome densities (Figueroa 1989). Care must be taken with any mechanical removal methods, since improper disposal of plant material can spread the species further.

Biocontrol Potential: No information available. Rationale for listing: Japanese knotweed is an escaped ornamental that is becoming increasingly common along stream sides and rights-of-way in Washington. The species forms dense stands that crowd out all other vegetation, degrading native plant and animal habitat. In addition, Japanese knotweed can create a fire hazard in the dormant season. This perennial plant is difficult to control because it has extremely vigorous rhizomes that form a deep, dense mat. In addition, the plant can resprout from fragments; along streams, plant parts may fall into the water to create new infestations downstream.

CURRENT DISTRIBUTION

Japanese knotweed is found along the Wishkah River on the Olympic WA. And there maybe some on the other areas. NRCS currently surveying.

ACRES AFFECTED BY WEED: Less then acre known.

WEED DENSITY: Low

GOALS

Control expanding populations
Prevent new occurrences

OBJECTIVES

Check on other areas for knotweed
Keep in contact with NRCS for survey information
Treat areas affected

ACTIONS PLANNED

Japanese knotweed will be aggressively controlled on the areas for total eradication where known populations exist.

CONTROL SUMMARY AND TREND

No known populations in the past on our lands.

REED CANARYGRASS WEED SPECIES CONTROL PLAN

Latin name:(*Phalaris arundinacea* L.)

Common name: Reed Canarygrass

DESCRIPTION: Description and Variation: A highly variable species, reed canarygrass is a rhizomatous perennial grass that can reach three to six feet in height. 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. Flowers are borne in panicles on culms high above the leaves. The panicles are generally three to six inches in length. The species flowers in June and July (Weinmann et al. 1984; Hitchcock et al. 1969).

Economic Importance: *Detrimental* - Reed canarygrass forms dense, highly productive single species stands that pose a major threat to many wetland ecosystems. The species grows so vigorously that it is able to inhibit and eliminate competing species (Apfelbaum and Sams 1987). In addition, areas that have existed as reed canarygrass monocultures for extended periods may have seed banks that are devoid of native species (Apfelbaum and Sams 1987). Unlike native wetland vegetation, dense stands of reed canarygrass have little value for wildlife. Few species eat the grass, and the stems grow too densely to provide adequate cover for small mammals and waterfowl (Maia 1994). The species is considered a serious weed along irrigation banks and ditches because infestations can increase siltation (Marten and Heath 1973). When in flower, the species produces abundant pollen and chaff, which aggravate hay fever and allergies (Weinmann et al. 1984). *Beneficial* - Frequently cultivated as a forage species, reed canarygrass is an important component of lowland hay from Montana to Wisconsin (Hitchcock 1950). In some areas, the grass has been used for erosion control. The variegated-leaved variety *picta* L. is sometimes grown as an ornamental under the common name "ribbon grass" or "gardener's garters" (Hitchcock 1950; Hitchcock et al. 1969). Frequently cultivated as a forage species, reed canarygrass is an important component of lowland hay from Montana to Wisconsin (Hitchcock 1950). In some areas, the grass has been used for erosion control. The variegated-leaved variety *picta* L. is sometimes grown as an ornamental under the common name "ribbon grass" or "gardener's garters" (Hitchcock 1950; Hitchcock et al. 1969).

Geographic Distribution: Reed canarygrass is a circumboreal species (Larson 1993). While possibly native to North America, European cultivars have been widely introduced for use as hay and forage on the continent; there are no easy traits known for differentiating between the native plants and European cultivars (White et al. 1993). The species is rather common throughout most of southern Alaska and Canada, as well as all but the southeastern portion of the U.S. (Hitchcock et al. 1969).

Habitat: A wetland plant, this species typically occurs in soils that are saturated or nearly saturated for most of the growing season, but where standing water does not persist for extended periods. However, established stands can tolerate extended periods of inundation. Ideal conditions typically occur in roadside ditches, rights-of-way, river dikes and levees, shallow marshes, and meadows (Weinmann et al. 1984).

Growth and Development: Reed canarygrass is a perennial species.

Reproduction: Reed canarygrass can spread by seeds or by creeping rhizomes. The species will also produce roots and shoots from the nodes of freshly cut, well-jointed culms (Marten and Heath 1973).

Response to Herbicides: Glyphosate, Amitrol, Dalapon, and Paraquat have all been tried with some success. Maximum control depends on the timing of application (Apfelbaum and Sams 1987). These herbicides provide control for up to two years at the most. After this period, reed canarygrass recolonizes a treated area from adjacent stands or from seed bank recruitment (White et al. 1993). However, only glyphosate (Rodeo®) is licensed for use in aquatic systems in Washington. Rodeo® application, followed in two to three weeks by prescribed burning has also been effective. The use of fire helps to ensure mortality by killing resprouts and germinants (Apfelbaum 1993).

Response to Cultural Methods: Studies in the Midwest indicate that prescribed burning is effective in areas with an existing component of native plants, either above ground or in the soil seed bank. To be effective, burns should be conducted in the late spring, early to mid-summer, or early to mid-fall. Early spring burning stimulates the production of shoots (Apfelbaum 1993).

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MANAGEMENT INFORMATION:

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Response to Mechanical Methods: Heavy equipment has been used unsuccessfully in reed canarygrass removal. Rapid re-growth occurs from rhizomes and seeds that remain in the soil even after mechanical removal. Clipping back plants at ground level and covering them with opaque black plastic tarps can reduce but not eliminate populations (Apfelbaum and Sams 1987). However, this method is not always effective because reed canarygrass shoots can grow up through most materials, and seasonal inundation may displace covering materials (Gillespie and Murn 1992). Mowing may be a valuable control method, since it removes seed heads before seed maturation and exposes the ground to light, which promotes the growth of native species. Studies in Wisconsin indicated that twice-yearly mowings (in early to mid-June and early October) led to increased numbers of native species in comparison to reed canarygrass-infested plots that were not mowed (Gillespie and Murn 1992). Reed Canarygrass can be controlled by flooding that covers the plant with three to four inches of water for an extended period of time. When possible, mowing and cultivation prior to flooding will increase control.

Rationale for Listing: Although reed canarygrass is planted as a forage crop in some areas, the Washington State Noxious Weed Control Board feels the species poses a significant threat to the state's wetlands. Reed canarygrass is extremely aggressive and often forms persistent, monocultures in wetlands and riparian areas. 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. Although reed canarygrass is planted as a forage crop in some areas, the Washington State Noxious Weed Control Board feels the species poses a significant threat to the state's wetlands. Reed canarygrass is extremely aggressive and often forms persistent, monocultures in

wetlands and riparian areas. 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.

CURRENT DISTRIBUTION ON THE SITE

Reed Canarygrass is widespread throughout the wildlife areas. Areas managed for control are the Chehalis, Hoxit and John's River Wildlife Areas. It is also found in lesser amounts on the Olympic Wildlife Area and Wynoochee mitigation.

ACRES AFFECTED BY WEED: ~2379

WEED DENSITY: Low to High

GOALS

- Control expanding populations
- Prevent new occurrences
- Control area to expand sheet water
- Control areas to encourage aquatic plant such as smartweed

OBJECTIVES

- Expand open water and seasonal sheet water
- Encourage Aquatic plant such as smartweed
- Continue herbicide application tests
- Continue mowing regime on all sites

ACTIONS PLANNED

Reed Canarygrass control on all sites will be essentially the same. A comprehensive program utilizing mechanical, chemical and flooding methods will be used. Reed Canarygrass will be mowed using a tractor and mower where conditions permit. In other areas not accessible by tractors, flooding or chemicals may be used to control the density of the grass. In aquatic areas, such as on the Chehalis Wildlife area, an aquatic cutter (cookie cutter) has been used to open water ways with good success for eight to ten years.

CONTROL SUMMARY AND TREND

- 2002- Approximately 300 to 400 acres were mowed, 10 acres were flooded
- 2003- Approximately 300 to 400 acres were mowed, 20 acres were flooded
- 2004- Approximately 300 to 400 acres was mowed, 20 acres were flooded.
- 2005- Approximately 300 to 400 acres were mowed, 10 acres were flooded

SCOTCH BROOM WEED SPECIES CONTROL PLAN

Latin name: Hieracium pilosella

Common name: Scotch or Scot's Broom

DESCRIPTION: Scotch broom is native to Europe and was likely introduced as an ornamental. It spreads by seed and inhabits well-drained sites over a wide range of precipitation regimes. Several commercial varieties of Scotch broom are not considered noxious. Scotch broom is a woody perennial species up to 10 feet tall. Leaves are mostly trifoliate with ½ inch long, alfalfa-like leaflets. Stems are strongly angled and dark green, with branches that spread only slightly from the main stem. Flowers are bright yellow, pealike, 1 inch in length, and borne in the leaf axils during June. Brown seed pods are smooth (except for hair along the margins), flattened, and contain several beanlike seeds, which are thrown some distance as the pods snap open at maturity. Like many other legumes, Scotch broom forms root nodules with soil bacteria to fix nitrogen. Scotch broom is widespread along both coasts and has been introduced in northern Idaho primarily. It grows best in open prairies, meadows, scrublands, and roadsides.

MANAGEMENT INFORMATION:

Hand pulling using weed wrenches can be effective if the infestation is small enough. Soil disturbance as a result of hand pulling increase the chance of reinfestations. Mowing of Scotch broom is most effective during the late summer months when the plants are most stressed. When mowed, Scotch broom plants with smaller stem diameters are more likely to resprout than plants with larger diameters. There are several biological controls available for Scotch broom. Leucoptera spartifoliella, a twig-mining moth reduces the vigor of the Scotch broom but will not usually kill them. Apion fuscirostre is a seed feeding weevil that eats the seeds and are then released when the seedpod pops open. Agonopterix nervosa is a shoot tip leaf-tying moth, but has little effect in controlling Scotch broom. Herbicides such as triclopyr ester (Garlon 4), triclopyr amine (Garlon 3A), triclopyr and 2,4-D low volatile ester (Crossbow), and glyphosate (Roundup) all can be used to control Scotch broom. Late summer burning has been shown to be somewhat effective against Scotch broom.

CURRENT DISTRIBUTION ON THE SITE

Scattered occurrence on several of the Wildlife Area Units. John's River has scattered plants in uplands around access road and more around main parking area. Occurs on West Branch unit of Olympic. Scattered plants on uplands of the Nemah and Palix Units.

ACRES AFFECTED BY WEED: ~150

WEED DENSITY: Low to High

GOALS

Control expanding populations
Prevent new occurrences

OBJECTIVES

Survey and map existing populations
Research availability of biological control insects for use on all sites
Research new herbicide application tractor implements
Continue herbicide application tests
Continue mowing regime on all sites

ACTIONS PLANNED

Scotch broom control on all sites will be essentially the same. A comprehensive program utilizing mechanical, chemical, biocontrol and burning methods will be used. In areas of thick large

infestations, Scotch broom will be mowed using a tractor and mower. In more sensitive areas, or in areas with low-density infestations, the preferred method is spot spraying application of herbicide. Biocontrols have been released on SPSUWA and Scatter Creek units in the past, and will be monitored for possible use on other Wildlife Area units in the future.

CONTROL SUMMARY AND TREND

2002- Approximately <1 acre mowed, <1 acre treated with herbicide as part general weed control.

2003- Approximately <1 acre mowed, <1 acre treated with herbicide as part general weed control.

2004- Approximately <1 acre mowed, <1 acre treated with herbicide as part general weed control.

2005- Approximately <1 acre mowed, <1 acre treated with herbicide as part general weed control.

CANADA THISTLE WEED SPECIES CONTROL PLAN

Latin name: *Cirsium arvense*

Common name: Canada Thistle

DESCRIPTION: Canada thistle (*Cirsium arvense*) is an aggressive, creeping perennial weed that infests crops, pastures, rangeland, roadsides and noncrop areas. Infestations start on disturbed ground, including ditch banks, overgrazed pastures, tilled fields or abandoned sites. Canada thistle grows in a variety of soils and can tolerate up to 2 percent salt content. It is most competitive in deep, well-aerated, cool soils. It usually occurs in 17- to 35-inch annual precipitation zones or where soil moisture is adequate. It is less common in light, dry soils. Canada thistle develops from seed or vegetative buds in its root system. Horizontal roots may extend 15 feet or more and vertical roots may grow 6 to 15 feet deep. Canada thistle begins to flower in late spring to early summer in response to 14- to 16-hour days. Plants are male or female and grow in circular patches that often are one clone and sex. Female flowers produce a sweet odor and insects readily pollinate different sexed patches up to 200 feet apart. Canada thistle may produce 1,000 to 1,500 seeds per flowering shoot. Generally, vegetative reproduction from its root system contributes to local spread and seed to long distance dispersal. Seed can remain viable in the soil for up to 20 years.

MANAGEMENT INFORMATION:

Grasses and alfalfa can compete effectively with Canada thistle. Herbicides such as Tordon 22K (picloram), Curtail (clopyralid plus 2,4-D), Transline (clopyralid), Banvel/Vanquish/Clarity (dicamba), 2,4-D and Telar (chlorsulfuron) are effective against Canada thistle. These herbicides are most effective when combined with cultural and/or mechanical control. Mowing can be an effective tool if combined with herbicide treatments. Mowing alone is not effective unless conducted at one-month intervals over several growing seasons. *Ceutorhyncus litura* and *Urophora cardui* are biocontrol insects used for Canada thistle. *Ceutorhyncus* alone will not effectively control Canada thistle. It must be combined with other methods to be successful.

CURRENT DISTRIBUTION ON THE SITE

One infestation on Pinkney unit of the Olympic. There is approximately an additional 40 acres scattered over other Olympic Wildlife Area Units. There is scattered occurrence on Wynoochee Mitigation Unit parcels, particularly in the brush piles and field edges. Some occurrence in Anderson Homestead fields. Chehalis Wildlife Area Unit and Chinook Unit have scattered infestations in Reed Canarygrass infested areas.

ACRES AFFECTED BY WEED: ~680

WEED DENSITY: Low to High

GOALS

Control expanding populations
Prevent new occurrences

OBJECTIVES

Monitor existing populations
Research new biological control methods
Use mechanical control in wet areas
Spot spray upland concentrations with broad-leafed herbicide

ACTIONS PLANNED

Canada thistle will be controlled using a combination of chemical, mechanical and biocontrol methods. In areas containing sensitive plant species, or areas too wet for use of chemicals,

mechanical control will be used. In uplands that contain few sensitive plant species, chemical herbicides will be used.

CONTROL SUMMARY AND TREND

2002- Approximately 680 acres were controlled

2003- Approximately 680 acres were controlled

2004- Approximately 680 acres were controlled

2005- Approximately 680 acres were controlled

ENGLISH IVY WEED SPECIES CONTROL PLAN

Latin name: Hedera helix

Common name: English Ivy

DESCRIPTION: English ivy is an evergreen climbing vine that attaches to the bark of trees, brickwork, and other surfaces by way of numerous, small rootlike structures. It was probably first introduced to the US by European immigrants and is widely sold as an ornamental plant for landscapes throughout the US. Leaves are dark green, waxy, somewhat leathery, and are arranged alternately along the stem. English ivy has many recognized leaf forms, the most common being a 3-lobed leaf with a heart-shaped base. Leaves in full sun are often unlobed, oval and have wedge-shaped bases. Umbrella-like clusters of small, greenish-white flowers appear in the fall. Fruits mature in Spring and are black with a fleshy outer covering enclosing one to a few hard, stone-like seeds. English ivy is an aggressive invader that threatens all vegetation levels of forested and open areas. The dense growth and abundant leaves form a thick canopy just above the ground that prevents sunlight from reaching other plants. English ivy also serves as a reservoir for bacterial leaf scorch (*Xylella fastidiosa*), a plant pathogen that is harmful to native trees such as elms, oaks, and maples. English ivy occurs in at least 26 states and the District of Columbia, where it is one of the most abundant and widespread invasive plants.

English ivy infests woodlands, forest edges, fields, hedgerows, coastal areas, salt marsh edges, and other upland areas, especially where some soil moisture is present. It does not grow well in extremely wet conditions and is often associated with some form of land disturbance, either human-caused or natural. English ivy reproduces vegetatively and by seed, which is dispersed to new areas primarily by birds. New plants grow easily from cuttings or from stems making contact with the soil.

MANAGEMENT INFORMATION:

Vines growing as groundcover can be pulled up by hand and left on-site or bagged and taken to a landfill. Vines climbing up into the tree canopy are more difficult to manage. They should be cut to kill upper portions and relieve the tree canopy. A large screwdriver or forked garden tool can be used to pry and snap the vines away from the tree trunks. Vines can be cut using an axe or using a pruning saw. Rooted portions of vines will remain alive and should be pulled, and repeatedly cut. Herbicides such as triclopyr (e.g., Garlon) are extremely effective in killing English Ivy. It is translocated throughout the plant and effectively kills it in place. There are no biological controls currently available for English ivy.

CURRENT DISTRIBUTION ON THE SITE

English Ivy has been well established at John's river around the residence and parking area. There is also a small patch across from Pekola's and at the Bigg's fields on the Olympic WA unit.

ACRES AFFECTED BY WEED: ~one acre

WEED DENSITY: Low

GOALS

Control expanding populations

Prevent new occurrences

OBJECTIVES

Use mechanical control to eradicate it

ACTIONS PLANNED

To control the English ivy, past control methods used have been mechanical removal, and herbicide applications to resprouting plants. These control methods will continue until the plant has been eradicated from the area.

CONTROL SUMMARY AND TREND

2005- Approximately 1/2 acre was controlled

GENERAL WEEDS CONTROL PLAN

Scientific name: *Many*
Updated: 2006

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 and include species like blackberry, Sour Dock, thistle, various grasses, spikerush(*Juncus*), Mustard, Radish, etc. General weeds may also occur in agricultural fields, or comprise the dominant vegetation at a site identified for habitat restoration and includes species like Jim Hill mustard, radish, reed canarygrass, sour dock, thistle, etc.

MANAGEMENT INFORMATION:

Herbicide can be an effective tool for control and applicators should refer to the PNW 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, burning, or plowing and disking entire fields.

CURRENT DISTRIBUTION ON THE SITE

All public accesses and roadsides on the wildlife area contain general weeds to varying degrees. Some agricultural fields at the Wynoochee, Olympic, Anderson Homestead Units are comprised of general weeds.

ACRES AFFECTED BY WEED: ~400

WEED DENSITY: High

GOALS

Maintain public access
Restore agricultural fields
Reduce fire danger

OBJECTIVES

Treat high public use areas with residual herbicide to prevent seed production.
Treat forage areas prior to restoration

ACTIONS PLANNED

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

One set of agricultural fields on both the Olympic and Wynoochee mitigation will be fallowed in the spring and again in mid-summer in preparation for a restoration planting in the fall.

General weed along public access and service roads used to access the wildlife area will be maintained to keep brush overgrowth to a minimum, especially where our lands lie adjacent to agricultural areas. This is especially important to comply with Weed Board rules near Agricultural lands.

CONTROL SUMMARY AND TREND

2002- Approximately 120 acres were treated.

2003- Approximately 120 acres were treated.

2004- Approximately 120 acres were treated.

2005- Approximately 120 acres were treated.

Roadside and access management have required a consistent, yearly maintenance effort. However, using new residual herbicide has reduced the effort needed to accomplish the same amount of work. There are approximately 500-1000 acres of general weed infested fields, roadsides, and access areas that must be eventually controlled.

APPENDIX 3. FIRE CONTROL PLAN: OLYMPIC-WILLAPA HILLS WILDLIFE AREAS

Responsible Fire-Suppression Entities: The Olympic-Willapa Hills Wildlife Areas (and its Satellite Units) primarily fall within the jurisdictions of Local Fire District's (LFD's and the jurisdiction of the Department of Natural Resource's (DNR). Fires that occur within the LFD's (non-timbered areas of the wildlife area) are the responsibility of the LFD's and fires that occur within the state fire protection boundary are the responsibility of the DNR. Therefore, depending upon where the fire occurs, the appropriate entity 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 entities.

Department Fire Management Policy: It is the Departments policy that wildlife area staffs are not firefighters and should not fight fires. Wildlife Area staff are trained in fire fighting and fire behavior, however, staff will only provide logistical support and information regarding critical habitat values to the Incident Commander of the responding fire entity.

Wildlife Habitat Concerns: The Olympic-Willapa Hills Area contains fire sensitive habitat that is critical to the survival of numerous wildlife species. Priority should be given to protection of large woody vegetation over grassland habitats, which may actually be improved by fire. This priority protects riparian habitats, salmon habitat, and old forest dependant species.

Reporting: Report any fire on or adjacent to all units of the Olympic-Willapa Wildlife Area by contacting the local fire district and the DNR Dispatch Office (See contacts below).

Fire Districts – DIAL 911

DNR- Report a Forest Fire 1-800-562-6010

NAME	TELEPHONE
DNR (Olympic)	(360) 374-6131
DNR (Central)	800-527-3305

The following table provides telephone numbers in priority order of Department staff to be contacted in the event of a fire.

Department of Fish and Wildlife - contact in order listed

NAME	TELEPHONE	PRIVATE TELEPHONE	CELL
Jim Gerchak, Olympic-Willapa Hills Wildlife Areas Manager	(360) 533-5676	(360) 533-5676	DNR D Radio Wildlife 280
Jim Gallegos, WA Assistant manager	(360) 648-2443	(360) 648-2443	
Local Wildlife Agent	Call local WSP		
Captain Dan Brinson	(360) 249-1226	(360) 532-5284	(360) 701-6261
Regional Office - Montesano	(360) 249-4628	(360) 249-6522	(360) 753-2600
Regional Program Manager – Jack Smith	(360) 249-1222		(360) 789-2005

APPENDIX 4. WATER RIGHTS: OLYMPIC-WILLAPA HILLS WILDLIFE AREA

File #	Person	Status	Doc	Purpose	Qi	UOM	Qa	IR Acres	WRIA	County	TRS	QQ/Q	Src's	1stSrc	Com
G2-04789	WN ST DEPT GAME	A	Claim S	DG		GPM			22	GRAYS HARBOR	16.0N 11.0W 01		1	WELL	Domestic water for residence at John's River WA

Abbreviations:

CI - Commercial Industrial; **DS** - Single Domestic; **FR** - Fire Protection; **IR** - Irrigation; **Qa** – allowed Annual Quantity in acre feet per year; **Qi** – Allowed Instantaneous Quantity in GPM (ground water) or CFS (surface water); **SR** - Storage; **ST** - Stock; **WL** – Wildlife; **DG** - General Domestic - defined as “use of water for all domestic uses not specifically defined in the water right record or not defined by the other specific domestic use categories. Includes sewage treatment, farm supply and laboratory use.” **UOM** – Unit of measure: **GPM** – gallons per minute, **CFS** – cubic feet per second; **Stat** – status: **A**=Active, **I**=Inactive and therefore conveys no right to divert water; **TRS** - Township, Range, Section – location of point of diversion.

APPENDIX 5. MANAGEMENT PLAN COMMENTS & RESPONSES

Washington State Department of Fish and Wildlife, February 2007

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

Comment Author	Organization	Location
Marlene Penry	Coast Access	Ocean Shores

Comments received on the Olympic-Willapa Hills 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
	Oyhut Unit	
Marlene Penry	My comment isn't on Willapa Hills, but Olympic is as close as I can come to my question! Why isn't the Oyhut Wildlife Area (Ocean Shores, Grays Harbor County) on this plan list, or on your list of Region 6 Wildlife Areas? It is shown on the map, but no information is available that I can find.	<p>The Oyhut Unit is listed in the table on page 33. This table describes the following;</p> <p>Location – S end of Ocean Shores Peninsula adjacent to the City of Ocean Shores and Grays Harbor County</p> <p>Acquisition – A total 683 acres were acquired in 1964-1965</p> <p>Funding – Partial: Land transfer</p> <p>Purpose - Waterfowl habitat and associated recreation</p> <p>Adjacent Property – City of Ocean Shores, Saltwater Intrusion sand dunes, N jetty of Grays Harbor</p> <p>The Oyhut Unit is mentioned in the Important Habitat Section 2.10 <u>Estuary</u> on page 37. It is described as being managed for wintering and foraging habitat and recreational hunting opportunities for migratory waterfowl on page 38 in the Fish and Wildlife Section 2.11. The Oyhut Unit is mentioned in Chapter III, Management Objectives, Issues and Strategies on page 43. <i>Manage for Species Diversity 8. Protect and Manage other species, Strategy D. <u>Continue Efforts of Snowy Plover Recovery Plan at Oyhut Unit.</u></i></p> <p>It is also mentioned on page 44 Strategy R: Maintain non-vehicle public access at Oyhut Unit.</p>

REFERENCES

Natural Vegetation of Oregon and Washington (Franklin and Dyrness 1973)