DRAFT
COLUMBIA BASIN WILDLIFE AREA MANAGEMENT PLAN

Washington Department of Fish and Wildlife

Prepared by Wildlife Area Manager, Greg Fitzgerald

2006

Table of Contents

List of Figures

List of Tables

CHAPTER I. INTRODUCTION

This plan provides the management direction for the Columbia Basin Wildlife Area. The plan will be updated annually to maintain its value as a working document. It identifies needs and guides activities on the Wildlife 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 (WDFW) 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 goal and objectives directly apply to the management of this Wildlife Area. These goals and objectives can be found in the Agency's Strategic Plan.

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

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

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's 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.
- Others Affecting the Columbia Basin Wildlife Area:
    - Banks Lake Resource Management Plan
    - Potholes Resource Management Plan
    - Soil and Moisture Conservation Contract
    - Terrestrial Habitat Management Plan for the Priest Rapids Project
    - 25-Year Management Agreement with the Bureau of Reclamation

1.4 Columbia Basin Wildlife Area Goals

Management goals for the Columbia Basin Wildlife Area are 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, an provide diverse opportunities for the public to encounter, utilize and appreciate wildlife and wild areas. Public participation, in the form of a Citizen's Advisory Group (CAG), will be encouraged as a means to identify social, cultural and economic issues important to the people of central Washington and influential in the management of this Wildlife Area. Specific management goals and objectives for the Columbia Basin 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 and 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 on one representative for each interest group/entity. CAG members are spokespersons for their interest groups.

Columbia Basin Wildlife Area Citizens Advisory Group

Craig Conley	US Bureau of Reclamation, land management
Hugh McEachen	Irrigation Districts, vegetation management; sportsman
Don Derfield	Irrigation Districts, administration; sportsman
Bill McLean	Cattleman; lessee
Dick Hemore	BASS Club member
James Clark	Central Basin Audubon
Dan Stout	Grant County Noxious Weed Inspector
Dick Price	Pheasants Forever; Waterfowl Advisory Committee
Betsy Jordon	Irrigation Districts, water quality manager
Jerry Bensen	Former WDFW employee, plant ecologist
Elaine Fuller	Irrigation Districts, administration
Randy Hill	Columbia National Wildlife Refuge biologist, USF&WS

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 Columbia Basin Wildlife Area plan will be review 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 DESCRIPTIONS AND MAP

2.1 Unit Description, Purchase History and Maps

In the 1930's, Grand Coulee Dam was constructed, leading to the development of the Columbia Basin Irrigation Project in the 1950's. Columbia River water, pumped up into Banks Lake Equalizing Reservoir, supplies water to approximately 670,000 acres of irrigated agriculture through a series of reservoirs, canals, and wasteways. The U.S. Bureau of Reclamation retained ownership of large parcels of land critical to the operation of the Columbia Basin Irrigation Project. In 1952, and with several subsequent supplements, a Memorandum of Understanding was finalized with the Washington Department of Game (WDOG), the U.S. Fish and Wildlife Service (USF&WS) and the U.S. Bureau of Reclamation that turned over fish, wildlife and recreational management of much of those parcels to the WDOG. The original, 50-year MOU expired and in 2002 a new, 25-year agreement was finalized.

The Washington Department of Fish and Wildlife (WDFW) manages approximately 192,000 acres as the Columbia Basin Wildlife Area (Figure 1). The U.S. Bureau of Reclamation owns approximately 71% of the land within the Columbia Basin Wildlife Area, WDFW owns approximately 20% and the remaining land is owned by other state and federal agencies. Lands acquired by WDFW were primarily complementary to USBR lands already under WDFW management, with the exception of Lower Crab Creek. As mitigation for habitat inundation after the construction of Wanapum and Priest Rapids Dams, lands along Crab Creek and the Priest Rapids pool were purchased with funds provided by Grant County Public Utility District (Grant PUD). Adjacent USF&WS, Washington Department of Natural Resource (WDNR), and U.S. Bureau of Reclamation (USBR) lands were added to form the Lower Crab Creek Unit.

Figure 1. Columbia Basins Wildlife Area

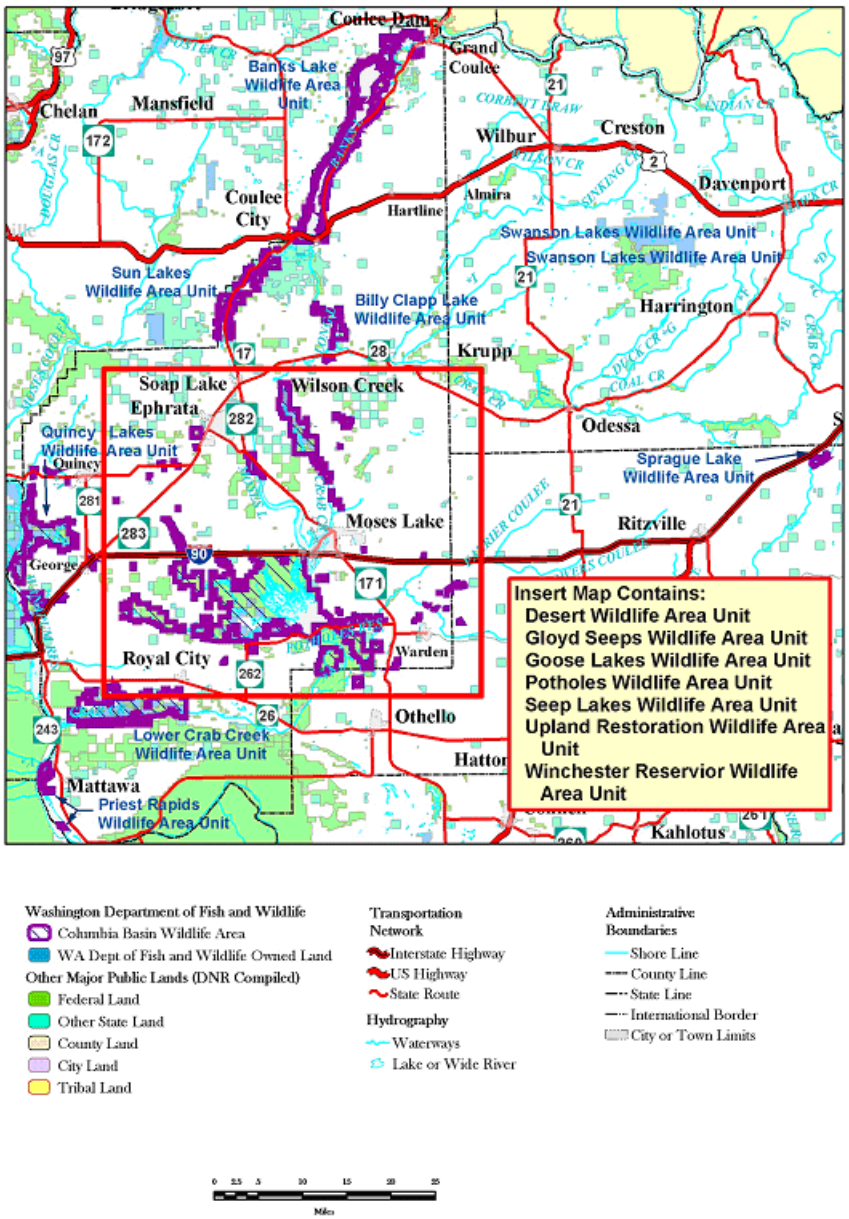
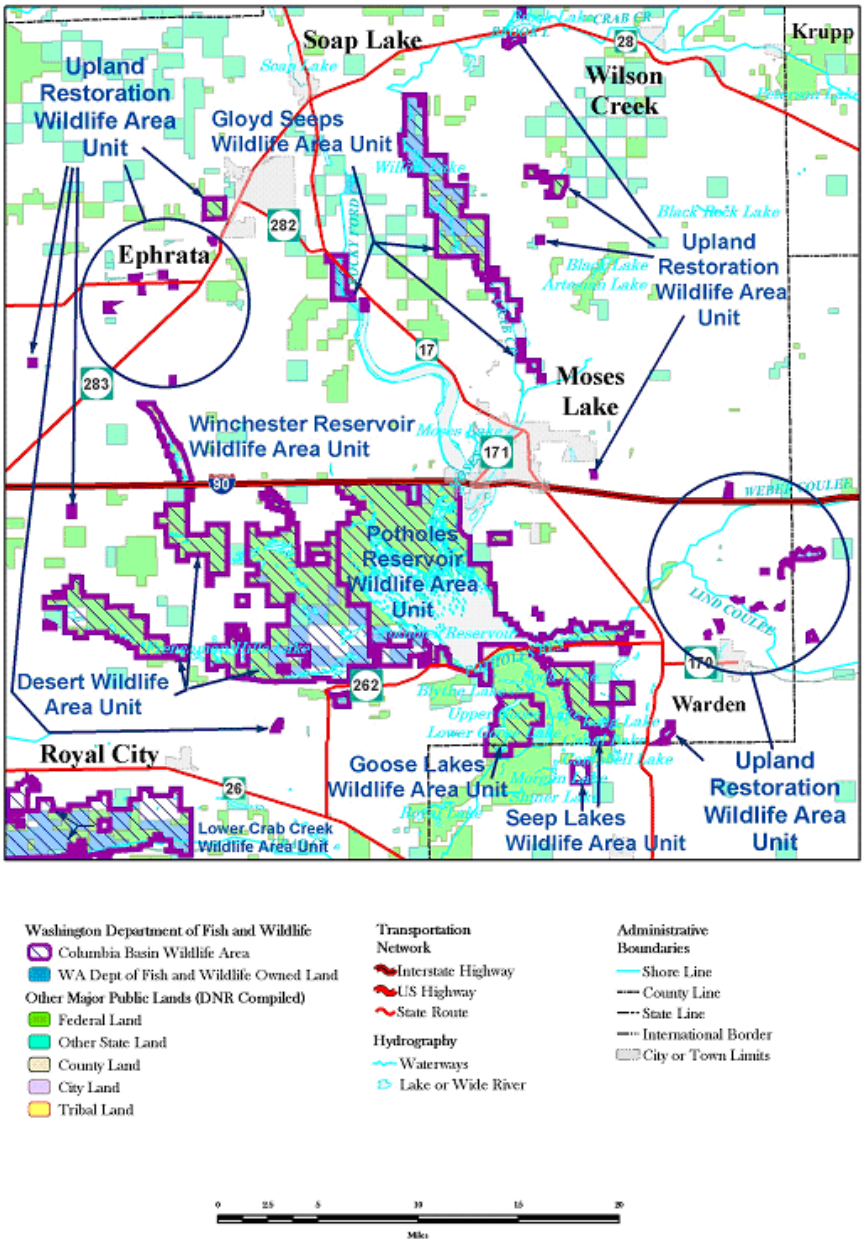


Figure 2. Columbia Basing Wildlife Area Insert Map



A brief description, with acreage and ownership of each unit of the Columbia Basin Wildlife Area is provided:

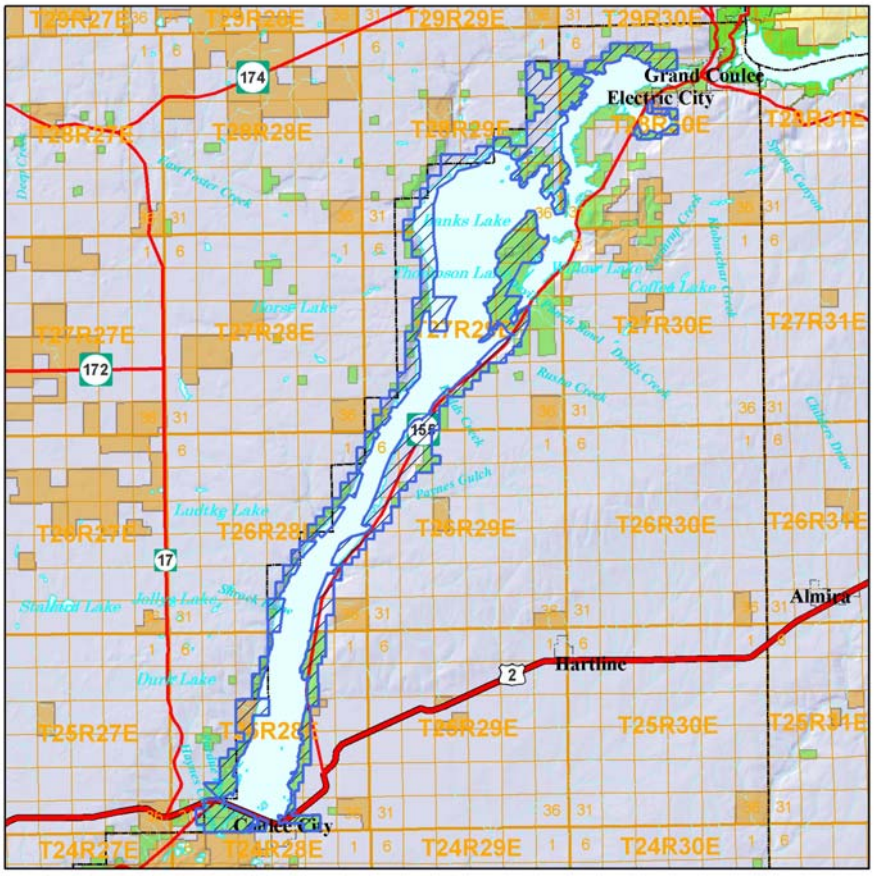
Banks Lake

Description - Located in the upper Grand Coulee of central Washington, Banks Lake (Figure 2) is a man-made impoundment built to store and supply irrigation water for the Columbia Basin Irrigation Project. Formation of this reservoir required the construction of two dams, the North Dam near Grand Coulee and the Dry Falls Dam near Coulee City. The reservoir is filled with water from Franklin D. Roosevelt Reservoir pumped up at Grand Coulee Dam. At full pool, the lake has about 27,800 surface acres of water with an average depth of 47 feet and a maximum depth of 90 feet. Banks Lake is 27 miles long and varies from 1 to 3 miles in width. Most of the 91 miles of shoreline are ringed with basalt cliffs and talus slopes. Shallow soils and rocky outcrops characterize the dry upland portions of this unit. A shrub-steppe community, dominated by sagebrush, perennial forbs, cheatgrass, Sandberg bluegrass and bluebunch wheatgrass occurs on these areas. In areas with deeper soils and on talus slopes, woody shrubs are more common. Intermittently flooded depressions with poor drainage and alkaline soils, support greasewood, saltgrass and basin wildrye grass. Willows and Russian olives grow on the fringes of some cattail and bulrush wetland areas. There are about 23 islands in the reservoir. The southern islands are basalt outcroppings. The northern islands are granite outcroppings. The islands vary in size from less than one acre to several acres. Their vegetation is similar to the surrounding upland areas. Steamboat Rock, in the northern part of the lake, is the largest of several peninsulas. A cooperative agreement between USBR and the State, established the top of Steamboat Rock as a Research Natural Area. Across the lake to the east is the Castle Rock Natural Area. Both of these areas exhibit some unique examples of undisturbed northern Columbia Basin vegetation associations.

Acquisition - The Banks Lake unit includes 44,700 acres of USBR land, purchased for the Columbia Basin Irrigation Project, and 41 acres of WDFW owned land. The Department of Fish and Wildlife and Washington State Parks co-manage 8,230 acres of this unit between Steamboat Rock State Park and Electric City. In 2000, a Resource Management Plan (RMP) was developed for the Banks Lake Unit, which guides current management.

Ownership	Acres
USBR	44,700
WDFW	41
Total	44,741

Figure 3. Banks Lake Unit



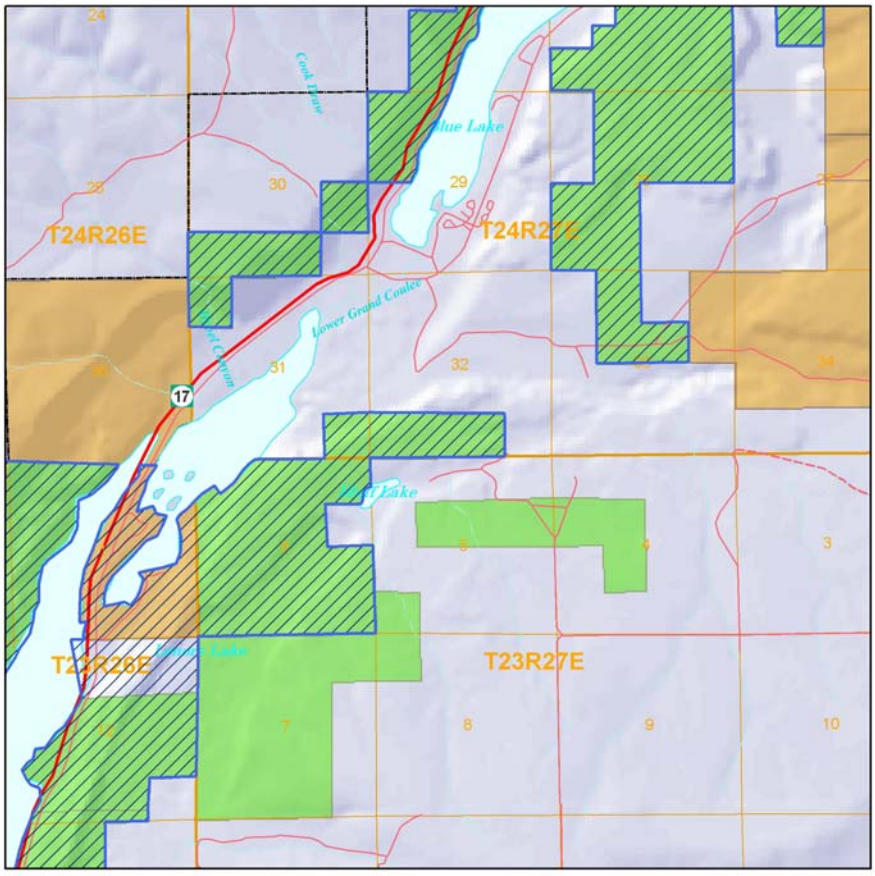
Sun Lakes

Description - This unit is within the lower Grand Coulee. Glacial floods scoured and carved away millions of cubic feet of lava leaving behind a deep and long coulee rimmed by basalt cliffs. WDFW controlled land abuts Sun Lakes State Park and parts of Park, Blue, Alkali, and Lenore Lakes. Park and Blue Lakes are popular trout fishing lakes and Lenore Lake is a quality Lahontan Cutthroat fishery. Very little wetland vegetation exists on WDFW land in this unit. A stiff sage/Sandberg bluegrass community occupies most of the uplands. Big sage/Bluebunch wheatgrass occurs where there are pockets of soil. Bare rock is the most common feature of this unit. Many spectacular geological features exist here.

Acquisition - Nearly all of the 9,140 acres within this unit came under WDOG control in 1955. The U.S. Bureau of Sport Fisheries (U.S. Fish & Wildlife Service) licensed the Lenore Lake National Wildlife Refuge to the WDOG for management as the Lenore Game Range. Ownership of the Lenore lake bottom to the high water line is claimed by the Washington Department of Natural Resources.

Ownership	Acres
USBR	240
WDFW	200
USF&WS	8,700
Total	9,140

Figure 4. Sun Lakes Unit



Washington Department of Fish and Wildlife
- Sun Lakes 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

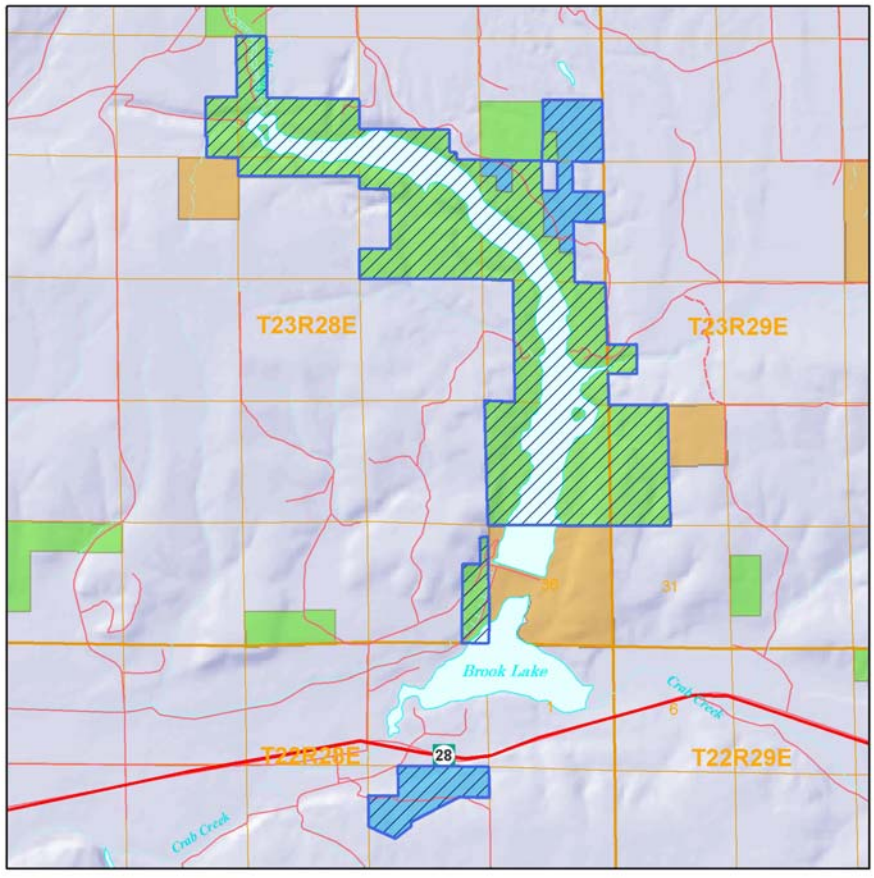
Billy Clapp

Description – Named in honor of one of the originators of the Columbia Basin Irrigation Project, Billy Clapp Lake was originally called Long Lake Reservoir. The reservoir stores water for the irrigation project. The natural coulee was dammed on the lower south end (Pinto Dam) to create the lake. Water cascades into the upper end of the lake from the Main Canal creating Summer Falls. Basalt cliffs of varying heights encompass the lake. Most of the shoreline is too steep and rocky to support wetland or riparian vegetation. The uplands are a mix of poor quality gravelly soils and basalt outcroppings. Vegetation varies from the fire-caused cheatgrass or bunchgrass communities to stiff sage/poa or big sage/ bunchgrass. Numerous species of native woody shrubs can be found in the talus slopes beneath basalt outcroppings. USBR maintains a public parking area and boat launch on the south end of the lake. The Stratford Game Reserve encompasses nearly all the public land in this unit. Originally designated to provide a resting area for migrating waterfowl each fall, public use and changing migration patterns have made the Game Reserve less effective.

Acquisition - Most of the Billy Clapp Lake unit was transferred to WDOG control by a 1954 supplement to the 1952 MOU between Washington State and USBR. Of the 4,000 total acres within this unit, WDFW owns 290 acres purchased in 1972.

Ownership	Acres
USBR	3,710
WDFW	290
Total	4,000

Figure 5. Billy Clapp Unit



Washington Department of Fish and Wildlife
- Billy Clapp Lake 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
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- US Highway
- State Route
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Hydrography
- Annual Stream or River
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- Canal
- Shoreline
- Lake or Wide River

1:75,000
1 inch equals 1.2 miles

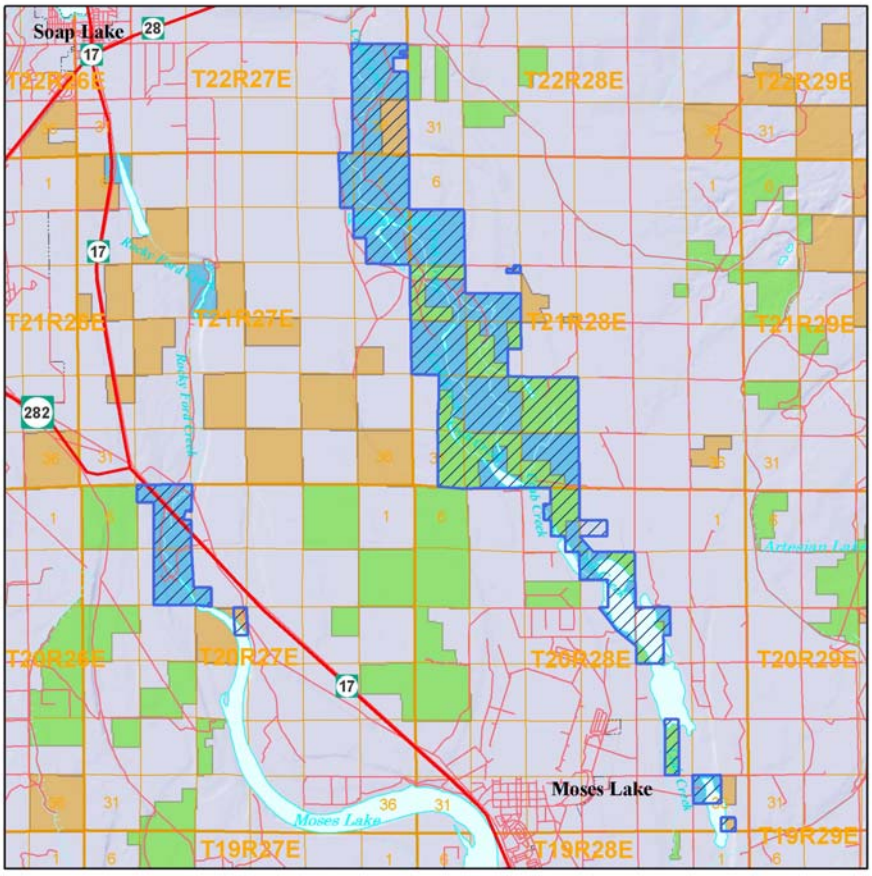
Gloyd Seeps

Description - Most of this unit is along Crab Creek, midway between Moses Lake and the small town of Stratford to the north. Rocky Ford Creek is ten miles northeast of Moses Lake. Both are within the historic flood channels of Crab Creek. Numerous wetlands, ponds and seeps are surrounded by the older shrub-steppe uplands and basalt scablands. Fires have created grasslands along most of the area on the west side of Crab Creek. WDFW manages 172 acres of farmland within this unit. Other developments include about 18 acres of shrub plots; four diked ponds, four water control structures on four tributary creeks, several access roads and parking areas. Rocky Ford Creek and Homestead Creek are quality trout fishing waters.

Acquisition - The Gloyd Seeps unit was purchased mostly in a piece-meal fashion beginning in 1955. Most of the 7,320 acres of deeded land was purchased in the early 1970's, except for Rocky Ford, which was purchased in 1987 and 1989. Management of the 3,342 acres of federal land was transferred to WDOG from the USBR via the Third and Eighth Supplements to the original 1952 MOU.

Ownership	Acres
USBR	3,342
WDFW	7,320
WDNR	320
Total	10,982

Figure 6. Gloyd Seeps Unit



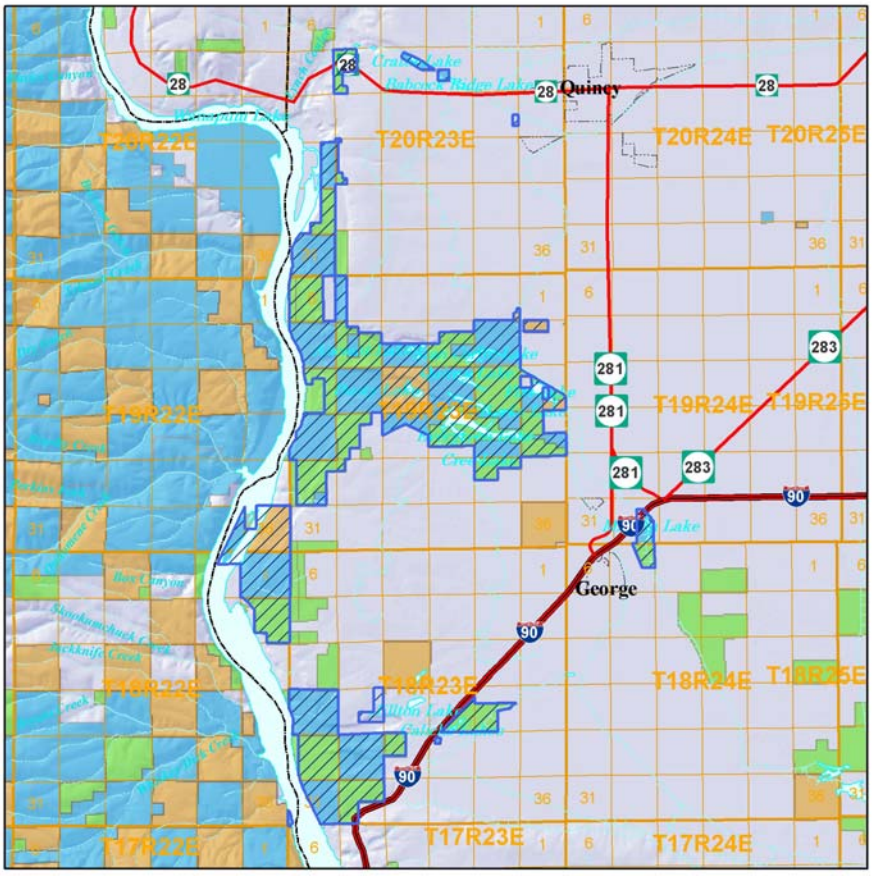
Quincy Lakes

Description - The most striking feature of the 15,266-acre Quincy Lakes unit is the geology. The geology is a product of erosion of lava flows by glacial floodwaters. The many layers of basalt are exposed in towering 800-foot cliffs, isolated mesas, stair stepped benches, box canyons and potholes. Several of the potholes are filled with water that has seeped from the irrigation of the Quincy Basin farmlands upslope. These wetlands, ponds and lakes have added an important diversity to the habitat of this area. Most of this unit is well vegetated with perennial plants. Big sage/bluebunch wheatgrass is the most common plant community. There are a variety of other native shrub-steppe communities in areas where the soil is scarce. Block 74 Farm Unit 125, a part of the Quincy Unit, has been turned into a 70-acre shrub plot. A White eatonella (*Eatonella* nivea) plant site near Frenchman Coulee has been designated a Natural Area by the Washington Department of Natural Resources. Several of the lakes are managed for seasonal trout fishing. Limiting vehicles to the graveled roads and parking areas control public access.

Acquisition - The Quincy Game Range began with the purchase of an 80-acre parcel of land near Ancient Lake in 1951. In 1954, USBR turned over management to another 1,510 acres to the WDOG for game range purposes. In 1960 the WDOG purchased about 6,900 acres from Stan Coffin and USBR transferred another 1,284 acres through the Fourth Supplement. Most of the rest of the Quincy Lakes unit was acquired through small land purchases in the 1960's and 1970's. The USBR added more acreage via the Fifth and Seventh Supplements to the 1952 MOU.

Ownership	Acres
USBR	6,017
WDFW	7,636
WDNR	720
USBLM	853
Total	15,226

Figure 7. Quincy Lakes Unit



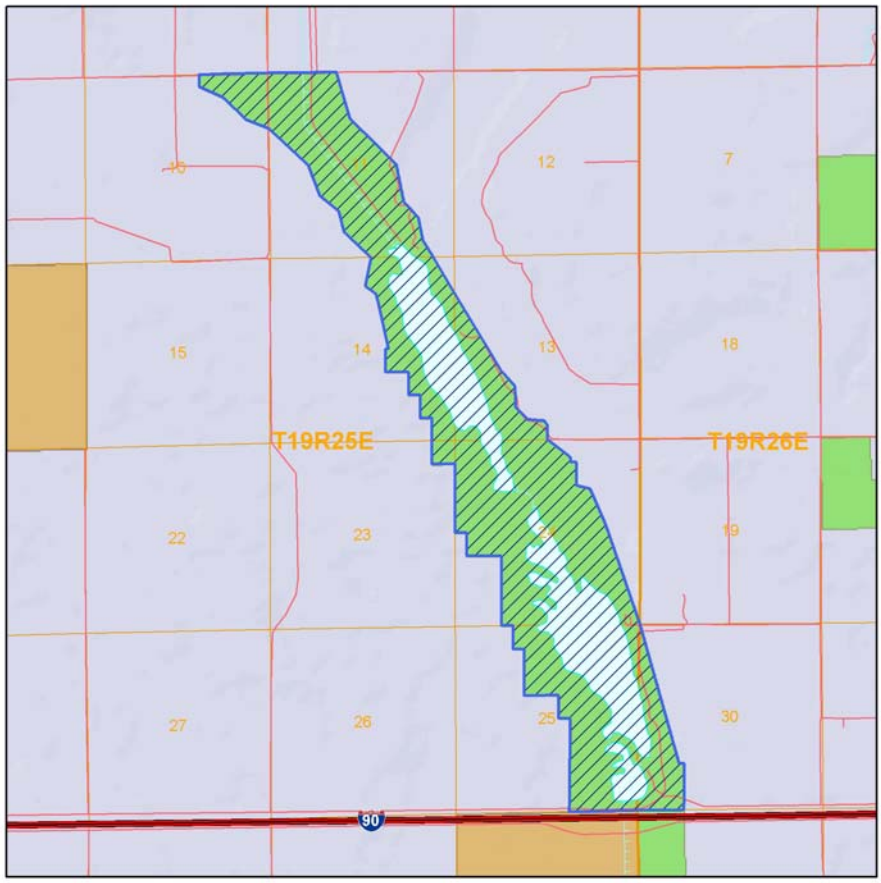
Winchester Reservoir

Description - The Winchester Reservoir unit is 930 acres of land and 1,020 acres of water. The lake is actually a wide spot in the Winchester Wasteway. Average depth of the lake is around six feet. The surrounding landscape is relatively flat with the lake being in a natural low area. Most of the lake is surrounded by cattail and bulrush marsh. The uplands are a mix of tall wheatgrass or intermediate wheatgrass with big sage/bluebunch wheatgrass in some areas. The entire area is underlain with basaltic black sand. Agricultural lands border the east and west sides of the unit. County roads provide public access to the parking areas and gravel boat launches on the south and upper east sides of the lake. A large locust tree grove was planted by WDFW on the east side as well as a small shrub plot on the north end. About 20 acres are leased for farming.

Acquisition - The entire 1,950-acre Winchester Reservoir unit was transferred to WDOG control by a 1954 supplement to the 1952 MOU, between Washington State and the USBR.

Ownership	Acres
USBR	1,950
Total	1,950

Figure 8. Winchester Reservoir Unit



Washington Department of Fish and Wildlife
- Winchester Reservoir 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
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Transportation Network
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Hydrography
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- Intermittent Stream
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- Shoreline
- Lake or Wide River

1:50,000
1 inch equals 0.79 miles

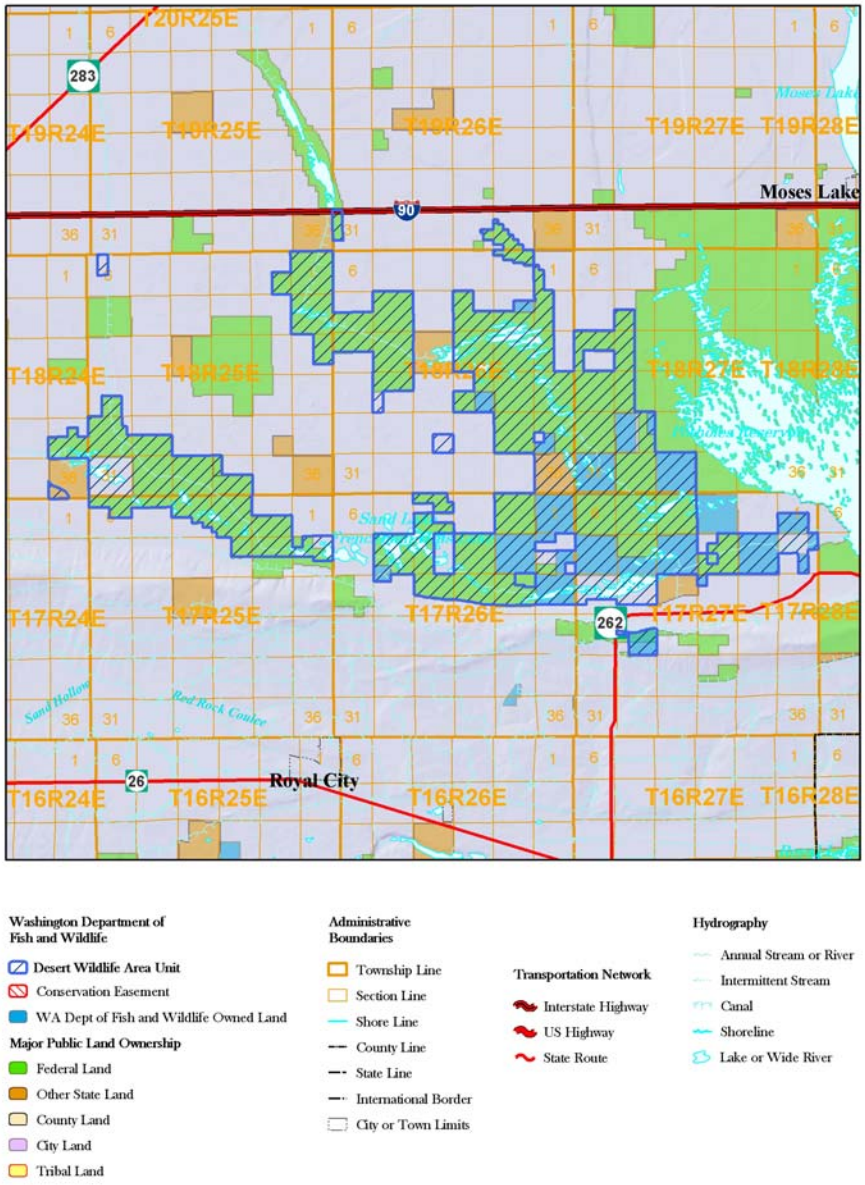
The Desert

Description - The Desert Unit was wholly a desert prior to the coming of the Columbia Basin Irrigation Project. The area is the lowest part of a very large basin (the Quincy Basin) that once was filled with glacial floodwater. Ground up basalt, carried by ancient floodwaters, was deposited in this basin as black sand. These black sands formed sand dunes, which were very actively moving until recent times. The natural basin now serves as a collector for irrigation water from upslope farmlands. Most of this water is collected in the Winchester and Frenchman Hills Wasteways. These wasteways have been allowed to meander their way southeasterly across several miles of the Desert Unit and eventually empty into the southwestern part of Potholes Reservoir. The vegetation in this mosaic of wetlands and desert uplands is very diverse. In addition to naturally occurring shrub-steppe communities, there are many acres that have been aerially seeded to non-native grasses. The wetlands and shallow ponds created by the meandering wasteways and the high water table were once occupied by native marsh vegetation, but non-native invaders (Russian olive and purple loosestrife) are now taking over many acres. While county roads provide access to much of the perimeter of this large area, access to the interior is very limited. Large numbers of waterfowl find a perfect haven in the remote wetlands. Many ponds have been isolated from the wasteways with low sand dikes to exclude carp and improve waterfowl habitat

Acquisition - The Desert Unit was built around the 3,280 acres of USBR lands transferred to the WDOG in 1960 via the Fourth Supplement to the 1952 MOU. The WDOG purchased the 6,769-acre Floyd Harris ranch in 1971. Also in 1971, an additional 16,900 acres of USBR lands were transferred to WDOG via the Eighth Supplement. A few other USBR parcels and WDFW acquisitions make up the present 34,920 acres in this unit.

Ownership	Acres
USBR	27,245
WDFW	7,675
Total	34,920

Figure 9. Desert Unit



1:225,000
1 inch equals 3.6 miles

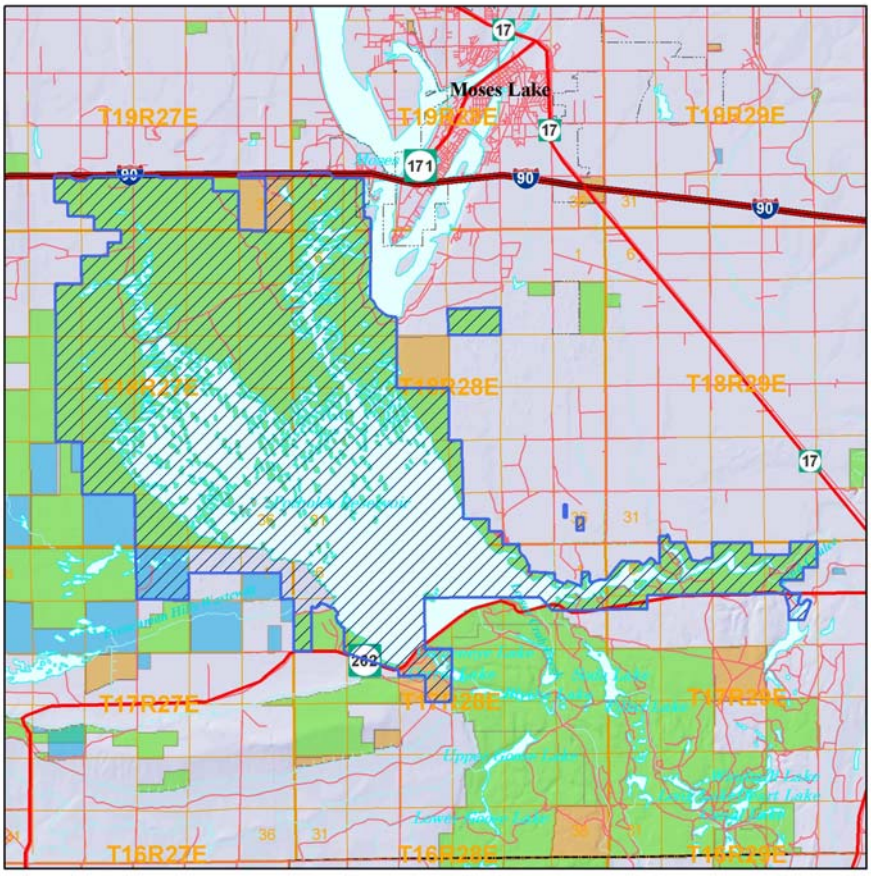
Potholes Reservoir

Description - The Potholes Reservoir was created by the construction of O'Sullivan Dam and is a part of the Columbia Basin Irrigation Project. The reservoir lies just south of Moses Lake in Grant County. The principal use of the reservoir is to gather waste and return flow waters from the irrigation project lands upstream and store the water for re-use on the farmland downstream from the dam. As a result of this storage and re-use feature, the reservoir water levels are subject to wide fluctuations in surface elevation. There are 20,000 acres of surface water in the spring when the elevation of the reservoir is at the full pool level. When the reservoir was initially filled, it inundated the Crab Creek channel and about 800 small ponds scattered among the sand dunes of the area. With several thousand acres of water covering the sand dune area, perhaps 1,000 islands were formed in the north and west parts of the reservoir. These seasonally flooded areas currently support a small forest of willow trees. The higher elevation wetlands on the northern and western fringes of the reservoir have cattail and bulrush communities. The western part of the Potholes Unit still has many active sand dunes. The vegetation there is shrub-steppe except for the wetland areas along the Winchester and Frenchman Hills Wasteways. The Desert Unit borders the west side of the Potholes Unit. The eastern part of the Potholes Unit is mostly sand, gravel and round rock soil with shrub-steppe vegetation bordered by irrigated farmland. The vegetation of this area is primarily rabbitbrush and needle and thread grass. The southern area, adjacent to O'Sullivan Dam, is mostly basalt outcroppings with big sage and bluebunch wheatgrass occurring where soil exists. The original Crab Creek channel is exposed again just below O'Sullivan Dam and west of Potholes Canal, the outlet of the reservoir.

Acquisition - The Potholes unit is 32,500 acres of USBR property transferred to Washington State Parks and the WDOG, in 1952, for management of fish, wildlife and recreational purposes. The two agencies agreed that State Parks would administer parks and commercial concessions and State WDOG would take charge of fish, wildlife and grazing on these lands. Under the agreement, the agencies consult with each other and coordinate their management plans to make them as compatible as possible. In 2002 the Potholes Reservoir Resource Management Plan was finalized, and guides the management of this unit.

Ownership	Acres
USBR	32,500
WDNR	320
Total	32,820

Figure 10. Potholes Reservoir Unit



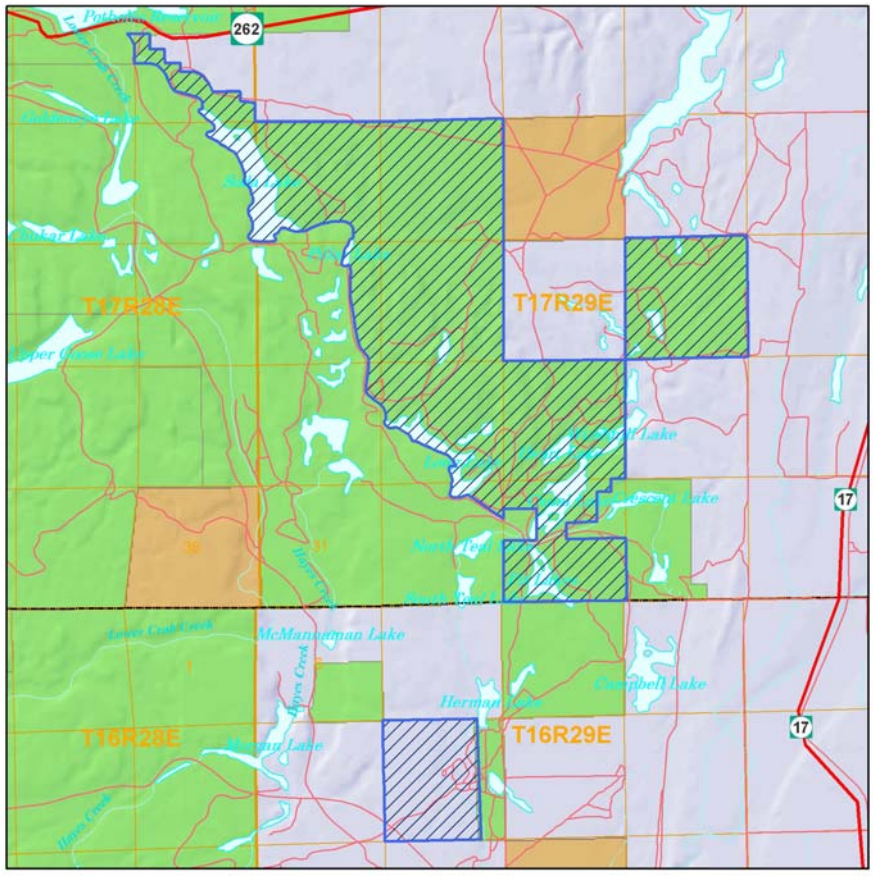
Seep Lakes

Description - The Seep Lakes Unit is a part of eastern Washington's channeled scablands created by glacial floodwaters of the Pleistocene Epoch. It is mostly rolling countryside with basalt outcroppings forming cliffs, mesas, box canyons and potholes. Many of the canyons and potholes are filled with water that has seeped from the Potholes Reservoir, north of this unit. A few lakes are actually wide spots in the Potholes Canal, which borders the west side of the unit. A long history of range fire has turned almost all of this area into grassland comprised mostly of Sandberg bluegrass and cheatgrass. A few protected pockets contain big sage and bluebunch wheatgrass or needle and thread grass. Most of the lakes have steep and rocky shorelines with very little wetland habitat. WDFW maintains many miles of graveled access roads as well as several boat launches and parking areas primarily for the public fishing crowd.

Acquisition - Most of the 4,537 acre Seep Lakes Unit was transferred to WDOG control by the 1965 Fifth and 1969 Seventh Supplements to the 1952 MOU.

Ownership	Acres
USBR	4,537
WDNR	340
Total	4,877

Figure 11. Seep Lakes Unit



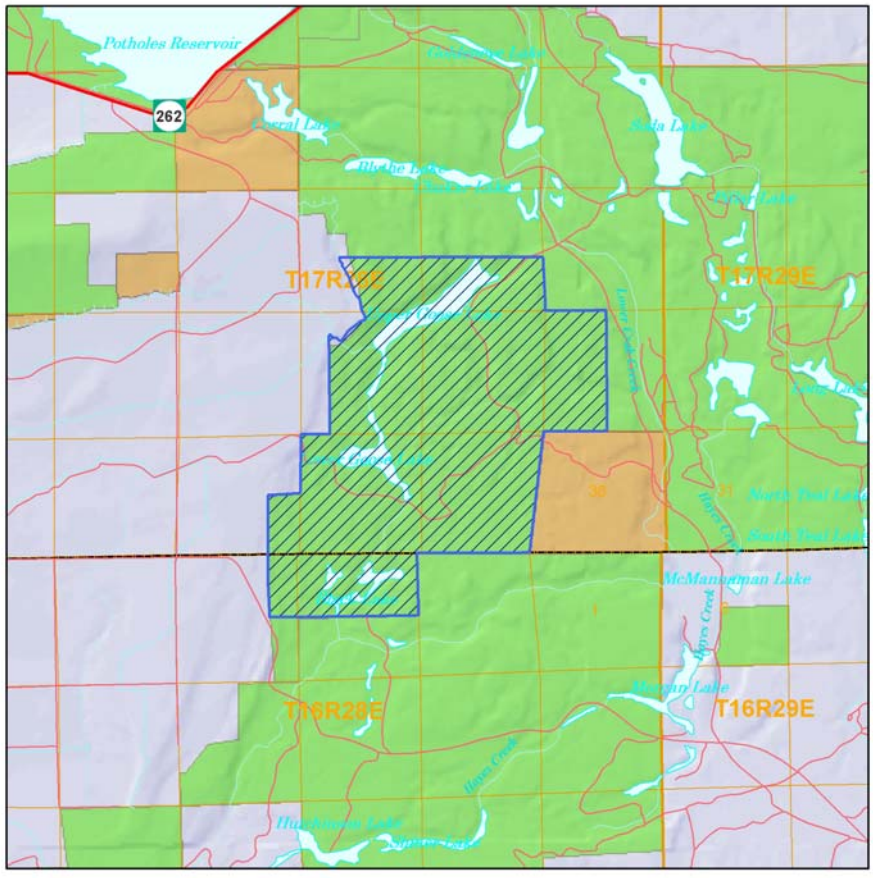
Goose Lakes

Description - The Goose Lakes Unit is a part of eastern Washington's channeled scabland created by glacial floodwaters of the Pleistocene Epoch. It is mostly rolling countryside with basalt outcroppings forming cliffs, mesas, box canyons and potholes. One major canyon is filled with water that has seeped from the Potholes Reservoir north of this unit. Two low rock dams were built in the 1950's to create Upper and Lower Goose lakes. A long history of range fire has turned almost all of this area into grassland comprised mostly of Sandberg bluegrass and cheatgrass. A few protected pockets contain big sage and bluebunch wheatgrass or needle and thread grass. Both of the lakes have steep and rocky shorelines with very little wetland habitat. WDFW maintains graveled access roads as well as two boat launches and parking areas primarily for the public fishing crowd. A small stream flows southward from Lower Goose Lake. This stream feeds Black Lake. The outlet of Black Lake flows into Crab Creek on Columbia National Wildlife Refuge lands. Another small lake, Shoofly Lake, is just west of Black Lake and is fed by seepage from the western part of this unit. A long narrow wetland and some pretty good big sage/bluebunch wheatgrass exist on the west side of this unit.

Acquisition - the 1958 Third Supplement to the 1952 MOU transferred most of the 3,546 acre Goose Lakes unit to WDOG for management.

Ownership	Acres
USBR	3,546
Total	3,546

Figure 12. Goose Lakes Unit



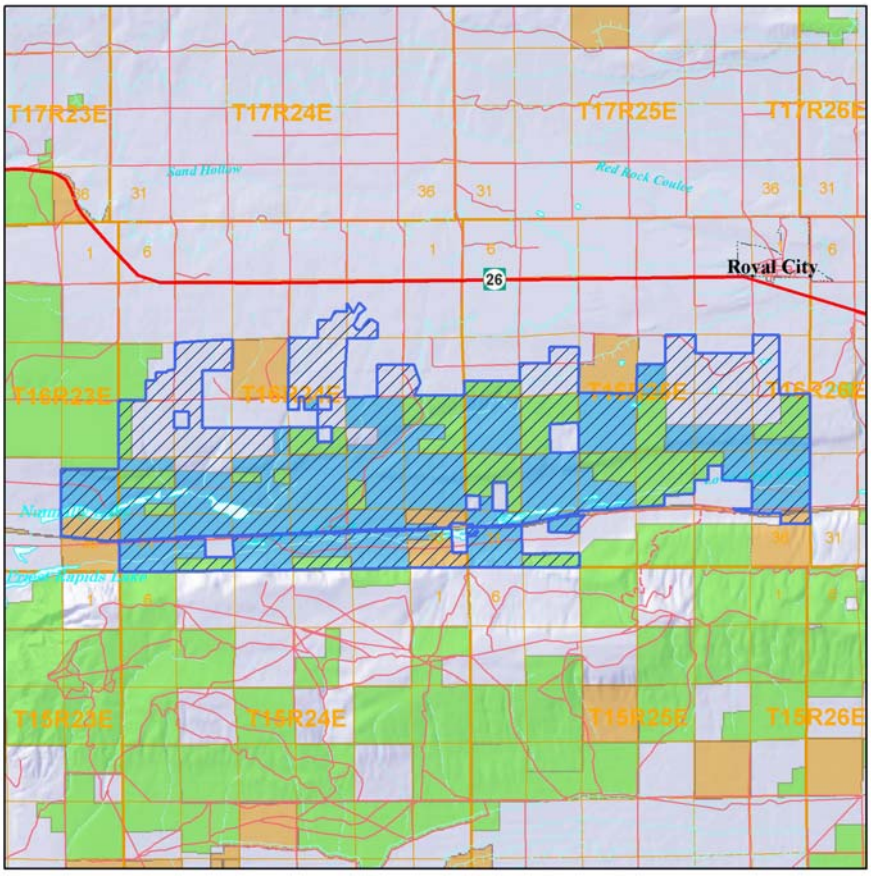
Lower Crab Creek

Description - The Lower Crab Creek Unit lies along the north side of the Saddle Mountains. The eastern boundary is just a few miles south of Royal City. The western boundary is near the Columbia River. The wetlands and riparian areas along the creek and the seep ponds and uplands above the creek valley provide a diverse habitat for many species of wildlife. A native black greasewood and saltgrass community near Smyrna has been designated a Natural Area Preserve. Lenice and Nunnally lakes are quality trout fishing lakes. The abandoned Milwaukee Railroad right-of-way (part of the John Wayne Trail) traverses the length of this valley. About 110 acres of WDFW land on the east end of the unit is sharecrop leased for farming. Other developments include a 5-acre shrub plot, a few lakes with low dikes, access roads and parking areas. An Off Road Vehicle Area on the west end is managed by the Department of Natural Resources.

Acquisition - The 17,000 acre core of Lower Crab Creek Unit became possible November 23, 1964, when the Grant County P.U.D. commissioners granted the State WDOG permission to draw $118,000 from its allocation from the PUD for game and wildlife management in the Priest Rapids Pool area. This money was applied to the total purchase price of $310,000 for land along lower Crab Creek. A leaseback agreement for grazing paid $20,000. The core area included 8,940 acres of private land and 7,680 acres of public land. Joe Barker owned the private land and the grazing leases on the public land. The purchase agreement granted 20 years of grazing rights to Mr. Barker. The origination of the agreement was a requirement of the Federal Power Commission license granted the PUD to build Priest Rapids and Wanapum dams. The PUD agreed to pay the WDOG a total of $550,000, $50,000 a year for the first three years and $20,000 a year for 20 years thereafter. The north upper bench part of the Lower Crab Creek Unit, about 7,000 acres, is mostly USBR land. This land was turned over to the WDOG in the Seventh and Tenth Supplements to the 1952 MOU.

Ownership	Acres
USBR	7,215
WDFW	12,048
WDNR	815
USF&WS	4,880
Total	24,958

Figure 13. Lower Crab Creek Unit



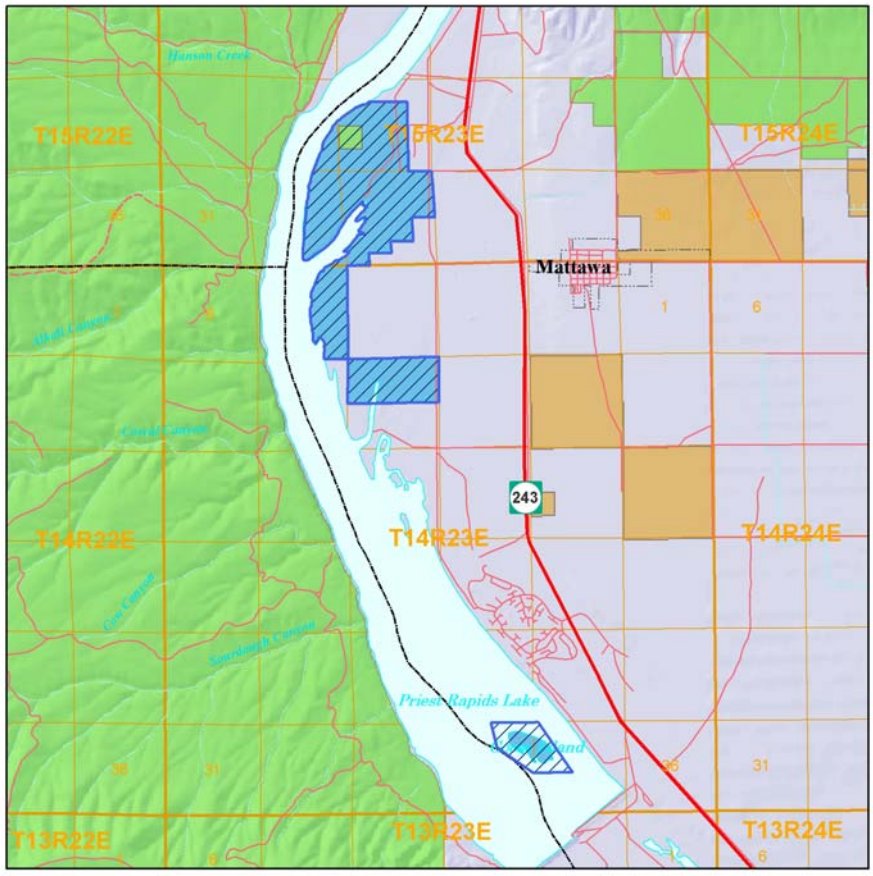
Priest Rapids

Description - The Priest Rapids Unit is along the east bank of the Columbia River south of Sentinel Gap. The land is relatively flat and during ancient glacial floods was intermittently under water, resulting in a thin layer of soil covering a mostly river cobble substrate. This unit has three large peninsulas that create sheltered backwater pools. The water in the Priest Rapids Pool fluctuates a lot. The riverbanks are slowly developing a riparian border. The shallow back water sloughs and the ponds of the WB-48A Wasteway are fringed with willows, Russian olives and other trees. In the 1960's, many woody shrubs were planted by the WDOG in the moist areas around the middle and lower peninsulas. An irrigated field was also developed at that time for a goose brooding pasture. The uplands here are mostly a poor quality mix of rabbitbrush and cheatgrass. A few scattered occurrences of big sage or bitterbrush and needle and thread grass can be found on the upper peninsula. WDFW maintains a public parking area and boat launch near the middle of this unit.

Acquisition - 2,247 acres of this unit was created primarily as a result of mitigation with Grant County P.U.D. for their Priest Rapids and Wanapum dams quit claim deeded most of the unit to the WDOG in 1964, the same year a Use Agreement was finalized for additional associated PUD lands. A few of those parcels were purchased by the WDOG in 1967. The PUD acquired (or condemned) these lands from private ownership for the purpose of creating a water storage reservoir behind the Priest Rapids dam. Since 1983 an additional 690 acres of USBR land in irrigation Block 26 has been managed by WDFW as part of the Priest Rapids unit.

Ownership	Acres
USBR	915
WDFW	2,247
USBLM	40
Total	3,202

Figure 14. Priest Rapids Unit



Washington Department of Fish and Wildlife
- Priest Rapids 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

1:100,000
1 inch equals 1.6 miles

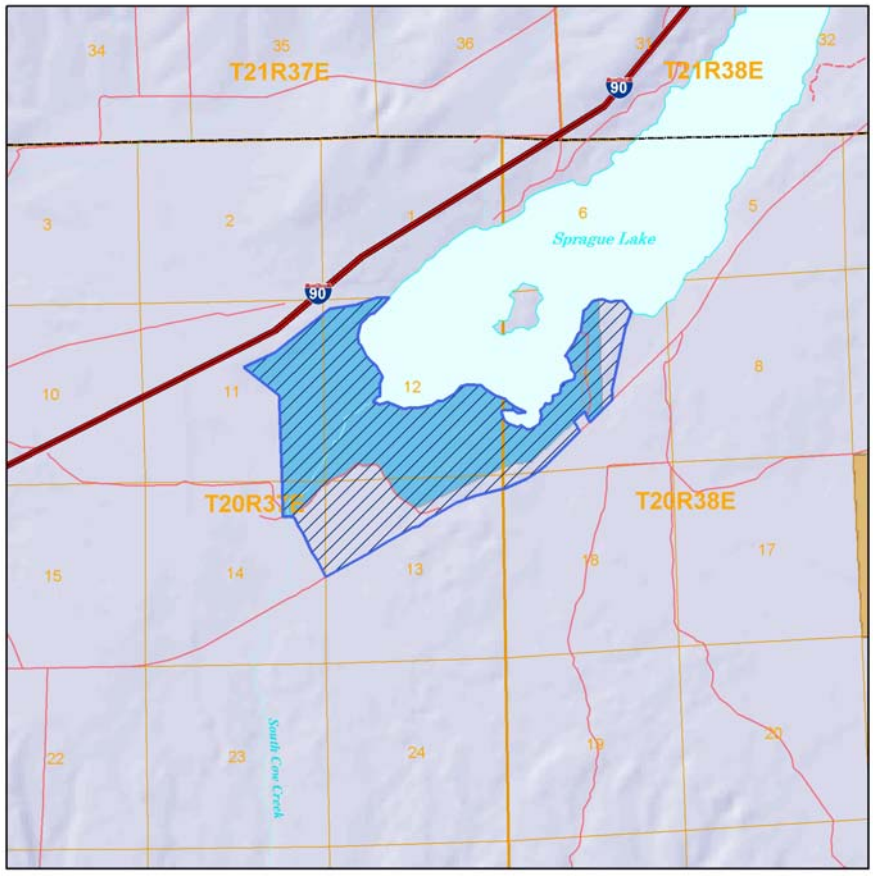
Sprague Lake

Description – The vast majority of this unit is wetlands, with a good riparian fringe along part of the lake. Cow Creek flow through the western portion of the unit. The wetlands are protected under the Wetlands Reserve Conservation Program (WRP); the uplands are protected under a WDFW Conservation Easement with Hercules Ranch. Uplands have historically been grazed by cattle, but are in fair condition, with stiff sage and Sandburg bluegrass dominating the numerous shallow soil rock outcroppings and big sage with basin wildrye occupying the small depressions with deeper soils. WDFW maintains a boat launch and parking area.

Acquisition – This 675 acre parcel was acquired from the Hercules Ranch; owned by Rex Harder, in 2003 with Washington Department of Natural Resources Aquatic Lands Enhancement Account grant funds.

Ownership	Acres
WDFW	675
Total	675

Figure 15. Sprague Lake Unit



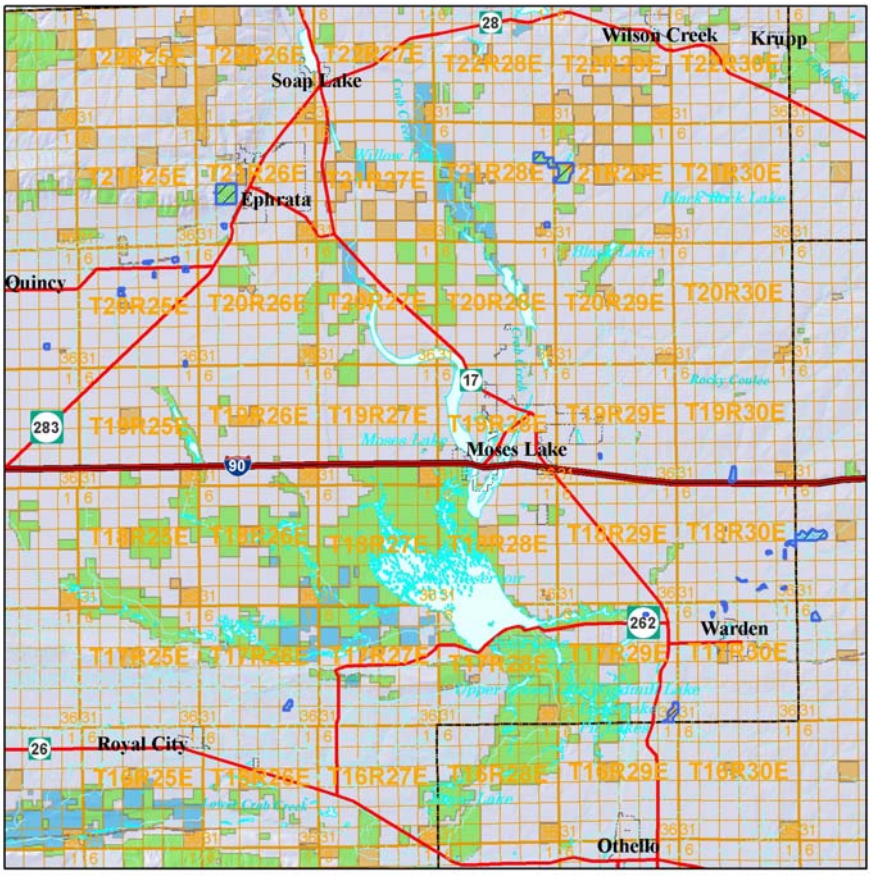
Upland Wildlife Restorations Sites

Description - The UWR Units are scattered throughout the Columbia Basin Irrigation Project mainly in Grant County. Prior to WDFW management of these areas, they were primarily poor quality farm ground. These 18 units have been primarily managed as small blocks of winter cover for upland birds within the irrigated farmland of the Columbia Basin Irrigation Project. Habitat enhancements include native grass plantings and shelterbelt shrub rows.

Acquisition - The Upland Wildlife Restoration Program has managed the 327 acres of Washington Department of Natural Resource land for many years. WDFW-owned lands were acquired between 1991 and 1994 to provide a core area of permanent habitat, primarily for pheasants. The majority of these properties are in the Warden area, the original emphasis area for pheasant recovery and management.

Ownership	Acres
WDFW	1,118
WDNR	327
Total	1,445

Figure 16. Upland Restoration Units



CBWA acreage and ownership totals –

USBR	WDFW	WDNR	USF&WS	USBLM
135,917	39,250	2,842	13,580	893

2.2 Ownership and Use of Adjacent Lands

The vast majority of the land adjacent to the CBWA is privately owned agricultural lands, producing virtually everything from tree fruits, vineyards, root, grain, seed, and hay crops. Land unsuitable for crops is used primarily for cattle grazing. Many rural homes have been built adjacent to the CBWA, producing a whole new set of problems including loss of wildlife habitat value, increased wildlife/human interactions, conflicts with traditional CBWA users, and complaints of nuisance wildlife.

2.3 Property Location and Legal Description

The CBWA consists of 16 Units and many sub-Units, within Grant and Adams Counties. Examples include the Banks Lake Unit on the northern boundary of Grant County, Priest Rapids in southern Grant County, Quincy Lakes on the western boundary of Grant County and Sprague Lake near the east boundary of Adams County. Abbreviated legal descriptions for each Unit and sub-Unit are provided in **Table 1**.

Table 1. Legal Descriptions

Unit	Sub-Unit	Township	Range	Sections
Banks Lake		24	28	4, 9
		25	28	2, 3, 4, 9, 10, 11, 14, 15, 16, 20, 21, 22, 23, 27, 28, 29, 31, 32, 33, 34, 35
		26	28	1, 12, 13, 14, 22, 23, 24, 25, 26, 27, 34, 35
		26	29	5, 6, 7, 8, 18, 19
		27	29	1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 27, 28, 29, 30, 31, 32, 33
		28	29	12, 13, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34, 35, 36
		27	30	6, 7
		28	30	3, 4, 5, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 29, 30, 31, 32
Sun Lakes		22	26	2
		23	26	1, 2, 11, 12, 13, 14, 22, 23, 24, 25, 26, 27
		23	27	6
		24	27	2, 10, 14, 15, 17, 20, 21, 22, 28, 29, 30, 31, 32, 33
Billy Clapp		22	28	11
		23	28	9, 10, 11, 12, 13, 14, 24, 25, 35
		23	29	19, 30
Gloyd Seeps		21	27	1, 2, 12
		22	27	25, 36
		20	28	3, 4, 10, 14, 15, 26, 36
		21	28	7, 12, 13, 17, 18, 19, 20, 28, 29, 30, 31, 32, 33
		21	29	18
	Rocky Ford	20	27	5, 8, 9, 16
		21	27	6, 8, 16

Quincy Lakes		18	22	1, 2, 12
		19	22	35, 36
		19	23	5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 30
		20	23	8, 9, 10, 19, 20, 30, 31, 32
	Frenchman Coulee	18	23	19, 20, 28, 29, 30, 31, 32
	Caliche Lake	18	23	22, 23
	Martha Lake	18	24	5
		19	24	32
Winchester Res.		19	25	10, 11, 13, 14, 23, 24, 25
		19	26	30, 31
Desert		18	24	25, 36
		17	25	2, 3, 4, 5, 6, 10, 11, 12
		18	25	1, 2, 6, 12, 13, 19, 29, 30, 32, 33, 34
		17	26	1, 2, 4, 8, 9, 10, 11, 12, 13, 14, 15, 16
		18	26	1, 2, 7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 20, 22, 23, 24, 25, 26
		19	26	34, 35
		17	27	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20
		18	27	8, 17, 18, 19, 20, 28, 29, 30, 31, 32, 33, 34
Potholes Res.		17	27	1, 2
		18	27	1, 2, 3, 4, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 34, 35, 36
		19	27	25, 27, 28, 29, 32, 33, 34, 35
		17	28	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16, 17
		18	28	6, 7, 8, 10, 17, 18, 19, 20, 21, 27, 28, 29, 30, 31, 32, 33, 34
		19	28	31, 32

		17	29	3, 4, 5, 6, 7
		18	29	32
Seep Lakes		17	28	12
		17	29	10, 17, 18, 19, 20, 22, 28, 29, 32
Goose Lakes		17	28	22, 23, 25, 26, 27, 33, 34, 35
		16	28	3, 4
Lower Crab Creek		16	23	4, 25, 36
		16	24	10, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
		16	25	13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36
		16	26	17
Priest Rapids		14	23	5, 8, 9, 16, 34
		15	23	28, 29, 32, 33
	Block 26	14	24	6, 7, 19, 20, 28, 33
Sprague Lake		20	37	10, 11, 13, 14
		20	38	7
UWR Sites		19	30	33 (Unit 1)
		18	31	17, 18 (LCA)
		19	29	28 (McNeely)
		17	31	5 (Unit 202)
		20	24	26 (Unit 367)
		18	30	35 (Unit 116)
		18	30	24 (DE 49, Unit 79)
		20	25	16 (Unit 152)
		18	30	28 (Unit 110, 111)
		20	25	3 (Unit 40)
		21	26	32 (Unit 4 & 5)
		17	26	35 (Unit 9)
		18	30	23 (Unit 75)
		17	09	2 (The Hole)
		20	25	2 (Manly DNR)
		20	25	12 (DOT Plot)
		21	28	36 (Odegaard DNR)
		17	29	36 (County Line DNR)

2.4 Funding

The Federal Aid in Wildlife Restoration, the State Wildlife Fund, and a Soil and Moisture Conservation Contract supplies funding for management of the CBWA. State General Funds provide the required 25% match for the Federal Aid moneys from the Pitman-Robertson Act. The Soil and Moisture Conservation Contract moneys are reserved for USBR lands and are primarily used for noxious weed control. Additional funds were allocated for fiscal year 2005 from the State Weed Control account. A land use agreement with the House of Blues, Gorge Concert Venue, provides minor funding to remedy impacts to the Quincy Lake Unit caused by people attending concerts. Grant funding is the primary vehicle for habitat enhancement work.

Four CBWA staff positions are supported:
1 FTE Wildlife Area Manager (Fish and Wildlife Biologist 3)
1 FTE Assistant Wildlife Area Manager (Fish and Wildlife Biologist 2)
1 FTE Watchable Wildlife/Diversity Biologist (Fish and Wildlife Biologist 2)
1 FTE Vegetation Management Specialist (Fish and Wildlife Biologist 2)
1 FTE Natural Resource Technician 2

2.5 Climate

The Columbia Basin Wildlife Area lies near the geographic center of Washington. The Cascade Range and the Rocky Mountains influence the climate in the Columbia Basin. The Rocky Mountains shield the Columbia Basin from the severe winter storms moving southward across Canada, while the Cascade Range forms a barrier to the easterly movement of moist air from over the ocean; however, some of the air from each of these sources reaches Grant and Adams Counties. Summers are warm or hot. Summer precipitation occurs mainly as brief showers or short, intense thunderstorms. Average annual precipitation ranges from approximately 8 inches in the western units to approximately 14 inches in the eastern units. Of this, 35 percent usually falls April through September. Average annual snowfall is approximately 22 inches. Average daily temperatures range from a high of 87˚ in July to 18˚ in January. Growing season is approximately 140 days long (SCS, 1967, 1984).

2.6 Soils and Geology

The Columbia Basin Wildlife Area (CBWA) lies within the “Big Bend” of the Columbia River in Grant and Adams Counties. From the soaring cliffs of the Grand Coulee in the north, to the alluvial fan of deposited fertile soils, to the channeled scablands, the Ice Age floods shaped the geography of the Columbia Basin and left behind many spectacular erosional features.

The geology and soils of the CBWA vary widely. Generally, cliffs and talus slopes are common; the most common soils tend to be shallow, well drained, and steep. Channeled scablands characterize several of the units, others have sand dunes and some contain high quality irrigable soils. Wetlands, caused by irrigation seepage and return flows, with developing organic soils, are heavily interspersed.

The following soils descriptions are excerpts from the Soil Survey of Grant County (SCS 1984) and the Soil Survey of Adams County (SCS 1967).

Cliff and talus slopes surround the northern parts of Banks Lake, with soils in the Bakeoven-Anders-Benco association occupying the hillsides, ridgetops, benches, and terraces.

Bakeoven: Bakeoven soils are on ridgetops, hillsides, and benches. These soils are very shallow and well drained. They formed in loess and in material derived from basalt. Slope is 0 to 55 percent. The surface layer is very cobbly loam. The subsoil is very gravelly loam. Basalt is at a depth of about 7 inches. Depth to basalt ranges from 4 to 12 inches.

Anders: Anders soils are on benches. These soils are moderately deep and well drained. They formed in loess. Slope is 0 to 10 percent. The surface layer and the upper part of the subsoil are silt loam. The lower part of the subsoil is gravelly silt loam. Basalt is at a depth of about 23 inches. Depth to basalt ranges from 20 to 40 inches.

Benco: Benco soils are on terraces. These soils are very deep and well drained. They formed in gravelly glacial outwash that is mixed with loess in the upper part. Slope is 0 to 15 percent. The surface layer is stony loam. The subsoil is very gravelly loam. The substratum to a depth of 60 inches or more is extremely gravelly coarse sand.

Southern Banks Lake, Billy Clapp, and Sun Lakes Units also have numerous cliffs and talus slopes, soils on the hillsides, ridgetops, benches and terraces within these units are mostly of the Bakeoven-Roloff association.

Bakeoven: Bakeoven soils are on ridgetops, hillsides, and benches. These soils are very shallow and well drained. They formed in loess and in material derived from basalt. Slope is 0 to 55 percent. The surface layer is very cobbly loam. The subsoil is very gravelly loam. Basalt is at a depth of about 7 inches. Depth to basalt ranges from 4 to 12 inches.

Roloff: Roloff soils are on benches and hillsides. These soils are moderately deep and well drained. They formed in loess. Slope is 0 to 25 percent. These soils are silt loam. Basalt is at a depth of about 29 inches. Depth to basalt ranges from 20 to 40 inches.

The Quincy, Seep Lakes, Goose Lakes, and Gloyd Seeps Units are characterized by channeled scablands, with the Starbuck-Bakeoven-Prosser associated soils occupying the benches, hillsides and ridgetops.

Starbuck: Starbuck soils are on benches, hillsides, and ridgetops. These soils are shallow and well drained. They formed in loess and in material derived from basalt. Slope is 0 to 65 percent. The surface layer is very fine sandy loam. The

subsoil is silt loam. Basalt is at a depth of about 15 inches. Depth to basalt ranges from 12 to 20 inches.

Bakeoven: Bakeoven soils are on ridgetops, hillsides, and benches. These soils are very shallow and well drained. They formed in loess and in material derived from basalt. Slope is 0 to 55 percent. The surface layer is very cobbly loam. The subsoil is very gravelly loam. Basalt is at a depth of about 7 inches. Depth to basalt ranges from 4 to 12 inches.

Prosser: Prosser soils are on benches and hillsides. These soils are moderately deep and well drained. They formed in loess. Slope is 0 to 45 percent. The soils are a very fine sandy loam. Basalt is at a depth of about 26 inches. Depth to basalt ranges from 20 to 40 inches.

Channeled scrabland associated with the Goose Lakes Unit

Most of the Lower Crab Creek Unit is covered with Schawana soils.

Schawana: Schawana soils are on benches and hillsides. These soils are shallow and somewhat excessively drained. They formed in eolian deposits and in material derived from basalt. The surface layer is cobbly loamy fine sand. The underlying material is gravelly very fine sandy loam. Basalt is at a depth of about 12 inches. Depth to basalt ranges from 8 to 20 inches.

The Potholes, Desert and Winchester Reservoir Units are primarily Quincy fine sand, 2 to 15 percent slopes.

> This very deep, somewhat excessively drained soil is on dunes and terraces. It formed in sand derived from mixed sources. Permeability of this Quincy soil is rapid. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is very high.

Other soil types found in minor amounts on the CBWA include Burbank very bouldery loamy sand on the Priest Rapids Unit, the Kennewick-Warden-Sagemoor association on the Upland Wildlife Restoration Sites, and the Benge-Anders-Kuhl association on the Sprague Lake Unit.

2.7 Hydrology and watersheds

Two major watersheds, Grand Coulee and Crab Creek, encompass the Columbia Basin Wildlife Area (CBWA). The Grand Coulee Water Resource Inventory Area (WRIA) #42 includes the Banks Lake, Sun Lakes, and Billy Clapp Units; the Crab Creek WRIA # 41 includes all the other units of the CBWA.

The Grand Coulee watershed starts at the north end of Banks Lake. Fed by water pumped up to Banks Lake from Grand Coulee Dam, water flows through Banks Lake into Billy Clapp Lake and feeds the Columbia Basin Irrigation Project. Subsurface water influences the Sun Lakes Unit.

The main influence on the CBWA is the Crab Creek watershed, draining a vast area of some 13,200 square kilometers (CCSP, 2004). Spring runoffs can have a tremendous influence on the Gloyd Seeps Unit, scouring the creek channel and inundating large areas of the flood plane. In north Gloyd Seeps, Crab Creek is ephemeral, flowing only in those years when adequate amounts of snow pack and runoff allow. Historically, Rocky Ford Creek and Gloyd Springs were the only perennial sources of water that fed Crab Creek in the Moses Lake area. Irrigation-influenced springs and irrigation return flows cause mid-Crab Creek to become perennial from south Gloyd Seeps through the Potholes Reservoir. Irrigation returns flow through the Winchester, Desert, and Potholes Units feed Potholes Reservoir. Return flows also feed the many lakes of the Quincy Unit.

From O'Sullivan Dam to the Columbia River, Crab Creek flows perennially, fed by water released from O'Sullivan Dam, several irrigation-influenced tributaries, and irrigation return flows. This portion of Crab Creek flows through Columbia National Wildlife Refuge and the Lower Crab Creek Unit of the CBWA. The stretch of Crab Creek within the Lower Crab Creek Unit supports anadromous fall Chinook salmon and steelhead.

Potholes Reservior Unit

Much of the Grand Coulee watershed has been dammed to create a series of irrigation water storage reservoirs.

Waters

- WRIA 41 Crab Creek
- WRIA 42 Grand Coulee

2.8 Fire History

Fire occurrence on the Columbia Basin Wildlife Area can be characterized as frequent (about 12 fires per year) and generally small (less than 25 acres).

Much of the CBWA has been held at a sub-climatic stage of shrub-steppe development by fire. Some non-native grasses planted for weed control and soil stabilization have proved to be a fire fuel source, but cheatgrass, promoted by past overgrazing, provides the most common and flammable fuel source for Columbia Basin range fires.

Illegal campfires and fireworks start fires on the Seep Lakes Unit just about every summer and on the Quincy Unit almost as frequently. Lightening caused fires are also

common in the shrub-steppe. The presence of power lines across some units have resulted in fires from tree contacts, bird nests shorting electrical devices and large birds arcing between power lines. Adjacent landowners burning weeds have caused several fires on the CBWA. Hundreds of miles of roads and highways transect the CBWA and cigarettes carelessly discarded from vehicles cause many fires.

Already this year (as of May 2005) fires have occurred on the Lower Crab Creek, Desert, and Quincy Units. Three were human-caused and a nest on a power pole probably started one.

2.9 Vegetation characterization

Shrub-steppe - The vegetative composition of shrub-steppe communities within the CBWA varies and is influenced primarily by the soils on the site. Dominant shrubs and grasses characterize the four or five most common shrub-steppe communities and the many important plants associated each shrub-steppe community are predictable. The most common shrub-steppe communities within the CBWA include Rabbitbrush/Needlegrass on the sandy soils, Stiff sage/Sandberg bluegrass on the lithosols, Big sage/Bluebunch wheatgrass on silt loam and Greasewood/Saltgrass on alkaline flats. Bitterbrush communities also occur in some parts of the CBWA, particularly in gravelly soils along the Columbia River and in irrigation influenced sandy low areas in the Desert Unit.

Shrubsteppe habitat on the Quincy Lakes Unit

Emergent wetland vegetation - Nearly all of the wetland plant communities on the CBWA developed because of the introduction of irrigation water. Since 1952, when the irrigation influence began, the composition of the CBWA wetland plant communities has not yet stabilized. Cattails and native rushes developed quickly and dominated CBWA emergent wetlands for most of the past fifty years. Willows took hold and continue to flourish in some areas, especially in the north Potholes Unit. In the early years, Canada thistle and Perennial pepperweed rapidly invaded and dominated the new and evolving wetland perimeters. Since about 1985, invasive non-native wetland plants have displaced cattails and rushes in many areas and have become significant or dominant components of most CBWA wetlands, especially along the irrigation wasteways through The Desert Unit. The non-native wetland invaders include Reed canarygrass, Russian olive, Purple loosestrife, Salt cedar and Common reed (Phragmites) in addition to Perennial pepperweed and Canada thistle.

Riparian vegetation – This vegetation type is not very common on the CBWA. The only existing riparian vegetation on the CBWA that predates the arrival of irrigation water is found associated with less than two dozen small springs in the Banks Lake, Gloyd Seeps and Lower Crab Creek units. Early settlers probably found and used willow trees in the riparian zones of Crab Creek and Rocky Ford Creek in Grant County, but no old riparian zone remnants are left in those areas. Riparian vegetation is currently developing in many protected CBWA sites that are influenced by irrigation water. Most of the developing riparian communities are not yet diverse or stable and generally are dominated by Russian olive. More efficient use and conveyance of irrigation water have dried up some developing riparian communities. Sections of the Columbia River impounded in the 1960s along the Priest Rapids and Quincy units, have slowly developed new riparian vegetation that includes a mix of native and introduced trees and shrubs.

Typical riparian vegetation (background) along Lower Crab Creek

Woody vegetation – Since the 1950s, evergreen and deciduous trees and shrubs have been planted in several managed upland plots and many scattered locations throughout the CBWA where irrigation water was available to get them established. There are no naturally established trees in CBWA upland areas except where irrigation water has increased the soil moisture the Russian olive dominates those sites. Tree and shrub plantings are a mix of introduced and native cultivars most commonly available from local nurseries. Remnant Chinese elm and black locust exist at old homestead sites.

Xeric vegetation - Many CBWA sites with sand dunes, basalt outcroppings and lithosols support a variety of native xerophytic plants. Some of these xerophytic plants are very uncommon and a few are listed as rare.

Agricultural crops – There are some 30 agricultural leases and agreements on about 1000 acres within the CBWA. Most of these leased lands are 20 acres or less and are normally planted with annual crops such as wheat, corn, beans or potatoes. Alfalfa and grass hay are also grown on some CBWA leases and a few leases produce seed crops each year.

2.10 Important habitats

Ponds – The several thousand acres of pond habitat in the CBWA provide a critically important link in the migration routes and life cycles of many species of waterfowl and shore birds. The warm waters of CBWA ponds are nutrient rich and highly attractive wildlife food sources. Shallow ponds and open shorelines have been created and managed primarily for dabbling duck production, but have also proved to provide essential habitat benefits for many other wildlife species as well. Invasion by non-native carp reduce the attractiveness of these ponds and carp exclusion is an essential part of pond management. Game Reserves and Waterfowl Closure sites encompassing some larger ponds and reservoirs are managed to provide resting areas for migrating waterfowl on the CBWA.

Wetlands – The developing and evolving Columbia Basin wetlands are providing important habitats for an increasing number of wetland dependent wildlife species. Hydrology of these wetlands is somewhat abnormal because they are heavily influenced by irrigation practices, but these somewhat artificial habitats attract and support typical year-round wetland residents such as reptiles and amphibians, as well as many seasonal breeding and nesting bird species. Wetland habitat diversity and quality on the CBWA are protected and enhanced using a variety of management techniques.

Shrub-steppe – This habitat type dominated most of Eastern Washington for several centuries, but the amount of shrub-steppe habitat has been drastically reduced by agriculture, development and other human activities. A large number of native wildlife and introduced game bird species still depend on the CBWA shrub-steppe habitats for part or all of their life requirements. Some of those wildlife species are listed as Sensitive, Threatened or Endangered. All of the CBWA management units have some shrub-steppe habitat and associated wildlife, management has primarily focused on protective measures.

Cliffs and talus – These two habitat types normally occur together and are common on many of the CBWA units. Study and documentation of the wildlife habitat value of the cliffs and talus slopes on the CBWA has been somewhat limited. These habitat types are known to be very important for Cliff swallows, White throated swifts, Peregrine falcons, Golden eagles, several bat species including Spotted bats, Bushy tailed woodrats, Rattlesnakes and a species of Mountain snail. Rock climbing, illegal hunting and mining of rock materials are the management issues most frequently encountered for the CBWA cliff and talus habitats.

2.11 Fish and wildlife

Upland game birds – Ring necked pheasants, California valley quail, Chukars and Grey Partridge provide a very popular recreation for many people on the CBWA. Management strategies have been developed and implemented in many CBWA locations that help insure the needs of these upland game birds are met and their populations have the potential to thrive.

Waterfowl – The CBWA supports very respectable populations of dabbling ducks, diving ducks and Canada geese through most of the four seasons, with the lowest numbers during the coldest part of the winter. Duck and goose production on the CBWA contributes significantly to their flyway populations. The numerous ponds, lakes and reservoirs on the CBWA provide ample opportunity to increase waterfowl numbers and enhance waterfowl related recreation.

Shorebirds - Many species of shorebirds have made the Columbia Basin an important part of their annual routine since the federal irrigation project was completed. Bird watchers with a special interest in shorebirds are becoming aware of the great opportunity on the CBWA. Shorebirds are finding and utilizing rich feeding sites in the wetlands and on the shorelines within many CBWA units. Some shorebirds are breeding and nesting on the CBWA. Others are only visitors, utilizing the CBWA feeding grounds when they are preparing themselves for migrating southward or to their breeding grounds in the north.

Colonial nesting birds – A few of the CBWA units provide all the nesting habitat components needed by herons, egrets, cormorants, terns and gulls. Pelicans are also present on the CBWA during their nesting season, but nesting success has not yet been observed for them. The increasing cormorant population in the Columbia Basin has caused some concern among the fishing public and demands for population reductions for all fish eating birds are commonly heard where fishers gather.

Peregrine falcons – The good quality nesting and rearing habitats found on the CBWA, especially the Banks Lake and the Quincy Lakes units, has produced increasing numbers of breeding pairs of Peregrine falcons during the past ten years. The habitat requirements and management strategies for these birds are both well documented. Although these falcons were recently down-listed, the cliff habitat important for their nesting success will remain a high priority on the CBWA.

Mule deer – During the period 1950 through 1980, the CBWA deer population was small and hardly noticed. More recently, CBWA Mule deer herds have grown significantly, especially in the Potholes, Desert, Billy Clapp and Banks Lake units. A very popular 'quality' deer hunt has been managed in a portion of the Desert and Potholes units since 1996. Concentrations of Mule deer feeding on haystacks and fruit trees have caused problems in some parts of Grant County.

Washington ground squirrels - The range of the Washington ground squirrel once covered a large part of the northwest. Populations are now small and isolated. Washington ground squirrels have been studied for the past several decades. Scientists have found and documented great variability in habitats where the squirrels currently exist in Washington, Oregon and Idaho. Management of the Washington ground squirrels on the Seep Lakes and Lind Coulee units currently consists mostly of protective measures. Habitat enhancements will likely occur on the CBWA after limiting factors are confirmed and protocols have been developed.

Northern leopard frogs – The Potholes and Gloyd Seeps units of the CBWA have the only currently known viable populations of Northern leopard frogs remaining in Grant County. These frogs were recently listed as Endangered. Researchers have been studying the Northern leopard frogs in the Potholes unit, but the most critical habitat components and limiting factors have not yet been confirmed. It appears that protecting or enhancing natal habitat might be the best management practice for increasing Northern leopard frog numbers on the CBWA.

Striped whipsnake – One site along the Columbia River on the Quincy unit of the CBWA has the only known Grant County population of Striped whipsnakes. Other occurrences of this State Candidate species might exist on the CBWA, but more reptile inventory work is needed. The Quincy site used by the Striped whipsnakes will be monitored and protected. Management and protection recommendations will be sought and evaluated for implementation on the CBWA.

Fish - Warm water fish and trout provide a recreation resource for more than half the CBWA visitors each year. Management strategies favoring fish and fishing sometimes conflict with goals and objectives for other wildlife and uses on the CBWA. These conflicts and negative impacts are avoided or reduced by the use of the District Team approach to fish, wildlife and habitat management on the CBWA.

CHAPTER III. MANAGEMENT OBJECTIVES, ISSUES & STRATEGIES

Statewide goals and objectives listed in chapter 1 shape management priorities on the Wildlife Area. 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 Columbia Basin 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. Manage to protect State Listed and Candidate species on all Columbia Basin Wildlife Area units

There are at least eight State Listed species and several Candidate species known to occur on the CBWA.

State Endangered Species: Some of the last known populations of Northern Leopard Frogs in Washington are found on the Potholes Reservoir and Gloyd Seeps Units. Large flocks of American white pelicans use the shallow ponds on the Desert Unit. Huge flocks of migrating Sandhill cranes stage on the Lower Crab Creek Unit.

State Threatened Species: The nesting population of bald eagles is increasing on the Banks Lake Unit and wintering bald eagles perch in the trees around Banks Lake and sand dunes in the Potholes Reservoir Unit. Ferruginous hawks have historically nested in the Lower Crab Creek Unit. Sage grouse can be found wintering in the Gloyd Seeps Unit.

State Sensitive Species: Peregrine falcon aeries have can be found on the Sun Lakes and Banks Lake Units. Common loons can be observed on Banks Lake.

State Candidate Species: Candidate species that may be found on one or more units of the Columbia Basin Wildlife Area include: Columbia spotted frogs, sagebrush lizards, Columbia River tiger beetles, burrowing owls, golden eagles, loggerhead shrikes, sage sparrows, sage thrashers, western grebes, black-tailed jack rabbits, striped whipsnakes, and Washington ground squirrels.

A. Strategy: All CBWA management and enhancement activities will make protection of Listed and Candidate species a high priority. Timeframe: On-going.

B. Strategy: Fence cattle exclosures and enhance native grasses for Washington ground squirrels on Section 17 in the Seep Lakes Unit. Timeframe: Summer – Fall 2007.

C. Strategy: Assist researchers with Northern leopard frog research and implement management strategies to protect and enhance leopard frog habitat. Timeframe: Assist as requested subject to CBWA staff time availability. Rehab ponds in the Potholes Unit Fall 2006.

D. Strategy: Include Black Rock Lake area in the Bureau of Reclamation management agreement to assume management responsibilities for protection of Washington ground squirrel colonies. Timeframe: On-going negotiations with BOR.
E. Strategy: Include Bureau of Reclamation lands in the Royal Slope west area in the management agreement to assume management responsibilities for protection of striped whipsnakes. Timeframe: On-going negotiations with BOR.
F. Strategy: Update Priority Habitats and Species (PHS) maps for the CBWA. Timeframe: On-going as staff time allows.
G. Strategy: Investigate historic documentation of listed species. Timeframe: On-going as staff time allows.
H. Strategy: Protect known populations and inventory new populations of rare plants in cooperation with the Washington Department of Natural Resources. Timeframe: On-going as staff time allows, inventory schedule is determined by WDNR.

2. Manage to increase upland game bird populations

The CBWA provides important permanent habitat for pheasants, quail, chukar and grey partridge. These upland birds provide recreational opportunities for people from all parts of Washington.

A. Strategy: Maintain enhanced permanent cover:

- 20 acres of irrigated tree and shrub plots at the Adrian Farm Unit and Gloyd Farm Unit on the Gloyd Seeps Unit.
- 50 acres of irrigated tree and shrub plots at the Quincy Farm Unit on the Quincy Unit.
- 5 acres of irrigated tree and shrub plots on the Lower Crab Creek Unit.
- Approximately 40 acres of irrigated tree and shrub plots at the LCA, Unit 40, Manly, Unit 1, Unit 9, and Unit 79 on the Upland Wildlife Restoration Units. Timeframe: On-going.

B. Strategy: Maintain 30 winter feeders for upland birds, focusing primarily on California valley quail, relocate and expand feeders where necessary. Timeframe: Winter 2006 – 2007.
C. Strategy: Trap and transfer California valley quail into suitable habitat. Timeframe: Winter 2007 depending upon weather conditions.
D. *Strategy: Determine limiting habitats for upland game birds and enhance habitats where needed.*

3. Manage to attract migrating waterfowl

Canada geese and many dabbling and diving duck species use CBWA wetlands, ponds and reservoirs for all or part of their habitat needs. These ducks and geese provide hunting opportunity for thousands of hunters every year. Maintaining and enhancing attractive habitats for migrating waterfowl is a major part of the CBWA wetland management program.

A. Strategy: Manage agricultural leases on the Priest Rapids Unit for Canada goose use. Timeframe: On-going.
B. Strategy: Assess effectiveness of and maintain effective CBWA Game Reserves, Waterfowl Closures and controlled entry areas for attracting and holding fall migrating ducks and geese. Timeframe: On-going Fall – Winter.
C. Strategy: Complete the Frenchman Ponds (TD-01) wetlands improvement project. Timeframe: Fall 2006 - Spring 2007.
D. Strategy: Enhance nesting and brood rearing habitats for dabbling ducks by completing TD-02 wetland excavation project and seeding spoils with appropriate vegetation. Timeframe: Fall 2006.
E. Strategy: Use moist soil management techniques to attract fall migrating waterfowl to the Quality Hunting Area and Frenchman Ponds wetland cells. Moist soil management techniques include disking to stimulate early successional vegetation for abundant seed production and establishing vegetation attractive to waterfowl such as millet or smartweed. Timeframe: On-going spring – Summer.

4. Manage shrub-steppe habitats

The Columbia Basin was almost entirely covered by shrub-steppe vegetation prior to arrival of commercial agriculture and grazing animals. Many of the native wildlife species that evolved with the local shrub-steppe communities are dependent on those shrub-steppe habitats for their life requisites. The introduced upland game birds also need the shrub-steppe habitats for food and cover.

A. *Strategy: Monitor all grazing permits for impacts to shrub-steppe vegetation. Adjust or eliminate permits if the levels of impacts are unacceptable*. Timeframe: On-going. *Renew grazing permits due to expire on December 31, 2006.* Timeframe: Fall 2006.
B. Strategy: Identify and map important and high quality native shrub-steppe habitats on CBWA units.
C. Strategy: Develop and implement protection measures for CBWA shrub-steppe habitat by maintaining fences and fire breaks, and diligent weed control. Highest priority will be the most important and best quality native shrub-steppe vegetation and communities. Timeframe: On-going.
D. Strategy: Implement and evaluate shrub-steppe habitat enhancements including weed control, grazing, mowing, planting and other acceptable techniques. Timeframe: On-going.
E. Strategy: Construct 3 miles of new boundary fence in the Seep Lakes Unit. Timeframe: Spring – Summer 2007.

5. Manage wetland habitats

Wetland habitats are recognized nationally as very important for many species of fish and wildlife. They also provide other important environmental functions. Wetlands in the Columbia Basin Wildlife Area are mostly a result of

the recent (1950's) irrigation project, but they are now providing critical habitat for an increasing number of wildlife species including Northern leopard frogs, White pelicans and Sandhill cranes.

A. Strategy: Identify and map wetlands and wetland habitat types on the CBWA that are being used by listed, candidate and priority fish and wildlife species.

B. Strategy: Protect important wetland vegetation from invasive plants and animals, and detrimental use. Examples include Russian olive removal, and ATV and carp exclusion. Timeframe: On-going as staff time allows, past efforts have taken approximately 8 days.

C. Strategy: Enhance existing wetlands and create new wetlands in conjunction with on-going enhancement projects such as TD-01 and TD-02. Timeframe: Fall 2006.

6. Manage shallow ponds

Permanent and seasonal ponds can provide critical habitat for rearing amphibians, dabbling ducks and some shorebirds and reptiles on the CBWA. They can also provide feeding areas for bats and many other insectivores.

A. Strategy: Preserve the shallow pond habitat on the CBWA by controlling emergent vegetation that would dominate and reduce the shallow open water in the ponds. Control methods include mowing, disking, burning and herbicide applications. Mow tall emergent vegetation on the Gloyd Seeps Unit. Mow, disk and plant vegetation attractive to waterfowl at the Quality Hunting Area and the Frenchman Ponds Area. After treatment the areas will be flooded to produce shallow ponds. Timeframe: Spring 2007.

B. Strategy: Restore small ponds by removing organic materials that have accumulated and filled in the ponds at the Frenchman Ponds and TD-02 wetland enhancement projects. Timeframe: Fall 2006.

C. *Strategy: Protect small ponds from unacceptable human disturbances such as jet skis.*

D. Strategy: Enhance dabbling duck nesting around excavated ponds by seeding spoil piles to appropriate vegetation. Timeframe: Fall 2006, Spring 2007.

E. Strategy: Conduct controlled burns to reduce tall emergent vegetation (*Phragmites*) and Russian olives around shallow ponds in the Desert Unit.

7. Manage cliffs and talus slopes

The landscape of the Columbia Basin is primarily resultant from many layers of lava several thousand feet thick that were eroded by ice age floods that left behind basalt cliffs, talus slopes and flood deposited materials ranging from sand to boulders. Wind and plate movements also influenced the landscape of the Columbia Basin. These basalt cliffs and talus slopes of the CBWA are over 10,000 years old. Several species of native wildlife have become dependent on these two habitat types.

A. Strategy: Identify and map cliffs and talus slopes on the CBWA where priority wildlife numbers are the highest.

B. Strategy: Protect cliffs and talus slope from detrimental activities such as rock quarries and borrow sites.

C. Strategy: Manage recreational uses on and near important cliff and talus slope habitats in the Frenchman Coulee portion of the Quincy Unit. Timeframe: On-going as needed, prairie falcon closure spring 2007.

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 undesirable vegetation is one of the greatest threats to fish and wildlife habitat quality. Cooperative weed control efforts are encouraged to improve efficacy and to minimize impacts on adjacent landowners as part of the agencies good-neighbor priority.

A. Strategy: Produce and implement a weed management plan **(Appendix 2)** that includes weed identification and inventory, habitat threat, control priority, timing and monitoring. Completed 2005/Updated 2006

B. Strategy: Respond to official 'Weed Control Notices' that come from the eight County Weed Districts and Weed Boards that oversee most of the CBWA. Timeframe: On-going Spring – Fall.

C. Strategy: Coordinate weed control efforts with Federal, State and Local entities to improve efficacy and minimize costs. Timeframe: On-going quarterly meetings with entities, coordinate approximately weekly with BOR, 3-day cooperative effort between WDFW, WDNR, and BOR, Fall 2006.

D. Strategy: Attend pesticide applicators training sessions and participate in weed control education, listing and research efforts. Timeframe: 3 days of training Fall 2006, 2 days of training spring 2007, as needed on the Salt Cedar Task Force.

E. Strategy: Prevent and reduce noxious weed infestations where possible by applying good land management on the CBWA. Eliminate weeds and establish perennial native grasses on 14 acres on the Upland Wildlife Restoration Units. Timeframe: Fall 2006.

F. Strategy: Require livestock to be quarantined prior to entry onto the CBWA to prevent the introduction of noxious weeds. Timeframe: Implement with grazing permit renewals.

G. *Strategy: Control noxious weeds, on State and County Weed Lists, over the entire 192,000 acres of the CBWA, without damaging important non-target vegetation and wildlife habitats.*

H. *Strategy: Continue and expand the use of bio-control agents for noxious weed control.*

2. Manage species and habitats in compliance with the Endangered Species Act and Washington State rules and regulations.

Federal law requires the protection and management of Threatened, Endangered and Sensitive (TES) species. State law requires protection of certain natural resources, habitats, fish and wildlife on State lands.

A. Strategy: Identify and inventory TES species and rare or ecologically important plant communities on the CBWA. Timeframe: 2006 – 2009 as part of WDFW's Habitat Conservation Plan (HCP) for Wildlife Areas.

B. Strategy: Increase use of information from the Washington Natural Heritage Program botanists and their data. Timeframe: On-going.

C. Strategy: Plan and implement recovery and protection measures and monitoring for TES species and rare plants on the CBWA. Timeframe: Occur as the HCP is completed or as research or other current information identifies specific management recommendations.

D. Strategy: Ensure CBWA management actions do not adversely impact listed species. Protect native vegetation and important habitats by reducing detrimental uses and destructive events.

3. Provide fire control on agency lands (Appendix 3)

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, County, State or Federal entities to provide fire suppression support on the CBWA. Timeframe: On-going.

B. Strategy: Provide fire training for wildlife area manager and assistant manager and develop a list of fire responsible people. Timeframe: Spring 2006.

C. Strategy: Update the CBWA Fire Plan to address fire fighting priorities and fire response procedures on the CBWA. Timeframe: Spring 2006.

D. Strategy: Plan and implement fire control measures including fire breaks, fuel reduction, green strips, etc. Timeframe: Ongoing.

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: Monitor CBWA lands for evidence of possible cultural resource damage or looting and assist law enforcement with investigation and resolution of such activities. Timeframe: On-going.

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 recreation compatible with fish, wildlife and habitat protection.
Fish and wildlife related recreation is an agency priority. Public input clearly emphasizes the importance of providing recreational access with protections for the fish and wildlife resources.

A. Strategy: Monitor recreational uses on the CBWA and note possible negative impacts to fish, wildlife and habitats. Survey islands within the Potholes Reservoir Unit for colonial nesting birds and post for seasonal access closure. Timeframe: Spring 2007.

B. Strategy: Consult District 5 Team members for help resolving conflicts between public use and resource protection. Timeframe: Quarterly or as needed 2006.

C. Strategy: Manage public use impacts on the CBWA by careful planning of access developments and improvements, controlling vehicles, implementing seasonal and use restrictions and using other land and resource management techniques. Establish a parking area on the east side of the Quality Hunting Area. Timeframe: Summer 2007.

D. Strategy: Manage the CBWA primarily for walk-in access only. Maintain many permanent and 4 seasonal vehicle access closures. Timeframe: As needed 2006 for the permanent closures, Fall 2006 and Spring 2007 for the seasonal.

E. Strategy: Maintain existing American Disability Act accessible hunting blinds and trails. Timeframe: 2 days of maintenance, Fall 2006 for the hunting blinds, 3 days for Audubon Trail maintenance Fall 2006.

2. Permit commercial activities that have no significant negative impact to fish, wildlife, habitat or recreation, or are to be mitigated.
The Agency has an existing mechanism for permitting various commercial and non wildlife-related activities on wildlife areas. These activities can occasionally conflict with wildlife, habitat and recreation management goals. However, providing commercial opportunity is an Agency priority.

A. Strategy: Review Commercial and Temporary Use Permits issued by the Agency for the CBWA and consult with District 5 Team members to provide comments or recommendations for preventing or reducing negative impacts from permitted activities. Timeframe: On-going.

B. Strategy: Investigate activities on the CBWA that do not appear to be permitted or wildlife related and determine if corrective action is needed. Timeframe: On-going.

C. *Strategy: Monitor commercial hunting guiding activities for conflicts with public recreation, curtail if warranted.*

D. *Strategy: Develop and post informational signs reflecting the requirement to have a Commercial or Temporary Permit.*

Agency Objective: Provide sound operational management of WDFW lands, facilities and access sites.

1. Perform administrative duties and responsibilities

The Columbia Basin Wildlife Area is a complex of several large wildlife areas that have come under WDFW management from Federal, State, County and Local landowners. Administration of the CBWA includes a wide variety of duties and responsibilities.

A. Strategy: Develop Work Plans that identify and address performance of high priority administrative duties. Timeframe: Spring 2007.

B. Strategy: Supervise employees. Timeframe: On-going.

C. Strategy: Update the Columbia Basin Wildlife Area Management Plan annually to reflect changing agency and/or public priorities. Timeframe: Spring 2007.

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

Wildlife area management goals and uses vary across the State. Wildlife area managers need to have tailored maintenance and upgrade plans that fit into the Agency budget. These budgets and plans should provide for reasonable and timely maintenance of Agency facilities. Facility maintenance is very important for safety and meeting Agency Objectives.

A. Strategy: Supply, maintain and upgrade the CBWA office and shop facility to provide a safe and effective workplace. Provide utilities, phone and internet service, computers, and tools. Timeframe: Ongoing

B. Strategy: Maintain roads, parking areas, vehicle controls and other such facilities to provide safe public use while minimizing damage or disturbances to wildlife, habitat and other valuable resources. Timeframe: On-going as needed.

C. Strategy: Maintain boundary fences to establish land ownership and help control uses of the wildlife area. Timeframe: On-going as needed.

D. Strategy: Inventory, assess, and map buildings, fences, bridges, culverts, irrigation systems, gates and other facilities on the CBWA.

E. Strategy: Remove unnecessary interior fences and other unsafe or nonfunctional structures that could present a hazard to people or wildlife.

F. Strategy: Assess and survey CBWA boundaries periodically and determine priorities for fencing the approximately 150 miles that are unfenced. Timeframe: Periodically.

3. Maintain equipment, signs and other materials important for management and protection of the wildlife areas.

Protection of natural resources on the CBWA is a high priority management objective. Equipment and signs are essential and provide the most effective and efficient means for protection of wildlife and habitat.

A. Strategy: Within budget constraints, maintain all signs, gates, culverts, water control structures, and irrigation systems to perform operation and maintenance of the CBWA. Timeframe: On-going.

B. Strategy: Within budget constraints, maintain all equipment and request replacement as needed.

C. Strategy: Plan and budget for the equipment, signs and other materials needed on the CBWA each biennium. Timeframe: On-going, Summer and fall.

D. Strategy: Within budget constraints, maintain an inventory of essential equipment, signs and materials.

E. Strategy: Monitor wildlife areas for protective measures and public safety needs and take immediate action when possible.

4. Protect and apply water rights for best use.

Water rights can impact wildlife area operations including food plots, restoration project, etc. Water use can also reduce instream flows for fish and wildlife.

A. Strategy: Identify and record all water rights and uses of water **(Appendix 4).** Completed 2005**.**

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

5. Pursue funding opportunities

A. Strategy: Apply for grants and other funding opportunities consistent with planned priorities to supplement funding.

B. Strategy: Enroll lands in Conservation Reserve, Wetlands Reserve or other federal programs to generate revenue and accomplish desired habitat conditions.

CHAPTER IV. PERFORMANCE MEASURES, EVALUATION AND UPDATES TO THE COLUMBIA BASIN WILDLIFE AREA PLAN

The Columbia Basin Wildlife Area Management Plan is a working document that will evolve as habitat and species conditions change, as new regulations are adopted, and as public issues and concerns change. Plan updates will reflect those changes. CBWA plan performance measures are listed below. Accomplishments and desired outcomes will be monitored and evaluated to produce an annual performance report.

1. Columbia Basin Wildlife Area performance measures in 2006 include:

Manage for State Listed and Candidate species:

- Protect 500 acres and enhance 12 acres in Section 17 of the Seep Lakes Unit for Washington ground squirrel management.
- Rehab 10 ponds in the Potholes Unit for Northern leopard frog management.

Manage to increase upland game bird populations:

- Maintain 20 populations of California valley quail with supplemental winter feeding.
- Maintain approximately 115 acres of irrigated tree and shrub plots.

Manage to attract migrating waterfowl:

- Develop 138 acres of attractive waterfowl habitat at the Frenchman Ponds (TD-01) wetlands improvement project.
- Develop 80 acres of attractive waterfowl habitat at the TD-02 wetlands improvement project.

Manage shrub-steppe habitats:

- Administer, review, and evaluate grazing permits and agricultural leases due to expire December 31, 2006, to determine if objectives for wildlife are being achieved. Include Bureau of Reclamation, District Team, Citizens Advisory Group and appropriate WDFW Biologists.
- Construct 3 miles of new boundary fence and exclude cattle in the Seep Lakes to manage for Washington ground squirrel.

Manage shallow ponds:

- Mow 3 acres of tall emergent vegetation on Gloyd Seeps wetland areas at the Farm Unit and flood to create shallow open water.
- Mow 10 acres of tall emergent vegetation on the Quality Hunting Area of the Desert Unit and flood to create shallow open water.

Manage weeds:

- Plant 14 acres of native grasses on Units 110 and 111 of the Upland Wildlife Restoration Units to reduce weed infestation.
- Fallow for weed control approximately 10 acres on Unit 1 and LCA of the Upland Wildlife Restoration Units.

Provide fire control on agency lands:

- Maintain 3 miles of fire breaks on the Potholes Reservoir and Banks Lake Units.
- Reduce/eliminate fuel load along access roads and parking areas on all units with herbicides.

Provide recreation compatible with fish, wildlife, and habitat protection:

- Post 4 islands within the Potholes Reservoir with signs to reduce human disturbances during the nesting season.
- Establish a parking area on the east side of the Quality Hunting Area of the Desert Unit.

Maintain facilities to achieve safe, efficient, and effective management and use of the wildlife area:

- Maintain shop, office, and all equipment to provide a safe and effective workplace.
- Upgrade phone system for multiple lines.
- Finalize Exhibit A of the 25-year management agreement with the Bureau of Reclamation
- Finalize the water service contract with the Bureau of Reclamation to document the WDFW use of water for wildlife habitat.

2. Convene the CAG and District 5 Team regularly to assess wildlife area performance measures, accomplishments and results.

Agency performance measures are listed by Agency Goals and Objectives. Applicable Agency performance measures and wildlife area specific performance measures allow staff to monitor, measure, evaluate and report on progress, results and successes. Performance measures should relate to accomplishments identified in the strategies.

A. Strategy: Plan, assign and schedule performance measures.

B. Strategy: Report on performance measures.

3. Update Wildlife Area Management Plans

The Columbia Basin Wildlife Area Management Plan will be updated periodically to reflect the results of performance measures, new priorities, new strategies and other new information.

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. Management Plan updates will address these changes and other new information.

A. Strategy: Prepare for plan updates by recording potential new priorities, strategies and performance measures offered and discussed during the term of the existing plan.

APPENDIX 1. PUBLIC ISSUES

Citizens Advisory Group and District Team Issues and Concerns
Columbia Basin Wildlife Areas

August 5, 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 or WDFW staff. Issues that are not underlined originated from the CAG or other public sources.

Issue A – Access/Recreation

- Increase wildlife viewing opportunities without disturbing wildlife
- Control camping and decrease camping in areas with sensitive wildlife or habitat
- Allow commercial guiding if conflict with public recreation does not occur
- Post boating regulations and Potholes RMP boat speed limits for public safety and wildlife
- Post informational signs to reduce litter and vandalism problems
- Control camping at Barker Canyon per Banks Lake RMP
- Evaluate proposals for other entities to manage access areas on Banks Lake, Billy Clapp Lake and Goose Lakes
- Develop vehicle access to Road 702 and Wildlife Area land east of Sun Lakes
- Restrict vehicle access to Dry Island (Sand) Lake and manage it for walk-in use
- Consult District 5 Team members for help resolving conflicts between public use and resource protection
- Manage public use impacts on CBWA by careful planning of access developments and improvements, controlling vehicles, implementing seasonal and use restrictions and using other land and resource management techniques
- Review Commercial and Temporary Use Permits issued by the Agency for CBWA and consult with District 5 Team members to provide comments or recommendations for preventing or reducing negative impacts from permitted activities.
- Investigate activities on CBWA that do not appear to be permitted or wildlife related and determine if corrective action is needed.
- Protect small ponds from unacceptable human disturbances such as jet skis.
- Manage recreational and commercial uses on and near important cliff and talus slope habitats.

Issue B – Wildlife

- Improve communication with Irrigation Districts for fish management in their system
- Be certain grazing does benefit wildlife management objectives
- Reduce wildlife disturbances in northern Potholes from boats and other uses
- Retain management at Steamboat Rock peninsula for hunting and for priority species there
- Improve vehicle control at Dry Island (Sand) Lake to reduce wildlife and habitat disturbances.
- Identify wetlands on CBWA that are used by listed, candidate and priority wildlife species.
- Identify cliffs and talus slopes on CBWA where priority wildlife numbers are the highest.
- Maintain CBWA Game Reserves, Waterfowl Closures and controlled entry/use areas for attracting and holding fall migrating ducks and geese
- Identify and inventory TES species on CBWA.

Issue C – Habitat

- Increase CBWA weed control staff and continue the use of bio-controls
- Use grazing for habitat enhancement and look into compensating lessees for benefits
- Improve wildlife habitat where possible
- Increase use of winter food plots where possible
- Evaluate impacts to wildlife and infrastructure (dikes) before continuing the North Potholes grazing permit
- Discontinue grazing at Royal City Lakes and use other methods to enhance wetland habitats there
- Make sure grazing permits are in compliance with WDFW policies
- Increase use of information from the Washington Natural Heritage Program botanists.
- Protect native vegetation, plant communities and important habitats by reducing detrimental uses, controlling weeds and minimizing destruction from natural events.
- Maintain enhanced permanent wildlife cover.
- Prevent and reduce noxious weed infestations where possible by applying good land management on CBWA.
- Control noxious weeds, on State and County Weed Lists, over the entire 192,000 acres of the CBWA, while avoiding damage to important non-target vegetation and wildlife habitats.
- Produce and implement a weed management plan with habitat threat, control priority, timing, monitoring and cost information.
- Respond to official ‘Weed Control Notices’ that come from the eight County Weed Districts and Weed Boards that oversee most of the CBWA.

- Coordinate weed control efforts with Federal, State and Local entities to improve efficacy and minimize costs.
- Attend pesticide applicators training sessions and participate in weed control education, listing and research efforts.
- Contract and coordinate with Local, County, State or Federal entities to provide fire suppression on CBWA.
- Provide fire training for wildlife area personnel and develop a list of fire responsible people.
- Update the Fire Plan to address fire fighting priorities and response procedures on the CBWA.
- Plan and implement fire control measures like fire breaks, fuel reduction, green strips, etc…
- Determine limiting habitats or components for upland birds.
- Plan and prioritize enhancements for upland bird habitats.
- Maintain winter feeders for upland birds.
- Enhance nesting and brood rearing habitats for dabbling ducks.
- Construct and manage small ponds and shallow impoundments for dabbling duck habitats.
- Identify important and good quality native shrub-steppe habitats on CBWA units.
- Develop and implement protection measures for CBWA shrub-steppe habitat giving priority to the most important and best quality native shrub-steppe vegetation and communities.
- Implement and evaluate shrub-steppe habitat enhancements including weed control, grazing, mowing, planting and other acceptable methods and techniques.
- Enhance existing wetlands and create new wetland habitat for priority wildlife species.
- Protect important wetlands from invasive plants, non-native wildlife, and detrimental uses.
- Preserve shallow water habitat on CBWA by controlling emergent plants that could reduce the shallow open water in small ponds and impoundments.
- Restore small ponds by removing silt and organic materials that have filled in the ponds.

Issue D – Enforcement

- Emphasize enforcement of fish and wildlife rules over non-wildlife related enforcement activities.
- Post signs for reporting vandalism and litter problems on CBWA
- Increase enforcement presence in northern Potholes areas
- Inform public in an effort to change perception of the enforcement priorities and activities on CBWA
- Monitor CBWA lands for evidence of possible cultural resource damage or looting and assist law enforcement with investigation and resolution of such activities.

Issue E – Public Education and Involvement

- Form a Citizens Advisory Group (CAG) to represent various interests on CBWA
- Meet with the CAG twice a year to discuss CBWA issues and concerns
- Serve and assist the public in a timely and professional manner
- Develop volunteer activities and partnerships that assist in achieving CBWA goals

Issue F – Wildlife Area Infrastructure and Equipment

- Plan and budget for the supplies needed on the CBWA each biennium and maintain an inventory of essential equipment, signs and other materials.
- Maintain the CBWA office and shop facility to provide a safe and effective workplace
- Maintain roads, parking areas, vehicle controls and other such facilities to provide safe public use with minimal damage or disturbance to wildlife, habitat and other valuable resources.
- Establish and maintain boundary fences to establish ownership and help control uses of the wildlife area.
- Inventory and assess buildings, fences, bridges, culverts, irrigation systems, gates and other facilities and infrastructure on CBWA.
- Remove unnecessary interior fences and structures that present a hazard to people or wildlife.

Issue G – Monitor, Survey and Inventory

- Monitor wildlife areas for public safety needs and take immediate action when possible.
- Monitor uses on CBWA for possible negative impacts to fish, wildlife and habitats and take corrective actions.
- Plan and implement surveys and monitoring of TES species and rare plants on CBWA.

Issue H – Other

- Develop Work Plans that identify and address performance of the high priority duties.
- Plan, assign and schedule Performance Measures.
- Report on Performance Measures.
- Prepare for management plan updates.

APPENDIX 2. 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 for the desired plant species and communities, rather than 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 noxious weeds listed according to state law (Class A, Class B, Class C, and county listed weeds). The Columbia Basin Wildlife Area lands lie within the jurisdiction of eight different Weed Boards / Weed Districts. Class A weeds will receive the highest priority for complete elimination. Class B weeds will be controlled to the best degree possible within budget constraints. Class C weeds will be controlled if they interfere with management goals or cause other unacceptable problems.

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 work to 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.

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 Columbia Basin WA

Weeds of concern on the Columbia Basin Wildlife Area include:

- Dalmatian toadflax (*Linaria dalmatica ssp.dalmatica)*
- Canada thistle (*Cirsium arvenseL.)*
- Musk thistle (*Carduus nutans L.)*
- Scotch thistle (*Onopordum acanthium)*
- Diffuse knapweed (*Centaurea diffusa L.)*
- Spotted knapweed (*Centaurea biebersteinii)*
- Russian knapweed (*Acroptilon repens L.)*
- Hairy willow-herb (*Epilobium hirsutum L.)*
- Kochia (*Kochia scoparia L.)*
- Perennial pepperweed (*Lepidium latifolium L.)*
- Phragmites (*Phragmites australis L.)*
- Puncturevine (*Tribulus terrestris L.)*
- Purple loosestrife (*Lythrum salicaria L.)*
- Rush skeletonweed (*Chondrilla juncea L.)*
- Saltcedar (*Tamarisk ramosissima L.)*
- Russian olive (*Elaeagnus angustifolia L.)*

The following discussions are taken as excerpts from the Washington State Noxious Weed Control Board weed descriptions:

DALMATIAN TOADFLAX

Scientific name: *Linaria dalmatica ssp. Dalmatica* **Common name:** Dalmatian toadflax

DESCRIPTION: Dalmatian toadflax is an erect, short-lived, perennial herb, 0.8 to 1.5 m tall. Dalmatian toadflax is a perennial species that spreads by horizontal or creeping rootstocks and by seed. A mature plant can produce up to 500,000 seeds, which are primarily dispersed by wind. The seeds may live up to ten years in the soil (Robocker 1974; Morishita 1991). Most seedlings emerge in the spring when soil temperature reaches 8° C at 2.5 cm. Germination in the fall is probably limited by soil water content, as well as possibly seed dormancy with the average life span of a plant being three years (Robocker 1974).

Mature Dalmatian toadflax plants are strongly competitive. Studies indicate that plots without Dalmatian toadflax may produce two and a half times as much grass as plots with toadflax (Robocker 1974). Mature plants are especially competitive with shallow-rooted perennials and winter annuals. Because of its competitive ability, Dalmatian toadflax is a concern in pasture and rangelands, as well as in natural areas, where it may out-compete more desirable, native species. Dalmatian toadflax occurs in a variety of habitats, including: roadsides, pastures, rangelands, and waste areas. It has spread most extensively west of the 100th meridian, occurring primarily on coarse-textured soils, ranging from sandy loams to coarse gravels (Alex 1962). Cars, off road vehicles, deer, and birds, can spread Dalmatian toadflax. Dalmatian toadflax is a state-listed class B weed.

MANAGEMENT INFORMATION:
Intensive clean cultivation can effectively control Dalmatian toadflax. A successful approach includes at least a two year effort, with eight to ten cultivations in the first year and four to five cultivations in the second year (Morishita 1991; Butler and Burrill 1994). Cultivation should begin in early June and be repeated so that there are never more than seven to ten days with green growth visible (Butler and Burrill 1994). Since Dalmatian toadflax seedlings do not compete well for soil moisture against established winter annuals and perennials, control efforts should include attempting to establish and manage desirable species that will compete with toadflax (Morishita 1991; Butler and Burrill 1994). Herbicides can be an effective tool for control. *Calophasia lunula,* a defoliating moth, is well established in Washington and reportedly provides good control (William et al. 1996) and *Mecinus janthinus,* a recently introduced stem-boring weevil, shows promise. *Brachypterolus pulicarius,* although usually associated with yellow toadflax, can survive and may reduce seed production of Dalmatian toadflax.

CURRENT DISTRIBUTION
Dalmatian Toadflax is mainly found on the Gloyd Seeps and Banks Lake Units. Distribution is spotty on these units. Toadflax has also been found in isolated spots on some other units.

ACRES AFFECTED BY WEED: ~ 250 **WEED DENSITY**: Low (Widely Scattered)

GOALS
Control expanding populations
Prevent new occurrences
Add to Bio Control distribution

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Dalmatian toadflax
Release biological controls
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, the Gloyd Seeps Unit will be surveyed and spot treated in the spring using herbicide.
A biological agent, *Mecinus janthinus* and, will be released in the spring or early summer in areas where the terrain is too difficult to survey, or implement control.
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
2002- Approximately 4 acres were treated.
2003- Approximately 30 acres were treated.
2004- Approximately 6 acres were treated.
2005- Approximately 8 acres were treated.

REFERENCES:
*Robocker, W.C. 1974. Life history, ecology, and control of Dalmatian toadflax. Technical Bulletin

*Morishita, D.W. 1991. Dalmatian toadflax, yellow toadflax, black henbane, and tansymustard: Importance, distribution, and control. *In* James, L.F., J.O. Evans, M.H. Ralphs, R.D. Child, eds.

*Alex, J.F. 1962. The taxonomy, history, and distribution of *Linaria dalmatica*. Canadian Journal of Botany 40: 295-307.

*Butler, M.D. and L.C. Burrill. 1994. Yellow toadflax and Dalmatian toadflax. Pacific Northwest Extension Bulletin 135. Oregon State University, Corvallis, OR.

*William, R.D., D. Ball, T.L. Miller, R. Parker, K. Al-Khatib, R.H. Callihan, C. Eberlein, and D.W. Morishita. 1996. Pacific Northwest Weed Control Handbook. Washington State University, Pullman, WA.

CANADA THISTLE

Scientific name: *Cirsium arvense L.* **Common name:** Canada thistle

DESCRIPTION: Canada thistle is a perennial herb with a deep-seated complex system of roots spreading horizontally which give rise to aerial shoots. The one to four foot tall stems are slender, green, and freely branched. The leaves are alternate, sessile, and deeply lobed. The leaf margins have stiff yellowish spines. The heads are many and relatively small. The plants are dioecious (all flowers on a plant are either male or female). The flowers are purple. The fruits are about 1/8 inch long, somewhat flattened, and brownish with an apical circle of long hairs, these eventually falling. Four varieties of Canada thistle have been recognized based on variation in leaf characters, texture, vestiture, segmentation, and spinyness. The weed is an effective competitor for light, moisture, and nutrients and it thus able to reduce crop yields.

Canada thistle also serves as an alternate host for insects and pathogenic microorganisms that attack various crops. Canada thistle can grow on a wide variety of soil types: clay loam, sandy loam, sandy clay, and sand dunes. It does poorly on wet soils without much aeration. Canada thistle is found in almost every plant community disturbed by man. It is common to roadsides, railway embankments, lawns, gardens, abandoned fields, sand dunes, agricultural fields, margins of forests, and waterways. It grows poorly in shaded conditions and produces few flowers. Since Canada thistle is dioecious, it is mainly insect pollinated. Many insect visitors have been reported. The average seed production is about 1,530 seeds per plant, but exceptional plants may produce up to 5,300 seeds. The mechanism for long distance seed dispersal is not known. Possible means of seed transport are irrigation water and wind transport. Studies have shown that freshly collected seeds had germination rates of up to 95 percent. Different ecotypes of this species have different germination rates. Two-year-old seeds had a 38-71 percent germination rate. The seedlings of Canada thistle develop a fibrous taproot, and within a few months, the main root thickens and develops lateral roots. After growing 6-12 cm, the horizontal roots bend downwards, growing towards the water table. A new horizontal root develops at this point of bending and continues the horizontal spread. Aerial shoots develop from the original vertical root or from buds on the arching branches of the horizontal system. Canada thistle is a state -listed class C weed.

MANAGEMENT INFORMATION:
Cultivation is not a viable option as the weedy nature of this plant is also due to the ability of the root to regenerate from small pieces. Root fragments as small as 3 to 6 mm thick and 8 mm in length have been found to produce shoots about 15 percent of the time. Fragments of 12.5 mm produce shoots 100 percent of the time. Herbicides can be an effective tool for control. Several biological control agents have been released but the most promising has been *Larinus planus.*

CURRENT DISTRIBUTION
Canada thistle can be found on every unit on the Columbia Basin Wildlife Area.

ACRES AFFECTED BY WEED: ~ 5,000 **WEED DENSITY**: Low to High

GOALS
Control expanding populations
Prevent new occurrences
Add to bio control distribution

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Canada thistle
Release biological agents
Treat priority infestations before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, WDFW crews, ground contractors, and an aerial contractor will treat priority areas.
A biological control agent, *Larinus planus* will be released in early summer in areas that are too difficult to control by other means.
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
2002 - Approximately 310 acres were treated
2003 - Approximately 420 acres were treated
2004 – Approximately 520 acres were treated
2005 – Approximately 500 acres were treated

REFERENCES:
Moore, R.J. 1975. The Biology of Canadian Weeds. 13. *Cirsium arvense* L. Scop. Can J. Plant Sci. 55: 1033-1048.

MUSK THISTLE

Scientific name: *Carduus nutans L.* **Common name:** Musk thistle

DESCRIPTION: Musk thistle is a biennial plant although it may occasionally act as a winter annual. It is a robust thistle and given the right conditions may grow to six or seven feet tall. The large solitary flowers heads at the ends of the stem are reddish purple. The flower heads droop at maturity. Each plant may have 50 to 100 flower heads with up to 1,000 seeds per head. The seeds do not have a plume or parachute. The stems are spiny and winged except just below the flower head. The deeply lobed, spiny leaves are alternate on the stem.

Musk thistle invades pastures, meadows, and fields. In so doing it crowds out other more desirable forage plants. Livestock will not graze in areas heavily infested with musk thistle thus decreasing available pasture. It spreads rapidly by seed. It also invades stream banks hindering access, and has been reported as problematic in grain fields. Musk thistle is a native of Europe and Asia and has been present in the eastern United States for nearly 80 years. Most western states report some level of infestation. Musk thistle is a state-listed class B weed.

MANAGEMENT INFORMATION:
Musk thistle may be hand pulled or grubbed out. Properly managed pasture will resist musk thistle infestations as long as adjacent infestations are controlled. In cropland situations cultivation will kill young seedlings. Herbicides are an effective tool for control. The seed eating weevil, *Rhinocyllus conicus* is quite effective in reducing seed output, however, it has not been released on any of our management areas due to low-density occurrences.

CURRENT DISTRIBUTION
Musk thistle has been observed in scattered locations on the Desert and Quincy Units.

ACRES AFFECTED BY WEED: ~ 25 **WEED DENSITY:** Low (Widely Scattered)

GOALS
Control expanding populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Musk thistle
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
Survey and spot treated using herbicide.

Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
2002 – Approximately 1 acre was treated
2003 – Approximately 1 acre was treated
2004 – Approximately 6 acres were treated
2005 – Approximately 2 acres were treated

REFERENCES:
Bultsma, P.M., T.D. Whitson, and F. Lamming. 1991. Comparison of several herbicides applied at different growth stages for control of Canada thistle (*Cirsium arvense*) and musk thistle (*Carduus nutans*). *In:* Whitson, T. and M Ferrell, eds. Rangeland Research and Extension Demonstrations 1991. University of Wyoming Cooperative Extension Service, Agricultural Experiment Station, College of Agriculture.

Dunn, P.H. 1976. Distribution of *Carduus nutans, C. acanthoides, C. pycnocephalus,* and *C. crispus* in the United States. Weed Science 24:518-524.

Fick, Walter H. 1986. Control of bolted musk thistle using clopyralid. Down to Earth. 42:1.

Higgins, Robert E. 1977. Musk thistle and its control. University of Idaho Cooperative Extension Publication. Current Information Series No. 20.
Ministry of Agriculture, B.C. 1984. Musk Thistle Fact Sheet. Agdex 640.

Nilson, Erick B. and Walter H. Fick. 1982. Musk Thistle Identification and Control. Kansas State University Cooperative Extension Publication.

Whitson, Tom D. 1987. Weeds and Poisonous Plants of Wyoming and Utah. University of Wyoming Cooperative Extension Publication.

SCOTCH THISTLE

Scientific name: *Onopordum acanthium* **Common name:** Scotch thistle

DESCRIPTION: Scotch thistle is a branched, robust biennial (or sometimes annual) that often grows 8 feet or more in height and 6 feet in width. Main stems may be up to 4 inches wide at the base. Stems have vertical rows of prominent, spiny, ribbon-like leaf material or "wings" that extend to the base of the flower heads. Leaves, which are armed with sharp, yellow spines, are up to 2 feet long and 1 foot wide. Upper and lower leaf surfaces are covered with a thick mat of cotton-like or woolly hairs, which give the foliage a gray-green appearance. Plants flower in mid-summer. The globe-shaped flower heads are borne in groups of 2 or 3 on branch tips. Flower heads are up to 2 inches in diameter, with long, stiff, needle-like bracts at the base. Flowers range from dark pink to lavender. Seeds are smooth, slender, and plumed (Dewey 1991; Callihan and Miller 1998). Infestations of Scotch thistle reduce forage production and can virtually prohibit land utilization for livestock. Dense stands of the large, spiny plants constitute a barrier to livestock movement, almost totally excluding animals from grazing and access to water (Hooper et al. 1970; Sindel 1991).

Scotch thistle is usually a biennial, although it can behave as a winter or summer annual or a short-lived perennial under certain situations (Piper 1984; Hooper et al. 1970). As a biennial, Scotch thistle typically lives for two growing seasons. Seeds usually germinate in the late fall, but germination can occur at other times, as well. Seedlings that appear in late autumn behave as true biennials, but seedlings produced during late summer or early autumn behave as annuals. During its first year, Scotch thistle produces a rosette with a taproot that may extend down 1 foot or more. Early in the second year, the plant bolts (Piper 1984). Flowering occurs July to September (Hitchcock et al. 1955). Scotch thistle is a state-listed class B weed.

MANAGEMENT INFORMATION:
Small areas can be eradicated by digging. Plants must be cut off below the soil, leaving no leaves attached (Julian and Rife). Mowing has limited effectiveness for controlling Scotch thistle. It usually only prevents seed production if done either immediately prior to flowering or when plants are just starting to flower. When mowing is conducted too early, it may only delay flowering. However, when plants are cut too late in the flowering process, viable seed may still develop in the capitula following cutting. Because there can be a wide variety in the maturity of plants, a single mowing is unlikely to provide satisfactory control (Sindel 1991).

Establishing and maintaining dense, vigorous, competitive pasture can effectively prevent Scotch thistle establishment. Healthy pasture is particularly important in the autumn, when most Scotch thistle seeds germinate. Thistle invasion is unlikely to occur in ungrazed pasture. (Sindel 1991). Herbicides can be an effective management tool for control. No biological controls are currently available in the United States.

CURRENT DISTRIBUTION
Scotch thistle is mainly found on the Seep Lakes Unit but scattered plants have also been discovered on other units.

ACRES AFFECTED BY WEED: ~ 50 **WEED DENSITY:** Low

GOALS
Control expanding populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Scotch thistle
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, the Seep Lakes Unit will be surveyed and spot treated using herbicide. Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY
2002 – Approximately 3 acres were treated
2003 – Approximately 1 acre was treated
2004 – Approximately 1 acre was treated
2005 – Approximately 2 acres were treated

REFERENCES:
Callihan, R.H. and T.W. Miller. 1998. Scotch Thistle. Idaho's Noxious Weeds. http://www.oneplan.state.id.us/pest/nw27.htm.

Dewey, S.A. 1991. Weed thistles of the western United States. *In:* James, L.F., J.O. Evans, M.H. Ralphs, and R.D. Child, eds. Noxious Range Weeds. Westview Press, Boulder, Colorado. pp. 247-253.
Seattle.

Hooper, J.F., J.A. Young, and R.A. Evans. 1970. Economic evaluation of Scotch thistle suppression. Weed Science 18:583-586.

Sindel, B.M. 1991. A review of the ecology and control of thistles in Australia. Weed Research 31:189-201.

Piper, G. 1984. Scotch thistle – a continuing menace in the Pacific Northwest. Pacific Northwest Weed Topics 84:1-2.

Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson.. 1955. Vascular Plants of the Pacific Northwest. Volume 5: Compositae. University of Washington Press, Agriculture web page.

Julian, J. and J. Rife. Undated. Integrated weed management of Scotch thistle. Douglas County, Colorado web page.

DIFFUSE KNAPWEED

Scientific name: *Centaurea diffusa L.* **Common name:** Diffuse knapweed

DESCRIPTION: Diffuse knapweed is an 8 to 40 inch tall, biennial or short-lived perennial species, with a long tap root. The single, upright stem produces several spreading branches. The basal leaves are short-stalked and divided into lobes on both sides of the center vein. The stem leaves are stalk less, becoming smaller and less divided near the top of the stem. The flowers, which are generally white (sometimes pink or lavender), occur in urn-shaped heads that grow in clusters at the ends of the branches. The bracts of the flower heads are leathery, with obvious veins. The lower and middle bracts are yellowish-green with a buff or brown margin; they are edged with a fringe of spines plus a longer, spreading spine at the tip. Diffuse knapweed is a very aggressive species that can infest large areas quickly. The species has little value as forage for cattle and limited seasonal value for big game. Knapweed infestations increase production costs for ranchers, impair the quality of wildlife habitat, decrease plant diversity, increase soil erosion rates, decrease the visual quality and appeal of recreational lands, and pose wildfire hazards.

Diffuse knapweed has been found in a wide range of habitats, including sandy river shores, gravel banks, cracks in rocks on cliffs and outcrops, rangelands, pastures, and hayfields on sandy loams, loams, and silt loams. Diffuse knapweed appears to grow best on well-drained, light textured soils. It is not tolerant of flooding or shade. While it is not tolerant of cultivation with annual crops, diffuse knapweed thrives in gravel pits, roadsides, railroad tracks, vacant lots, airports, trails, and heavily grazed pastures.

Diffuse knapweed is a biennial or short-lived perennial plant. It establishes a rosette in its first season of growth and it commonly bolts the second year. However, when stressed by drought, grazing, or mowing, it may show short-term perennial characteristics: Diffuse knapweed is a biennial or short-lived perennial plant. It establishes a rosette in its first season of growth and it commonly bolts the second year. However, when stressed by drought, grazing, or mowing, it may show short-term perennial characteristics. While plants may regenerate from the crown, diffuse knapweed reproduces primarily by seed. A single flower stalk can produce 1,200 seeds. The seeds are dispersed when the plant breaks off at the base and behaves as a tumbleweed. Vehicles can often transport these tumbleweeds. The seeds are moved in shoelaces, by feeding rodents, and in contaminated hay and crop seed. While plants may regenerate from the crown, diffuse knapweed reproduces primarily by seed. Diffuse knapweed is a state-listed class B weed.

MANAGEMENT INFORMATION:
Cultivation will eliminate diffuse knapweed. Grazing or mowing delays flowering and may increase the number of stems, thereby increasing seed production. Five biocontrol agents have been established on diffuse knapweed in Washington. Two seed head weevils, *Bangasternus fausti* and *Larinus minutus,* do not occur in collectable numbers at present. *Urophora affinis (*seed head fly), *Urophora quadrifasciata* (seed head fly), and

Sphenoptera jugoslavica (root boring/gall beetle) are available for mass collections. Herbicides can be an effective tool for control.

CURRENT DISTRIBUTION
Diffuse knapweed is found on almost all units but is most apparent on the Gloyd Seeps, Banks Lake, Lower Crab Creek, and Quincy Units.

ACRES AFFECTED BY WEED: ~ 2,000 **WEED DENSITY:** Low to Medium

GOALS
Control expanding populations
Prevent new occurrences
Add to bio control distribution

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by diffuse knapweed
Release biological controls
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, as many locations as possible will be sprayed.
A biological agent, *Larinus minutus* will be released in additional locations.
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
2002 – Approximately 16 acres were treated
2003 – Approximately 57 acres were treated
2004 – Approximately 52 acres were treated
2005 – Approximately 35 acres were treated

REFERENCES:
Dennis, L.J. 1980. Gilkey's Weeds of the Pacific Northwest. Oregon State University Press, Corvallis.

*Gaines, X. M. and D.G. Swan. 1972. Weeds of Eastern Washington and Adjacent Areas. Camp Na-Bor-Lee Association, Davenport, WA.

*Hawkes, R.B., T.D. Whitson, and L.J. Dennis. 1985. A Guide to Selected Weeds of Oregon. Oregon Department of Agriculture, Salem.

*Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle.

Roche', B. 1983. Range plants: Their identification, usefulness and management. SBC, Washington State University, Pullman.

*Roche', B. and C.J. Talbott. 1984. Eastern Washington Range Plants. Extension Bulletin 1302. Washington State University, Pullman.

*Roche', B.F. Jr., G.L. Piper, and C.J. Talbott. 1986. Knapweeds of Washington. Cooperative Extension Bulletin EB1393. Washington State University, Pullman.

*Roche', B.F. Jr. and C.J. Talbott. 1986. The collection history of *Centaurea*s found in Washington State. Research Bulletin EB 0978. Agricultural Research Center, Washington State University, Pullman.

*Roche', B.F. Jr. and C.T. Roche'. 1991. Identification, introduction, distribution, ecology, and economics of *Centaurea* species. *In* James, L.F., J.O. Evans, M.H. Ralphs, and R.D. Child, eds. Noxious Range Weeds, pp. 369-388. Westview Press, Boulder, CO.
**References available from the Washington State Noxious Weed Control Board Office in Olympia.*

SPOTTED KNAPWEED

Scientific name: *Centaurea biebersteinii L.* **Common name:** Spotted knapweed

DESCRIPTION: Spotted knapweed is a perennial with several branched upright stems from a stout taproot, usually 2 to 4 feet tall. Deeply divided stalked basal leaves form a rosette. Stem leaves are divided into lobes, but become smaller up the stem and less lobed until the upper leaves are linear and entire. Heads of pink to purple, sometimes white, flowers are borne at the ends of the branches. Urn-shaped heads are ¼ to 5/16 inch in diameter and ½ inch tall, excluding the flowers. Bracts surrounding the flower heads have obvious vertical veins below the black triangular spot on the tip. The tip and upper margin have a soft spine like fringe, in which the center "spine" is shorter than the others. White flowered plants often lack the dark spot on the bract tip. Spotted knapweed flowers from June to October, and will continue as long as moisture and temperatures permit. Spotted knapweed is a state-listed class B weed.

MANAGEMENT INFORMATION:
Cultivation will eliminate spotted knapweed. Grazing or mowing delays flowering and may increase the number of stems, thereby increasing seed production. Five biocontrol agents have been established on spotted knapweed in Washington. Two seed head weevils, *Bangasternus fausti* and *Larinus minutus,* do not occur in collectable numbers at present. *Urophora affinis (*seed head fly), *Urophora quadrifasciata* (seed head fly), and *Sphenoptera jugoslavica* (root boring/gall beetle) are available for mass collections. Herbicides can be an effective tool for control.

CURRENT DISTRIBUTION
Spotted knapweed is found on almost all units but is most apparent on the Gloyd Seeps, Banks Lake, Lower Crab Creek, and Quincy Units.

ACRES AFFECTED BY WEED: ~ 50 **WEED DENSITY:** Low

GOALS
Control expanding populations
Prevent new occurrences
Add to bio control distribution

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by diffuse knapweed
Release biological controls
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, as many locations as possible will be sprayed.

A biological agent, *Larinus minutus* will be released in additional locations. Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND

2002 – Approximately 2 acres were treated
2003 – Approximately 5 acres were treated
2004 – Approximately 5 acres were treated
2005 – Approximately 5 acres were treated

REFERENCES:

Delorit, R.J. 1970. An Illustrated Taxonomy Manual of Weed Seeds. Agronomy Publications. River Falls, WI.

Dennis, L.J. 1980. Gilkey's Weeds of the Pacific Northwest. Oregon State University Press, Corvallis.

Gaines, X. M. and D.G. Swan. 1972. Weeds of Eastern Washington and Adjacent Areas. Camp Na-Bor-Lee Association, Davenport, WA.

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RUSSIAN KNAPWEED

Scientific name: *Acroptilon repens L.* **Common name:** Russian knapweed

DESCRIPTION: A bushy, branched perennial, Russian knapweed grows one to three feet tall and forms clones or colonies from its vigorous, spreading root system. The erect, hairy stems branch from above the middle or not at all. While young plants may have whitish and woolly stems, older plants will turn dark brown to black. The basal leaves are deeply notched and gray-green in color, while the upper leaves are smaller and linear with broken edges. The stem leaves are intermediate in size with toothed edges. The pinks to purple flowers grow in solitary heads at the tips of leafy branches. The bracts under the flower heads are greenish to straw colored, with a broad, papery tip. Russian knapweed flowers from June to September, producing ivory-white seeds with a feather-like plume. Russian knapweed is an aggressive and invasive noxious weed of pastures, non-crop areas, grain fields, and other cultivated fields. Livestock may avoid this species; in addition, the plant is poisonous to horses, causing chewing disease (nigropallidal encephalomalacia). Russian knapweed is common on the heavier, often saline soils of bottomlands, as well as subirrigated slopes and flats. The species is also competitive in hayfields, pastures, grain fields, and along roads or irrigation ditches. In eastern Washington, Russian knapweed is commonly found on sites occupied by basin wildrye (*Elymus cinereus*). The plant reproduces by seed, although the seeds are too heavy to be wind-borne. Long-distance transport is typically as a contaminant in hay or seed lots. Plants can spread locally via lateral extension of the roots. Russian knapweed is a state-listed class B weed.

MANAGEMENT INFORMATION:
Productivity is likely to be maximized in a minimum amount of time if Russian knapweed populations can be treated with a suitable herbicide, farmed, and seeded with competitive forage. Depending on the moisture regime, nitrogen fertilizer applied in conjunction with an herbicide can significantly improve the competitiveness of residual grasses. In addition, improved grazing management will significantly influence the life span of Russian knapweed control efforts. Herbicides can be effective depending on timing and consistency. There are no known effective biological control agents at this time.

CURRENT DISTRIBUTION
Russian knapweed can be found on almost all units, with the heavier infestations being on the Gloyd Seeps and Banks Lake Units.

ACRES AFFECTED BY WEED: ~ 5 **WEED DENSITY:** Medium to Heavy in spots

GOALS
Control expanding populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Russian knapweed
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering populations

ACTIONS PLANNED
In 2006, a fall treatment is planned on the more infested areas
Monitoring will continue on an annual basis on nearby units

CONTROL SUMMARY AND TREND
2002 – Approximately 12 acres were treated
2003 – Approximately 6 acres were treated
2004 – Approximately 8 acres were treated
2005 – Approximately 32 acres were treated

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HAIRY WILLOW-HERB

Scientific name: *Epilobium hirsutum* L **Common name:** Hairy willow-herb

DESCRIPTION:
Hairy willow-herb is a semi-aquatic, soft-hairy herb that ranges in height from 3 feet to 6 feet tall. The overall plant is covered with fine soft hairs. The leaf arrangement is mostly opposite, and the toothed leaves are lanceolate shaped (much longer than wide, and widest below the middle). The showy rose-purple flowers extend from leaf axils near the top of the plant. Flowers are approximately 3/4" across. Each flower has four sepals, four notched petals and eight stamens. Flowering occurs in July and August. Hairy willow-herb is a tall, attractive plant capable of escaping cultivation to form monotypic stands in natural wetland areas, where aggressive and dense growth can crowd out native or beneficial species. While initially found along ditch-banks and roadsides, hairy willow-herb is capable of spreading to undisturbed meadows. Records indicate this species is considered established throughout most of the northeastern United States, and the distribution continues to spread westward. The majority of Washington populations are limited to Whatcom County, where this plant is regularly found as a garden ornamental, and as an escapee to natural wetland areas.

Hairy willow-herb shares habitat, and the northeast to westward movement and establishment history, with purple loosestrife. These two exotic species co-exist and establish in riparian areas. Purple loosestrife has the ability to take advantage of early spring growing conditions, and hairy willow-herb takes advantage of increased growth in autumn growing conditions. Hairy willow-herb is aggressive and capable of spreading by wind-dispersed seeds, and by a large root system that produce rhizomes that facilitate vegetative spread. Hairy willow-herb is another exotic, aquatic species capable of disrupting the ecology of our wetlands by altering food chains, hydrologic cycles and floral composition. These factors all determine the succession or long-term management plans of these wetland areas.

This semi-aquatic, perennial herb is found in a wide range of moist soils, including wetlands, ditch and stream banks, low fields, pastures and meadows. In its native range hairy willow-herb is found in damp lands and waste places to an elevation of 8100 feet, and it is intolerant of shade. Once established, hairy willow-herb is somewhat shade tolerant. In England (and WA), hairy willow-herb co-exists with purple loosestrife, where both species colonize gaps along riparian areas created by erosion. Hairy willow-herb out competes and grows faster than purple loosestrife in the shorter days and colder temperatures of autumn. In the spring, this relationship is reversed, with purple loosestrife having a faster growth rate. Hairy willow-herb requires habitat with a pH of 5.5 or higher for seed germination.

Hairy willow-herb is a perennial, and it spreads by seeds and by rhizomes. Flower buds develop after 10 to 12 weeks of growth. Side shoots also produce flowering stems, and the whole plant is flowering by mid-summer (July – August). Self-pollination is

possible, but seed production is reduced by self-pollination. Seeds are ripe and begin to disperse 4 to 6 weeks after flowering. Each seed is oblong and flattened, with a tuft of long white hairs.

Auxiliary buds found at the base of the stem, produce stolons. These stolons develop adventitious roots, which pull the stolons into the ground, where they develop into fleshy, soft rhizomes. These rhizomes branch repeatedly, and spread to new areas. When the axillary buds produce stolons that spread along the soil surface, the stolons root and produce a pseudo-rosette of leaves. If this rosette gets separated from the parent plant, it produces an aerial shoot and develops much the same way as an autumn seedling. The aerial shoots die back each autumn, but the rhizome system remains. These rhizomes can reach almost 2 feet in length from the time of initial development to aerial shoot production. Hairy willow-herb adapts to its growing condition. The rhizomes growing in submerged water or water-saturated mud, develops arenchyma tissue. Rhizomes not submerged are mostly cork. Hairy willow-herb is a state-listed class C weed.

MANAGEMENT INFORMATION:
The most effective management tool to date is the herbicide 2,4-D.
Cultivation is not practical in a wetland environment.
No biological control agents are available at this time.

CURRENT DISTRIBUTION
Hairy willow-herb has only been found on some Upland Restoration sites, and has been found on several sites not managed by WDFW.

ACRES AFFECTED BY WEED: ~ 20 **WEED DENSITY:** Low

GOALS
Control expanding populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Hairy willow-herb
Treat all plants that can be reached before they set seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, all known locations will be surveyed and spot treated using herbicide.
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
Hairy willow-herb was first observed in late fall 2003
2004 – Approximately 5 acres were treated
2005 – Approximately 10 acres were treated

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KOCHIA

Scientific name: *Kochia scoparia L.* **Common name:** Kochia

DESCRIPTION: Kochia is an annual plant that reproduces from seeds. It has a deep taproot. The erect, much-branched stems are three to seven feet long, smooth below and usually hairy above. The alternate, simple leaves are pubescent to nearly glabrous; one to two inches long, lanceolate to linear with hairy margins, and without petioles. The small green flowers lack petals and are found in clusters in the axils of the upper leaves and in terminal spikes. The brown flattened seeds are about 1/16 inch long and grooved on each side.

Kochia is an effective competitor for light, nutrients, and soil moisture, and can reduce crop yield. There is a high variation in the flowering time of populations of Kochia. Kochia has a wide tolerance of soil types and is even adapted to salty soils. It is found on pasture, rangeland, roadsides, ditch banks, wastelands, and cultivated fields. Like many other species of the Chenopodiaceae, it becomes tumbleweed when mature. An abscission zone develops at the base of the stem in autumn. When winds reach velocities of 25 miles per hour, the stem breaks and the plants tumble. Kochia over winters as seeds. The seeds germinate very early in spring because of their frost tolerance. Kochia grows very rapidly through spring and summer and sends down a very long taproot (up to 16 feet). It flowers in late summer and sets seed.

The species typically produces around 14,600 seeds per plant. Seeds are dispersed in the fall when the plant becomes tumbleweed. The plant tumbles with the wind, dropping seeds as it is blown about. Laboratory studies report germination rates of 76 percent or better over a temperature range of 39-106 degrees F. Seeds buried in the soil have five percent viability after one year and zero percent after two years. Kochia reproduces by seed only. Kochia is a state-listed class B weed.

MANAGEMENT INFORMATION:
Early tillage in the spring gives good control of the Kochia seedlings.
Infestations of triazine resistant Kochia has been found along railroad lines in eleven states. Research has shown that triazine resistant biotypes were more susceptible to 2,4-D ester than triazine susceptible biotypes. There are also biotypes resistant to 2,4-D or Banvel (dicamba). It is suggested that rotating herbicides would reduce the possibility of an increase in the proportion of plants tolerant to 2,4-D or Banvel. No biocontrol agents are available.

CURRENT DISTRIBUTION
Kochia is normally a problem along roadsides and in parking areas and other disturbed sites.

ACRES AFFECTED BY WEED: ~ 300 **WEED DENSITY:** Medium to High

GOALS
Control expanding populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Kochia
Treat all plants that can be reached before they set seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, almost all areas will be treated with a pre-emergent herbicide.
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
Kochia is controlled during our roadside residual spray program that will be addressed later.

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PERENNIAL PEPPERWEED

Scientific name: *Lepidium latifolium L* **Common name:** Perennial pepperweed

DESCRIPTION:
Perennial pepperweed normally grows 1 to 3 feet tall, but may reach up to 6 feet. The plant has many stems that emerge from a somewhat woody root crown. The alternate, waxy leaves may have smooth or toothed margins and a prominent, whitish midvein. Basal leaves are lance-shaped and up to 12 inches long; they are attached by a stalk that can be almost as long as the leaf blade. Stem leaves are smaller, with shorter stalks. The milky white flowers grow in dense, rounded clusters at branch tips. Each flower has 4 sepals and 4 petals. Fruits are small (1/16 inch), round or egg-shaped, and contain 2 reddish-brown seeds (Callihan and Miller 1998; Whitson 1987; Bureau of Land Management).

An aggressive plant, perennial pepperweed tends to establish and rapidly colonize pastures, riparian habitats, and waste places in wetter areas. The plant is very tolerant of salty soils, but it is not restricted to these habitats (Young et al. 1995). The plant can also be a problem in roadside, rangeland, and field crop situations. Dense infestations of the plant can form near monocultures. Annual biomass production by perennial pepperweed builds a dense organic layer on the soil surface, which may have a significant consequence on carbon-nitrogen ratios over time. The plant is adapted to using water with a high salt content. The salts build up in the plant biomass. As a result, perennial pepperweed may act as a salt pump in some areas, as it removes salts from the soil solution and deposits the on the soil surface (Young et al. 1997).

In riparian zones, the weed interferes with the regeneration of willow and cottonwood species. Accumulations of perennial pepperweed's semi-woody stems degrade nesting habitat for wildlife. The extremely competitive plant may also completely displace more desirable species, which poses a particular threat to natural areas and hay meadows. Perennial pepperweed lowers the digestibility and protein content of hay, and the accumulation of old pepperweed stems inhibits grazing. Livestock avoid eating this weed if other forage is available (Young et al. 1995).

A perennial with creeping rhizomes, established perennial pepperweed plants have shoots that emerge in late winter and early spring (Fisher and McCaskill 1990; Young et al. 1997). Initially, the plant forms a rosette. Stem elongation is rapid during May (Young et al. 1997). The large amounts of semi-woody herbage produced by the plant can persist for several years (Young et al. 1995). Seeds germinate in February and March. The plant flowers from early summer through fall (Whitson 1987). Rosette leaves die back by flowering time. Fruits do not open at maturity; instead, they fall at irregular intervals throughout the winter (Young et al. 1995). Perennial pepperweed can spread by seed or rhizome. The plant produces abundant seed, which has a high germination rate. California studies have indicated that perennial pepperweed can produce over 16 million seeds per hectare (Young et al. 1997). Seeds have no heavy seed coat and no dormancy

requirement. A wide and fluctuating temperature range produces the highest germination rates. Constant cold or warm temperatures produce a low germination rate (Miller et al. 1986). There is no definitive information on the persistence of the soil seed bank, but the seeds appear to have a very short half-life (Young et al. 1997).Although the plant can spread by seed, populations more commonly expand by creeping rhizomes, which may advance 3 to 6 feet from the parent plant (Young et al. 1997). Root fragments may spread the plant. Movement of contaminated agricultural products and the transportation of root fragments on earth-moving and tillage equipment can spread the weed (Young et al. 1995). Perennial pepperweed is a state-listed class B weed.

MANAGEMENT INFORMATION:
Mechanical control of this plant is very difficult because very small sections of root contain buds that will sprout into new plants. Plant tops are easily killed, but root and crown buds can sprout and continue the infestation (Young et al. 1995; Young et al. 1998). Small infestations may be hand-pulled or dug, but as much of the root must be removed as possible. After control work, it is important to continue to monitor sites and remove all regrowth and seedlings. No biocontrol agents are available. Herbicides can be an effective tool for control.

CURRENT DISTRIBUTION:
Perennial pepperweed is found in all units on the Columbia Basin Wildlife Area, and it is rapidly spreading.

ACRES AFFECTED BY WEED: ~ 1,000 **WEED DENSITY:** Medium to Heavy

GOALS
Control spreading populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected go perennial pepperweed
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, herbicide will be used to control some populations
Monitoring will continue on an annual basis on nearby units

CONTROL SUMMARY AND TREND
2002 – Approximately –0- acres were treated
2003 – Approximately 4 acres were treated
2004 – Approximately 5 acres were treated
2005 – Approximately 35 acres were treated

REFERENCES:

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*Fisher, B.B. and J. McCaskill. 1990. Perennial pepperweed - *Lepidium latifolium* L. *In:* Growers Weed Identification Handbook. Publication 4030. University of California, Division of Agriculture and Natural Resources, Oakland, CA.

PHRAGMITES

Scientific name: *Phragmites australis L* **Common name:** Phragmites

DESCRIPTION: The non-native genotype of Phragmites is a large perennial, grass or reed with creeping rhizomes, and often also with stolons. The woody hollow culms (stems) can grow to 12 feet tall. Leaves are lanceolate, ranging from 8-16 inches long and .5- 1.5 inches wide. The sheath of the leaf blade is glabrous (smooth, no hairs or glands), and it is loose, allowing it to twist in the wind, so the blades turn to one side. Dense silky flowers develop in mid July through October. The densely flowered panicle (floral spikelets) is feathery, tawny or purplish, 6–16 inches long, with the branches ascending. When in flower, the glumes (the lower bracts at the base of the flowering spikelet) are glabrous. The glumes are smaller than the lemmas (the bracts at the base of the individual flowers in a grass spikelet).

The non-native genotype of Phragmites is frequently regarded as an aggressive, unwanted invader. It displaces native species that provide valuable forage for wildlife, (Hauber et al 1991). The non-native genotype of Phragmites is a problem when and where stands appear to be spreading while other species typical of the community are diminishing (Marks et al, 1994). Disturbances or stresses such as pollution, alteration of the natural hydrologic regime, dredging, and increased sedimentation favor invasion and spread of Phragmites (Roman et al. 1984). Phragmites is also thought to be the sole known host plant for the Yuma Skipper butterfly (*Ochlodes yuma)*. This skipper is the largest most conspicuous of the tawny, grass–feeding Hesperiine skippers. The skipper is distributed in the Great Basin area ranging from Arizona to south-central Washington. The occurrence of this obligate herbivore indicates the potential presence of a native Phragmites species.

Phragmites australis is found in disturbed and non-disturbed (pristine) sites that hold water, including roadside ditches and depressions. It is typically found in or near wetlands including marshes, swamps, fens, prairie potholes, and marsh upland areas. Phragmites has been known to inhabit areas near freshwater, brackish (slightly saline) and alkaline wetlands in the temperate zones worldwide (Haslam 1972, Roman et al. 1984). *Phragmites* will inhabit any slight depression that has the ability to hold water. *Phragmites* seeds are shed from November through January. When seeds germinate and become established the young plants would usually persist for at least two years in a small, inconspicuous stage where they resemble many other grass species. *Phragmites*' primary mode of reproduction is vegetative, through its extensive rhizomatous network. Individual rhizomes live for 3 to 6 years developing buds at the base of the vertical rhizomes in late summer each year. The buds grow horizontally approximately 1 meter before going dormant until spring. Phragmites is a state-listed class C weed.

MANAGEMENT INFORMATION:
Beall (1984) discourages mowing and disking. Mowing only affects the above ground portion of the plant, so mowing would have to occur annually. To remove the rhizome, disking could be employed. However, disking could potentially result in an increase of Phragmites since pieces of the rhizome can produce new plants. Cross and Fleming (1989) describe successful mowing regimes of several year duration during the summer (August and September) and disking in summer or fall.

Prescribed burning does not reduce the growing ability of Phragmites unless root burn occurs. Root burn seldom occurs, however, because a layer of soil, mud and/or water usually covers the rhizomes. Burning does remove accumulated Phragmites leaf litter, giving the seeds of other species area to germinate. Prescribed burning has been used with success after chemical treatment for this purpose at The Brigantine National Wildlife Refuge, NJ (Beall 1984). Occasional burning has been used in Delaware in conjunction with intensive spraying and water level management. This helps remove old canes and allows other vegetation to grow.
Dredging and draining are methods that have often been used to reduce stand vigor, however, draining and dredging are not appropriate for use on most preserves (Osterbrock, 1984).

Herbicides can be an effective tool for control if adequate coverage can be achieved. There are no biocontrol agents available.

CURRENT DISTRIBUTION
Phragmites is mainly in the Desert Unit but several clones have been observed in many other units.

ACRES AFFECTED BY WEED: ~ 3,000 **WEED DENSITY:** Low to Monoculture

GOALS
Control expanding population
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, fall aerial applications of herbicides on The Desert Unit.
Ground application will also be tried again in select areas on The Desert Unit..
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
2002 – Approximately –0- acres were treated

2003 – Approximately 115 acres were treated
2004 – Approximately 80 acres were sprayed
2005 – Approximately 150 acres were sprayed

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PUNCTUREVINE

Scientific name: *Tribulus terrestris L* **Common name:** Punctureviné

DESCRIPTION: Punctureviné is a prostrate annual herb that grows from a simple, woody taproot. The plant produces numerous stems, up to six feet long, that are much branched and arise from the crown to produce a dense mat. The leaves are opposite, have short petioles, one to three inches long, oblong, pubescent, and divided into pinnate leaflets; each leaflet is about 1/4 inch long. The small, yellow, flowers have five petals and are borne on short stalks at leaf nodes. The fruit is a woody burr with sharp, rigid spines (strong enough to puncture bicycle tires or penetrate shoe soles).

Punctureviné is a serious weed in pastures, roadsides, waste places, and cultivated fields. The spines of the fruit can cause damage to the feet of animals and are a nuisance to children. If growing in orchards or vineyards, it is a problem to the fruit pickers. If grazing animals happen to eat a bur, it may cause injury to the mouth, stomach, and intestines. Generally punctureviné is not grazed, but if it is, it is also toxic. Punctureviné is adapted to warm temperate conditions. It requires relatively high temperatures for germination and growth. It is highly adaptable to a wide range of conditions. Punctureviné prefers light-textured soils, but will grow on almost any type of soil.

Punctureviné reproduces completely by seeds, and there is considerable seed dormancy over the autumn and winter. Seeds germinate in late spring and early summer under suitably moist conditions. Flowers may form within three weeks and continue for several months. Fruits are thus produced through summer and fall. Punctureviné flowers are cross-pollinated by insects. A single plant can produce as many as 400 fruits, each containing two to three seeds. Seed dispersal is by animals and by rubber-tired vehicles. The seeds have an initial dormancy and very few will germinate immediately after development. A germination rate of 84 percent has been reported in six-month-old seed. Seeds may remain viable for many years if buried in the soil. Punctureviné is a state-listed class B weed.

MANAGEMENT INFORMATION:
Repeated cultivation just after germination is an effective control. If burrs are produced before cultivation, it is necessary to remove the plants and burrs and burns them. Two weevils, *Microlarinus lareynii* and *M. lypriformis*, native to India, France, and Italy, have been introduced into the United States as biocontrol agents. The larvae attack the seed and stems and have given reasonably good results. No microorganisms or viruses are known to give control. Herbicides can be an effective tool for control.

CURRENT DISTRIBUTION
Punctureviné is mainly found on the Desert Unit but scattered plants and patches are on other units.

ACRES AFFECTED BY WEED: ~ 25 **WEED DENSITY:** Low

GOALS
Control expanding populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by puncturevine
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering populations

ACTIONS PLANNED
In 2006, puncturevine will be spot sprayed as found.
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TRENDS
Puncturevine is just spot sprayed in conjunction with other spray activities so no hard numbers are available.

REFERENCES:
Johnson, E. 1932. The puncturevine in California. Univ. of Calif. Agric. Expt. Sta. Bull. 528: 42 pp.

Parsons, W.T. 1973. The Noxious Weeds of Victoria. Inkata Press, Melbourne.

Squires, V.R. 1979. The biology of Australian weeds. 1. *Tribulus terrestris* L. J. of the Australian Inst. of Agric. Sci. 179: 75-82.

U.S. Department of Agriculture. 1970. Selected Weeds of the United States. Agric. Hndbk. No. 366. USDA-ARS, Washington, D.C.

PURPLE LOOSESTRIFE

Scientific name: *Lythrum salicaria L* **Common name:** Purple loosestrife

DESCRIPTION: Purple loosestrife is a perennial, emergent aquatic plant (Thompson, et al. 1987; Malecki, 1991). As many as 30 -50 herbaceous, erect, annual stems rise to about nine feet tall from a persistent perennial tap root and spreading rootstock. Short, slender branches spread out to form a crown five feet wide on established plants (Thompson, et al. 1987). The somewhat squarish stems are four to six sided, with nodes evenly spaced. Stems submerged under water develop aerenchyma tissue characteristic of aquatic plants. The stalk less leaves can be opposite or decussate (opposite with alternating pairs at 90 degree angles) or sometimes in whorls of three, near the base. The upper leaves and floral bracts can be alternate (Mal, et al. 1992). The leaves are 1 ½ to four inches long, wider and rounded or heart-shaped at the base. Leaf shape varies from lanceolate to narrowly oblong, and the leaves are sometimes covered with fine hairs. Light levels influence the variability in pubescence and leaf shape - leaf area increases and fine hairs decrease with lower light levels.

The showy, magenta flowering stems end in a 4-16 inch flowering spike. Flowers appear from July to early October. The (usually) magenta flowers are in pairs or clusters of the upper leaf axils. Each flower is complete, containing five to seven petals, with the same number of sepals as petals, and twice as many stamens as petals. Typical flowers have six sepals, six petals and twelve stamens. The ovary is superior, with two fused carpels. The narrow, wrinkled petals are from 1/4 to 5/8 inch long. The petal color can range from white to pink to red to purple. The fruit is a two-valved capsule enclosed in the pubescent calyx. The pollen grain color and size varies, depending on the style length of the flower. The negative impact from purple loosestrife establishment in wetland habitat far outweighs any economic gain from horticultural or medicinal uses (Blossey and Schroeder 1992, Thompson et al. 1987). Wetland ecosystems are altered. Purple loosestrife is invasive and competitive and unavailing to native wildlife. It can quickly adapt to environmental changes and expand its range to replace native plants used for ground cover, food, or nesting material. Loosestrife stands are dense at the top, and open at the base. Structures of root masses create a three-foot opening, in the water, between plants. This provides no cover for nesting ducks (Timmerman 1992). Large loosestrife infestations are hard to mow and manage. Recreational hunting or trapping grounds are lost, decreasing the land value to those that own or manage operational wetlands.

Cutting alone is not a control option for purple loosestrife. Shoots and adventitious roots will develop. Cutting late in the season reduced shoot production more than mid summer cutting, indicating that carbohydrate reserves could not be restored for next year’s growth. Purple loosestrife is a state-listed class B weed.

MANAGEMENT INFORMATION:
In 1992 three beetles were released in Washington. Their damaging impact on purple loosestrife populations was evident in the Winchester Wasteway area of Grant County in

1997. Biological control agents may provide the long-term success in controlling this noxious weed. *Galerucella calmariensis* and *G. pusilla* - are both leaf-feeding chrysomelids. These beetles defoliate, and attack the terminal bud area, drastically reducing seed production. The mortality rate to purple loosestrife seedlings is high. Evidence of *Galerucella* ssp. damage is round holes in the leaves. Four to six eggs are laid on the stems, axils, or leaf underside. The larvae feed constantly on the leaf underside, leaving only the thin cuticle layer on the top of the leaf. By 1996 populations of *Galerucella* ssp. visibly impacted purple loosestrife stands in the Winchester Wasteway. Herbicides can be an effective tool for control.

CURRENT DISTRIBUTION
Purple loosestrife infestations are the heaviest on the Desert Unit, the Quincy Lakes Unit, and the Lower Crab Creek Unit. Some healthy populations are also found on several other units.

ACRES AFFECTED BY WEED: ~ 15,000 **WEED DENSITY:** Spotty to Dense

GOALS
Control expanding populations
Prevent new occurrences
Add to bio-control distribution

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Purple loosestrife
Release biological controls
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, herbicide applications will be done on critical populations.
Biological agents will be gathered and distributed to new areas.
Monitoring will continue on an annual basis.

CONTROL SUMMARY AND TREND
2002 – Approximately 10 acres were treated
2003 – Approximately 12 acres were treated
2004 – Approximately 3 acres were treated
2005 – Approximately 8 acres were treated

REFERENCES:
*Thompson, D.Q., R.L. Stuckey and E.B. Thompson. 1987. Spread, Impact and Control of Purple Loosestrife (*Lythrum salicaria*) in North American wetlands. United States Fish

and Wildlife Service, Fish and Wildlife Research No. 2. United States Department of Interior, Washington, D.C. 55pp.

*Malecki, R. A., S. Hight, L. Kok, D. Schroeder, and J. Coulson. 1991. Information for the Preparation of an Environmental Assessment. Host plant specificity testing of *Hylobius transversovittatus, Galerucella calmarienses* and *G. pusilla* for use in the biological control of *Lythrum salicaria* L. in North America. New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Fernow Hall, Cornell University, Ithaca, NY. 79 pp.
954.

*Mal, T.K., J. Lovett-Doust and L. Lovett-Doust. 1992. The biology of Canadian weeds. 100. *Lythrum salicaria.* Canadian Journal of Plant Science. Pp 1305 - 1331.

*Blossey, B. and D. Schroeder. 1992. Final Report. Biocontrol of Lythrum salicaria in the United States. Sponsored by subagreement No. 20057-57083 with the Cornell University under cooperative agreement No. 14-16-0009-1553 from the US Dept. of the Interior, Fish and Wildlife Service, the Washington State Dept. of Agriculture and the Washington State Dept. of Wildlife.

*Timmerman, K. 1992. Purple Loosestrife: Noxious Knockout. Idaho wildlife: Vol. 12, no. 2. (spring 1992) pp 26-27.

RUSH SKELETONWEED

Scientific name: *Chondrilla juncea L* **Common name:** Rush skeletonweed

DESCRIPTION: Rush skeletonweed belongs to the chicory tribe of the sunflower family. This herbaceous perennial ranges from one to four feet tall, with a taproot reaching down seven feet, or more. The seedlings have a long thin taproot. Rush skeletonweed over winters as a rosette of hairless, basal leaves that are two to five inches long and ½ to 2 inches wide and broader at the tip. The lateral lobes point back toward the base - very similar to a dandelion. The mature plant consists of a dark green, nearly leafless flowering stem, with many aerial branches. The basal rosette is absent at this stage. The stem and aerial branches support a few leaves, which are narrow and linear, and mostly entire. A distinguishing characteristic of rush skeletonweed is the presence of coarse, downward pointing brown hairs near the base of the stem. The stems and roots of rush skeletonweed exude a white latex sap when cut. The flower heads, about ½ inch in diameter, grow along the stem in the leaf axils or at the branch tips, and they are found individually or in clusters of two to five. Each flower head has 7-15 (usually 11) ray flowers, with yellow ligules resembling petals. These yellow ligules are strap shaped with small teeth across the blunt end. Mature, vigorous plants can produce 1,500 flower heads, with the capability of producing 20,000 seeds. The immature seeds are greenish-white, and they gradually darken to a yellow-brown or olive-green in the 13-15 days it takes to mature. The seed color can be used as an indication of maturity, with light colored seeds showing low germination rates (Old 1981). Each seed has a pappus, which is capable of carrying seeds along wind currents up to 20 miles (Cuthbertson 1967 and Schirman and Robocker 1967 as cited in McLellan 1991).

Rush skeletonweed is a threat to irrigated lands of the Columbia Basin, to the sandy soils of dry land wheat areas (Old 1981), and it is a threat to rangelands. Rangeland infestations impact the cattle industry when rush skeletonweed displaces native or beneficial forage species grazed by livestock and wildlife. Forage production is lowered when rush skeletonweed successfully out competes beneficial species for limited resources, particularly nitrogen. Often, the cost of herbicide control is not economical due to low productivity of the land (Sheley).

Rush skeletonweed prefers two soils types found in the pacific northwest: the sandy to gravely and well drained soils typical in the glacial lobe soils of Spokane, and the shallow soils over bedrock, typical in the channeled scablands. Roadside populations of rush skeletonweed are established when the seed is moved along transportation routes. Plant fragments can develop in areas not conducive to seedling establishment, with contaminated cultivation machinery responsible for the majority of this type of spread (Old 1981). Rush skeletonweed is a state-listed class B weed.

MANAGEMENT INFORMATION:
Using beneficial forage species for competition, will not suppress the dominance of rush skeletonweed. A more integrated approach using both plant competition and biological

control agents often result in better control then either method used separately (Groves and Williams 1975 as cited in Prather 1993; Prather 1993). Continual grazing as a control method decreased the populations of rush skeletonweed when seed production was prevented, but rotational grazing increased the plant densities (Kohn and Cuthbertson 1975 as cited in McLellan 1991).

Any mechanical damage to the plant stimulates new growth, often resulting in satellite plants. Root fragment regeneration depths varied with fragment size and soil type, with sandy soils producing regeneration from greater depths than clay soils. Cultivation as a control method can be considered on seedlings less than 36 days old, as they are unable to develop roots from root fragments (Old 1981). Frequently mowing rush skeletonweed plants infested with and impacted by the gall mite (*Eriophyes chondrillae*) may decrease the rate of spread of this plant (McLellan 1991). The gall midge (*C. schmidti*) was introduced to California in 1975, and is established throughout the Pacific Northwest. The gall midge impacts the rosette and flowering stems of all biotypes in this region, and affected stands are often a noticeable purple to reddish color (Martin 1996; Rees et al. 1996).

The rust fungus, *P. chondrillina*, was introduced to Washington in 1978. The early-flowering rush skeletonweed biotype in Washington and Idaho, and the late-flowering biotype in Oregon are resistant to this rust (Martin 1996; Rees et al. 1996). A gall mite (*Eriophyes chondrillae*) was introduced to Washington in 1979, and it is considered the most effective biological control agent available, to date. This mite is effective against all biotypes of rush skeletonweed. The visible impacts to flowering buds are leaf-like galls, up to two inches in diameter, which can reduce or prevent seed production. The gall mite also affects the roots carbohydrate reserves, preventing the formation of satellite plants. The seedlings and satellite plants often die. Soil disturbance associated with cultivation in croplands interferes with the life cycle of the mite, and as a result, there is a reduction in the persistence of gall mite infestations to rush skeletonweed (Martin 1996; Rees et al. 1996). Rush skeletonweed often remains the dominant species in gall-infested populations.

CURRENT DISTRIBUTION
Rush Skeletonweed is mainly found on the Gloyd Seeps Unit but it is also found on several other units.

ACRES AFFECTED BY THE WEED: ~ 2500 **WEED DENSITY:** Low to Medium

GOALS
Control expanding populations
Prevent new occurrences
Add to bio-control distribution

OBJECTIVES
Survey and map existing populations

More accurately calculate the acres affected by Rush skeletonweed
Release biological agents
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, the Gloyd Seeps will be surveyed and spot treated in the spring using herbicide
Biological agents will be released in early summer
Monitoring will continue on an annual basis on nearby units

CONTROL SUMMARY AND TREND
2002 – Approximately 35 acres were treated
2003 – Approximately 14 acres were treated
2004 – Approximately 67 acres were treated
2005 – Approximately 40 acres were treated

REFERENCES:
McLellan, P. W. 1991. Effects of Mowing on the Efficacy of the Gall Mite, *Eriophyes chondrillae*, on rush skeletonweed, *Chondrilla juncea*. Master of Science Thesis in entomology. Washington State University. Pp. 51.

Old, R. 1981. Rush skeletonweed (*Chondrilla juncea* L.) It's biology, ecology and agronomic history. A master's thesis, Washington State University, Department of Agronomy. 92 pp.

Sheley, R., J. M. Hudak and R. T. Grubb. (not yet published). Rush skeletonweed chapter from: Biology and Management of Noxious Rangeland Weeds.

Prather, T. S. 1993. Combined Effects of Biological Control and Plant Competition on Rush Skeletonweed. A dissertation in partial fulfillment for the degree of Doctor of Philosophy with a major in plant sciences. University of Idaho. 63 pp.

Martin, M. E. 1996. Rush skeletonweed (Chondrilla juncea) and Parasitic Associates: A Synopsis of Selected Information. Web site:
http://infoweb.magi.com/~ehaber/skeleton.html.

Rees, N. and P. Quimby, G. Piper, E. Coombs, C. Turner, N. Spencer and L. Knutson (eds.), 1996. Rush skeletonweed; *Cystiphora schmidti*; *Eriophyes chondrillae*; *Puccinia chondrillina*. Biological Control of Weeds in the West. Western Society of Weed Science in cooperation with USDA Agricultural Research Service, Montana Department of Agriculture and Montana State University.

SALTCEDAR

Scientific name: *Tamarix ramosissima L.* **Common name:** Saltcedar

DESCRIPTION:
Salt cedar plants are spreading shrubs or small trees, 5-20 feet tall, with numerous slender branches and small, alternate, scale-like leaves. The pale pink to white flowers is small, perfect and regular, and arranged in spike-like racemes. The distinct petals and sepals occur in fours or fives. The fruit is a capsule (Hitchcock and Cronquist 1961). As an aggressive colonizer that is able to survive in a wide variety of habitats, saltcedar often forms monotypic stands, replacing willows, cottonwoods, and other native riparian vegetation. The stems and leaves of mature plants secrete salt, forming a crust above and below ground that inhibits other plants (Sudbrock 1993). Saltcedar is also an enormous water consumer. A single large plant can absorb 200 gallons of water a day (Hoddenbach 1987), although evapotranspiration rates vary based on water availability, stand density, and weather conditions (Davenport et al. 1982). Saltcedar's high water consumption further stresses native vegetation by lowering ground water levels and can also dry up springs and marshy areas. Paradoxically, saltcedar infestations can also lead to flooding, as its extensive root system can choke streambeds (Rush 1994).

Infestations also have detrimental impacts on wildlife. Saltcedar seeds have almost no protein and are too small to be eaten by most animals. In addition, its scale-like leaves offer little suitable forage for browsing animals (Hoddenbach 1987). Studies indicate that saltcedar is not favored bird habitat. In their study of habitat use by birds along the lower Colorado River, (Anderson and Ohmart 1977) found that saltcedar stands supported only four species per hundred acres, as opposed to 154 species per hundred acres of native vegetation.

Seedlings establish most frequently in soils that are seasonally saturated at the surface. It appears to grow best in saline soils (up to 15,000 ppm sodium), but saltcedar is adaptable and tolerant of a wide variety of environmental conditions (Brotherson and Field 1987). A single mature saltcedar may produce hundreds of thousands of seeds between April and October (Sudbrock 1993). The tiny, hairy, pollen-sized seeds are widely dispersed by wind and water throughout the growing season, and they will germinate within 24 hours of moistening. In Arizona, seeds have been known to germinate in May and June, while floating on water. Early seedling growth is slow, but older seedlings grow rapidly and are tolerant of submergence, saline soils, and drought (Frasier and Johnsen 1991); seedlings may grow up to a foot a month in early spring (Sudbrock 1993). Once saltcedar is established, not even dramatic changes in soil moisture will completely eliminate it, as long as abundant ground water is available (Frasier and Johnsen 1991).

Saltcedar spreads by seed and also resprouts vigorously from roots if the top portion of the plant is damaged or removed. It can also readily establish from cuttings, if buried in moist soil (Frasier and Johnsen 1991). Saltcedar is a state-listed class B weed.

MANAGEMENT INFORMATION:
Because of saltcedar's ability to resprout from roots, many mechanical methods are largely unsuccessful. Root plowing 35 to 60 cm deep with a cutting blade equipped with fins to pull up roots and buried stems can be effective but destroys other vegetation as well (Frasier and Johnsen 1991). It is advisable to remove cut brush from a treated site (Sudbrock 1993). Effective control projects often utilize both mechanical and chemical control methods (see above).

A feasibility study, funded in part by the Bureau of Reclamation, has been done on the biological control of saltcedar. Research has indicated approximately a dozen insect species that might be used to fight saltcedar (Hays 1989). Currently none are available. Herbicides can be an effective tool for control.

CURRENT DISTRIBUTION
Saltcedar has been found in scattered locations throughout most of the Columbia Basin Wildlife Area.

ACRES AFFECTED BY WEED: ~ 50 **WEED DENSITY:** Low

GOALS
Control expanding populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Saltcedar
Treat all plants that can be reached before they produce seed
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, many areas will be surveyed and spot treated using herbicide.
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
2002 – Approximately 50 acres were treated
2003 – Approximately 32 acres were treated
2004 – Approximately 36 acres were treated
2005 – Approximately 40 acres were treated

REFERENCES:
Hitchcock, C.L. and A. Cronquist. 1961. Vascular Plants of the Pacific Northwest. Volume 3: Saxifragaceae to Ericaceae. University of Washington Press, Seattle.

Sudbrock, A. 1993. Tamarisk control. I. Fighting Back: An overview of the invasion, and a low-impact way of fighting it. Restoration and Management Notes 11: 31-34.

Hoddenbach, G. 1987. Tamarix control. Tamarisk control in southwestern United States. Cooperative National Park Resources Studies Unit, Special Report No. 9: 116-125.

Davenport, D.C., P.E. Martin, and R.M. Hagan. 1982. Evapotranspiration from riparian vegetation: Water relations and irrecoverable losses for saltcedar (*Tamarix chinensis*). Journal of Soil and Water Conservation 37: 233-236.

Davenport, D.C., P.E. Martin, and R.M. Hagan. 1982. Evapotranspiration from riparian vegetation: Conserving water by reducing saltcedar transpiration. Journal of Soil and Water Conservation 37: 237-239.

Meeting of the Society for Ecological Restoration.

Rush, E. 1994. Strangers in the wilderness. Pacific Horticulture 55: 20-23.

Anderson, B.W. and R.D Ohmart. 1982. Revegetation for wildlife enhancement along the lower Colorado River. Final report to the U.S. Bureau of Reclamation, Boulder City, Nevada.

Brotherson, J.D. and D, Field. 1987. *Tamarix:* Impacts of a successful weed. Rangelands 9: 110-112.

Hays, S.M. 1989. Scientists fight brush with imported insects. Agricultural Research 37: 16-17.

RUSSIAN OLIVE

Scientific name: *Elaeagnus angustifolia L.* **Common name:** Russian olive

DESCRIPTION:
Russian olive is a small, usually thorny shrub or small tree that can grow to 30 feet in height. Its stems, buds, and leaves have a dense covering of silvery to rusty scales. Leaves are egg or lance-shaped, smooth margined, and alternate along the stem. At three years of age, plants begin to flower and fruit. Highly aromatic, creamy yellow flowers appear in June and July and are later replaced by clusters of abundant silvery fruits.

Russian-olive can out compete native vegetation, interfere with natural plant succession and nutrient cycling, and tax water reserves. Because Russian olive is capable of fixing nitrogen in its roots, it can grow on bare, mineral substrates and dominate riparian vegetation where overstory cottonwoods have died. Although Russian olive provides a plentiful source of edible fruits for birds, ecologists have found that bird species richness is actually higher in riparian areas dominated by native vegetation.

Russian olive is found along streams, fields and open areas. Seedlings are tolerant of shade and it thrives in a variety of soil and moisture conditions, including bare mineral substrates. Establishment and reproduction of Russian olive is by primarily by seed, although some vegetative propagation also occurs. The fruit of Russian olive is a small cherry-like drupe that is readily eaten and disseminated by many species of birds. Russian olive is a state-listed class C weed in Weed district #3.

MANAGEMENT INFORMATION:
Mowing hedges with a brush type mower, followed by removal of cut material may be the most effective method for eradication. Herbivorous animals are not known to feed on it and few insects seem to utilize or bother it. Canker disease is occasionally a problem but not enough to be useful as a control agent. Establishment and reproduction of Russian olive is by primarily by seed, although some vegetative propagation also occurs. Herbicides can be an effective tool for control.

CURRENT DISTRIBUTION
Russian olive is found on all units.

ACRES AFFECTED BY WEED: ~ 10,000 **WEED DENSITY:** Low to Dense

GOALS
Control expanding populations
Prevent new occurrences

OBJECTIVES
Survey and map existing populations
More accurately calculate the acres affected by Russian olive

Treat problem plants before they can produce seeds
Survey nearby units for pioneering infestations

ACTIONS PLANNED
In 2006, some areas will be surveyed and spot treated using herbicide
Monitoring will continue on an annual basis on nearby units.

CONTROL SUMMARY AND TREND
2002 – Approximately 65 acres were treated
2003 – Approximately 72 acres were treated
2004 – Approximately 93 acres were treated
2005 – Approximately 60 acres were treated

REFERENCES:
Knopf, F.L., and T.E. Olson. 1984. Naturalization of Russian-olive: implications for Rocky Mountain wildlife. Wildlife Society Bulletin 12:289-298.

Shafroth, P.R., G.T. Aubla, and M.L. Scott. 1995. Germination and establishment of the native plains cottonwood (Populus deltoides Marshall subsp. moniifera) and the exotic Russian-olive (Elaeagnus angustifolia L.). Conservation Biology 9:1169-1175.

GENERAL WEEDS

DESCRIPTION: General weeds describe mixed vegetation that interferes with maintenance, agriculture, or restoration activities, where keying individual species is not appropriate. A general weed is vegetation that may occur along road sides and in parking areas, agricultural fields, or infest areas targeted for restoration. General weeds include cheatgrass (*Bromus tectorum*), Kochia *(Kochia scoparia L.*), Russian thistle (*Salsola iberica*), Jim Hill mustard (*Sisymbrium altissimum*), and Common cocklebur (*Xanthium strumarium L.*).

MANAGEMENT INFORMATION:
Herbicide treatment and mechanical control are affective control treatments.

CURRENT DISTRIBUTION
General weeds can be found on all units of the Columbia Basin Wildlife Area.

ACRES AFFECTED BY WEEDS ~ 10,000 **WEED DENSITY**: Low to high

GOALS
Maintain public access
Reduce fire danger
Restore perennial native grasses.

OBJECTIVES
Treat roadsides and parking areas with residual herbicides to reduce fire hazard.
Treat fire breaks to reduce fire hazard.
Treat restoration areas for summer fallow.
Treat newly planted areas to reduce competition.

ACTIONS PLANNED
General weeds are only controlled under two circumstances. Herbicides with residual quality are applied to roadsides and parking areas in an attempt to reduce or eliminate the fuel load in the areas most likely to be the source of wildfire. Firebreaks are maintained with residual herbicides to protect high quality shrub-steppe habitats. This scenario is by far and away the highest priority for controlling these general weeds. On a smaller scale, general weeds are controlled in a pre-planting fallow strategy where total vegetation elimination is the goal. By eliminating all general weeds in a fallow rotation, competition with planted perennial native vegetation is reduced. Fallowing may be accomplished mechanically or with non-selective herbicide application. Follow up applications of selective herbicides are routinely applied on newly established perennial native grass plantings to further eliminate competition for scarce resources. Some grazing permits are designed to target cheatgrass by concentrating grazing in the winter or early spring. Cheatgrass is a winter annual, sprouting before desirable native grasses. Concentrating grazing on cheatgrass should reduce the vigor of the plant.

CONTROL SUMMARY AND TREND
2002 – Approximately 20 acres treated
2003 - Approximately 35 acres treated
2004 - Approximately 50 acres treated
2005 - Approximately 50 acres treated

Roadsides and parking areas have required consistent yearly maintenance. Approximately half of the access roads and parking areas are targeted during the fall herbicide application effort, the remaining half is treated early in the spring.

APPENDIX 3. FIRE MANAGMENT PLAN

Responsible Fire-Suppression Entities

The Columbia Basin Wildlife Area falls primarily within the jurisdiction of Grant County Fire Protection Districts (FPD's). Fires that occur on unprotected lands not included within any of the Grant County Fire Protection Districts will fall under the jurisdiction of the Department of Natural Resources (DNR). Most of the unprotected lands of the Columbia Basin Wildlife Area are WDFW controlled federal lands. Fires that occur within the FPD's (exhibit A) are the responsibility of the FPD's and fires that occur within the State Fire Protection Boundary are the responsibility of the DNR (exhibit B). Therefore, depending upon where the fire occurs, the appropriate entity must be contacted first, followed by notification of the 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.

WDFW pays an annual fee to Grant County FPD's to maintain an existing fire protection services contract. This fee is in addition to Payment In Lieu of Taxes (PILT) that is paid to the county and is based on the assessed value of the Wildlife Area within their district. Suppression on WDFW lands within the State Fire Protection Boundary is performed by DNR. WDFW will receive itemized invoices from DNR for reimbursement of expenses. Cost sharing is appropriate when wildfires involve both WDFW and DNR lands. Cost will be shared at a portion of acreage burned within respective ownership boundaries or by some other equitable basis.

Department Fire Management Policy

It is WDFW policy that wildlife area staffs are not firefighters and should not fight fires. Wildlife Area Staff that are trained in fire fighting and fire behavior will only provide logistical support and information regarding critical habitat values to the Incident Commander of the responding fire fighting entity.

Wildlife Habitat Concerns

The Columbia Basin Wildlife Area contains shrub-steppe habitat components critical to the survival of Washington ground squirrels. Due to the low numbers of ground squirrel colonies in the basin, WDFW requests that the Incident Commander or other fire fighting personnel on site notify WDFW personnel immediately in the order listed below. A WDFW Advisor will provide information to the Incident Commander regarding habitat concerns.

Aerial Support

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

Reporting
Report any fire on or adjacent to all units of the Columbia Basin Wildlife Areas by contacting the appropriate fire protection districts (FPD's), DNR dispatch office, and WDFW staff (See contacts below). It is absolutely critical that any fire on the Columbia Basin Wildlife Areas is attacked as aggressively as possible during the initial attack. The importance of aerial support cannot be overstated.

Lands covered under Local Fire District Contracts

Fire Protection Districts -DIAL 911 or call Mac Dispatch Buss. Line 762-1160

Banks Lake - On the north end advise FPD # 14. 633-0529 Chairman of the board: Kary Byam 633-9591 (Cell 631-0274)
From Steamboat south, advise FPD # 6. 639-2522 Fire Chief: Daryl Dormaier 639-0154 (Cell 641-0330) 2nd in command Ron Thomas 639-2675
Most fires will stay below the cliffs.

Billy Clapp Lake - Advise FPD #12. 345-2375 Fire Chief: Daryl Moordhurst (Cell 760-2240)

Sun Lakes – Advise FPD #7. 246-0321. Fire Chief: Kirk Shepard (Cell 750-0752)

Gloyd Seeps – Advise FPD #5 Fire Chief Roger Hanson
Business phone 765 3175, Dispatch 762-1160, Emergency 754-3276.
The western part of this area has burned many times. Protect trees and big sage.

Quincy Lakes – Advise FPD #3 787-2713. Fire Chief: Don Fortier (Cell 797-5007)
Protect access facilities, trees, and shrubs.

Winchester Lake – Advise FPD #3 787-2713. Fire Chief: Don Fortier (Cell 797-5007)
Try to keep fire out of sagebrush and protect adjacent private lands.

The Desert – several fire districts cover this area, Advise FPD #15. 765-3175 and they can notify the appropriate district.
Protect accesses, power poles, and private lands.

Potholes – Advise FPD #5 765-3175 Fire Chief Roger Hanson
Protect sagebrush and shrubs.

Seep Lakes - Advise FPD #4 349-2471 Fire Chief: Bob Whitaker 349-2284 (Cell 750-0833)
Try to stop fires at roads and other barriers. Protect adjacent private land.

Goose Lakes – Advise FPD #11 Fire Chief: Garth Gunter (Cell 750-8291).
Try to stop fires at roads and other barriers. Protect adjacent private land.

Lower Crab Creek – Advise FPD #10 346-2658 Fire Chief: Bill Greenway
(Cell 989-2436).
Access is poor. All fires should be contained as soon as possible.

Priest Rapids And Block 26 – Advise FPD #8 932-4777 Fire Chief: Dave Hargroves
Protect sagebrush in block 26 units and shrubs at Buckshot access.

Sprague Lake – Advise FPD # 4 Fire Chief: Carl Harder 257-2884
2nd in command Henry Harder 257-2351

Lands covered under DNR MOU

DNR - receives requests from WDFW for emergency wildfire suppression services and resources through the Central Washington Interagency Communication Center (CWICC) Contact in order listed and request Operations Coordinator or Center Manager.

Fire Reporting Emergency 800-826-3383
General Business 509-884-3473
Normal Business 509-663-8575

Banks Lake
T27N, R30E; DFW Portions of sec. 6 & 7.
T27N, R29E; DFW Portions of sec. 12 & 13.
T26N, R28E; DFW Portions of sec. 26, 27, 34, & 35.
T25N, R28E; DFW Portions of sec. 2, 3, 4, 9, 11, 14, 16, 20, 21, 22, 23, 27, 29, 31, 32, 33, 34, & 35.

Sun Lakes
T27N, R30E; DFW Portions of sec. 2 & 10.

The Desert
T18N, R26E; DFW Portions of sec. 25, 26, 27, 34, 35, & 36.
T18N, R27E; DFW Portions of sec. 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, 34, & 35.

Seep Lakes
T17N, R29E; DFW Portions of sec. 3, 4, 5, 6, 7, 17, 18, 20, 22, 28, 29, & 32.

Goose Lakes
T17N, R28E; DFW Portions of sec. 12, 13, 23, 25, 26, & 35.

Department of Fish and Wildlife - contact in order listed when fires are reported on WDFW lands: (all personnel with radios monitor DNR Common and DNR repeaters).

NAME	POSITION	OFFICE PHONE	HOME PHONE	RADIO
Greg Fitzgerald	Wildlife Area Mgr.	509-765-6641	509-246-1855	W426
Brian Cole	Asst Wildlife Area Mgr.	509-765-6641	509-762-2212	W424
Matt Monda	WL Program Mgr.	509-754-4624	509-754-0469	W949
Steve Dauma	Enforcement Captain	509-754-4624	509-989-0138	W12
Dennis Beich	Regional Director	509-754-4624	509-754-6323	*
WDFW Regional Office		509-754-4624		WL BASE 2
State Patrol Office (Moses Lake)		509-765-6171		
State Patrol Office (Ephrata)		509-754-3571		

Fish and Wildlife officers are not directly involved with fire control, but may be a field contact person that will respond to a fire. They monitor all law enforcement frequencies, DNR Common and DNR repeaters. Detachment 16 covers Grant, Adams, and South Douglas Co.

NAME	RADIO	CELL PHONE	HOME PHONE
Chris Anderson (Sergeant)	W21	509-750-9771	509-764-0345
Steve Crown	W139	509-989-0391	509-754-4660
Mike Jewell	W80	509-398-1015	509-764-8645
Justin Steinhoff	W89	509-750-8250	509-765-3818
Drew Becker	W85	509-398-1034	509-488-3476

APPENDIX 4. WATER RIGHTS

Table 2. Water Rights

File	Stat	Doc.	Purp.	Qi	UOM	Qa	Acres	TRS	1/4	Unit
G3-093622CL	A	Claim L	IR		GPM			25N 28E 35		
S3-*19283ALJWRIS	A	ADJ CERT	DS,IR,ST	8.53	CFS	2,816	640	16N24E 32	N2/ SW	Crab Cr
S3-*14548ALPWRIS	I	PERMIT	IR	6.5	CFS		325	16N 24E 34	NE/SW	Crab Cr
G3-+00768SWRIS	A	CERT	DS,IR,ST	1,700	GPM	200	50	16N 25E 25	SW/SW	Crab Cr
S3-*14547PWRIS	I	PERMIT	IR	5	CFS		250	16N 25E 25		Crab Cr
S3-*14447ALPWRIS	I	PERMIT	IR	12.14	CFS		607	16N 25E 31		Crab Cr
G3-121368CL	A	CLAIM S	DG,IR,ST					16N 25E 36		Crab Cr
G3-093623CL	A	Claim L	ST		GPM			17N 25E 03		Desert
G3-046057CL	A	Claim L	DG		GPM			17N 27E 10		Desert
G3-093624CL	A	Claim L	ST		GPM			17N 27E 12		Desert
S3-*12243AWRIS	I	New App	FS	30	CFS			17N 28E 14		Desert
S3-*12244AWRIS	I	New App	FS	25	CFS			17N 28E 14		Desert
S3-*12242AWRIS	I	New App	FS	20	CFS			17N 28E 16		Desert
G3-093625CL	A	Claim L	No ID		GPM			18N 26E 20		Desert
G3-159743CL	A	CLAIM S	DG,IR,ST					17N 26E 11		Desert
G3-159744CL	A	CLAIM S	DG,IR,ST					17N 26E 11		Desert
G3-002523CL	A	CLAIM L	DG					17N 27E 09		Desert
G3-093621CL	A	Claim L	IR		GPM			19N 25E 30		Gloyd Seeps
G3-*09640AWRIS	I	New App	IR	124	GPM	100	30	20N 28E 04		Gloyd Seeps
G3-093619CL	A	Claim L	IR		GPM			20N 28E 04		Gloyd Seeps
G3-046055CL	A	Claim L	IR,DG		GPM			20N 28E 10		Gloyd Seeps
S3-148690CL	A	CLAIM L	IR				150	21N 27E 01		Gloyd Seeps
G3-047136CL	A	CLAIM L	ST					21N 27E 12	SE/NE	Gloyd Seeps
G3-047138CL	A	CLAIM L	DG					21N 27E 12	SE/NE	Gloyd Seeps
S3-*19250JWRIS	A	ADJ CERT	DS,IR,ST	4	CFS	1,320	300	21N 27E 16	NE/NW	Gloyd Seeps
S3-047137CL	A	CLAIM L	ST					21N 28E 07		Gloyd Seeps
G3-116348CL	A	CLAIM L	DG,IR,ST				40	21N 28E 18	SE/SE	Gloyd Seeps
S3-*14514AWRIS	I	NEW APP	IR	2	CFS		60	21N 28E 18	NE/SE	Gloyd Seeps
S3-119257CL	A	CLAIM L	IR				40	21N 28E 18	S2	Gloyd Seeps
R3-*21680CWRIS	A	Cert	FS,WL,RE		CFS	50		21N 28E 32	SW/NE	Gloyd Seeps
R3-00487CWRIS	A	Cert	WL,FS		CFS			21N 28E	NW/SW	Gloyd

						19.5		33		Seeps
G3-094322CL	A	Claim L	IR		GPM			22N 27E 25		Gloyd Seeps
G3-046056CL	A	Claim L	IR		GPM			22N 27E 36		Gloyd Seeps
G3-093620CL	A	Claim L	IR		GPM			22N 27E 36		Gloyd Seeps
R3-24571C	A	Cert	FS,WL,RE		CFS	150		16N 24E 30	NE/SE	Crab Cr
G3-046053CL	A	Claim L	DG		GPM			16N 25E 25		Crab Cr
G3-046054CL	A	Claim L	IR,DG		GPM			16N 25E 25		Crab Cr
G3-22054	A	Pmt	IR	670	GPM	366.8	67	16N 25E 25		Crab Cr
G3-26354AWRIS	I	New App	IR	1,000	GPM		100	16N 25E 25		Crab Cr
G3-004440CL	A	CLAIM L	DG					16N 36E 30		UWR
G3-24698C	A	Cert	IR	675	GPM	357.5	100	14N 23E 09	SW/NW	Priest Rapids
S3-*22119CWRIS	A	Cert	IR	1.5	CFS	303	75	14N 23E 09	NW/SW	Priest Rapids
S3-*23427ALAWRIS	I	New App	FS	90	CFS			21N 27E 09		Rocky Ford
S3-26356ALAWRIS	I	New App	FS	90	CFS			21N 27E 09		Rocky Ford
S3-005798CL	A	Claim L	No ID		CFS			21N 27E 16		Rocky Ford

Abbreviations:

Qi: Instantaneous quantity
Qa: Annual quantity
A: Active
I: In active
IR: Irrigation
DS: Domestic single
ST: Stock water
DG: Domestic ground
FS: Fish
WL: Wildlife
GPM: Gallons per minute
CFS: Cubic feet per second

APPENDIX 5. AGRICULTURAL LEASE AND GRAZING PERMIT JUSTIFICATIONS

Name of Agricultural Permit: Rice
Permit # BL-05 Steamboat Rock
Permit History: Farming began in 1977
Grant County – Region 2
Banks Lake Unit

Overview: Farming of the Steamboat Rock area began in 1977. However, due to the remote location and logistics for a willing farmer, WDFW and the current lessee have collaborated on a plan to return the agricultural fields to native vegetation.

Permit Goals & Objectives:
Enhance and maintain pheasant/upland bird cover, produce grain for wildlife food, and provide upland bird and goose hunting opportunities, and wildlife viewing opportunities.

Wildlife & Habitat Resource Issues:
Several Bald Eagle nesting locations occur on or near the 360 acres. Protection from disturbance should be provided during nesting and brood rearing seasons to ensure success.

Purpose of Lease:
The purpose of this lease is to restore this area to native vegetation by fall of 2007 that will provide permanent food and cover for wildlife. The land will be managed for multi-purpose recreation.

Terms of the Lease:
Legal description: Township 27 North, Range 29 East, W.M., Portions of Sections 11, 14, 15, and 22 west of Highway 155 and south of Steamboat Rock State Park, containing 360 acres more or less. The term of this lease shall be 3 years commencing 01/01/04 and terminating 12/31/07. Funding Plan: All the DCP farm program payments for 2004 through 2007 (~ $25,840) will go to Wayne Rice in exchange for establishing the 315 acres of native grasses and for planting the 24 acres of wildlife grain each year. DFW will use existing O&M allotments for all the weed control expenses and all of the 2007 expenses.

Name of Agricultural Permit: Allen Miller
Permit # GS-05
Permit History: 1970
Grant County – Region 2
Gloyd Seeps Unit

Overview:
This farm unit has been in production since 1970. Various crops have been grown throughout the years. There are two shrub rows located on the southern portion of the irrigated field along the east and west edges of the field in production.

Permit Goals and Objectives:
Enhance and maintain 5 acres of permanent woody cover irrigated and maintained for wildlife. Produce grain for wildlife food, and provide public recreation such as hunting and wildlife viewing.

Wildlife & Habitat Resource Issues:
Irrigation for the maintenance of the 5 acres of shrubs does not seem adequate, many shrubs appear dead, decadent, and stunted. It is recommended that a new lessee should be responsible for better care of these shrub plots. Adjacent habitat is the Gloyd Seeps Wildlife Area comprised mostly of native upland plant vegetation and some weedy areas in need of total restoration. Other adjacent habitats include: several farm houses and small farming operations.

Purpose of Lease:
Maintain water rights on farm unit land. Other purposes of this lease include: providing permanent woody vegetation, food, and cover for wildlife.

Terms of Lease:
Legal description: Township 22 North, Range 27 East, W.M. Portions of Section 25, containing 41 acres more or less. The term of this lease shall be 3 crop years, commencing January 1, 2004 and terminating December 31, 2008.

The annual rental fee shall be $40 per acre. Lessee will receive a $1,000 rent credit for irrigating three wildlife habitat plots adjacent to the rented cropland. Each of the permanent habitat plots must receive at least 24 hours of irrigation four times during the summer months. A $200 rent credit will be applied each year the Lessee supplies the irrigation pump and panel for this lease. Any wildlife enhancements must meet approval of WDFW.

Name of Agricultural Permit: Perry Bolyard
Permit # GS-06
Permit History: Initiated 1976
Grant County – Region 2
Gloyd Seeps Unit

Overview: This lease was originally developed to address an agricultural encroachment. To be good neighbors, the leased area was expanded to the present 10 acres to accommodate circle irrigation improvements.

Permit Goals and Objectives:
The purpose of this lease is to produce food and cover for wildlife and manage the land for multi-purpose recreation.

Wildlife & Habitat Resource Issues:
The uplands adjacent to the farmed land are poor quality cheatgrass rangeland except where the irrigation water has created a plant community of alfalfa, wheatgrass, and noxious weeds. These irrigated locations that are not farmed do provide nesting, feeding and hiding habitat for some wildlife including: pheasants, marmots, gophers, voles and cottontail rabbits. Cropland is adjacent to the Crab Creek channel that is normally dry at this location so no riparian vegetation is present. Areas adjacent to the leased area are within the Gloyd Seeps Wildlife Area and are comprised mostly of native shrub steppe vegetation; some weedy areas are in need of restoration work.

Purpose of Lease:
The purpose of this lease covers a small farming encroachment on WDFW lands,

Terms of Lease:
Legal description: Township 22 North, Range 27 East, W.M. Section 36; A portion of the NW ¼ under the Farm Unit 83 circle irrigation, containing 10 acres more or less. The term of the lease shall be 3 crop years commencing January 1, 2004 and terminating December 31, 2006.
The annual rental fee shall be $40.00 per acre. Planting two acres of wheat on the rented WDFW cropland and leaving the wheat standing over winter for wildlife food and cover may be used to satisfy annual rent.

Name of Agricultural Permit: Robert Schrom
Permit # CC-03
Permit History: Initiated 1967
Grant County – Region 2
Lower Crab Creek Unit

Overview:
The Lower Crab Creek Unit was acquired in 1964 as part of the mitigation for lands inundated by Priest Rapids Dam. This lease was developed in 1967 t o provide winter food for upland game birds. Trees and shrubs were later planted around the perimeter of the field to provide winter cover for upland game birds.

Permit Goals and Objectives:
The lessee provides a minimum of 11 acres of standing wheat for winter wildlife and food. The lessee provides irrigation for maintenance of shrubs planted along boarders of fields B and C, and takes special care to see that shrubs are protected from all farming activities.

Wildlife & Habitat Resource Issues:
The majority of adjacent habitats is within the Lower Crab Creek Wildlife Area and includes: shrub steppe, riparian, wetland habitats. Theses areas support a large variety of native plants and animals. Other areas adjacent to this lease include small ranches and several small cattle operations with intensely grazed cattle pastures.

Purpose of Lease:
The purpose of this lease is to produce food and cover for wildlife and maintain the trees and shrubs along the border.

Terms of Lease:
Legal description: Township 16 North, Range 25 East, W.M. Portions of Sections 25, 35, and 36, containing 110 acres more or less. The term of this lease shall be 10 crop years, commencing March 1, 1998 and terminating December 31, 2007.

Name of Agricultural Permit: Dave Freeman
Permit # PR-01
Permit History: 1965
Grant County – Region 2
Priest Rapids Unit

Overview:
The lease area was historically farmed and grazed. The current regime provides more for wildlife and no longer allows grazing to occur.

Permit Goals and Objectives:
It has been determined by WDFW that this area is highly beneficial to Canada geese for breeding, brood rearing, feeding, and resting. This agricultural lease is designed to provide good quality goose brooding habitat adjacent to the Priest Rapids Pool.

Wildlife & Habitat Resource Issues:
Vehicle traffic needs to be better controlled adjacent to the agricultural lease. The illegal dumping of garbage leads to habitat destruction and disturbance. Several small fires on the Wildlife Area have also reduced the amount of quality habitat. The Columbia River is adjacent to the agricultural lease to the south; other areas adjacent to the Wildlife Area include several homes and orchards.

Purpose of Lease:
The lessee will provide the two or three mowings required to maintain a gosling travel corridor west of the alfalfa field and allow geese to feed and loaf on the area. Other wildlife will also use this area. Public recreation such as hunting, fishing, and wildlife viewing is encouraged in this area.

Terms of Lease:
Legal description: Township 14 North, Range 23 East, W.M. Portions of the E ¼ of Section 8 and the W ½ of Section 9, east of the Columbia River, as shown on the attached map – Exhibit A, Containing 140 acres more or less. The term of this lease shall be 5 years, commencing January 1, 2006 and terminating December 31, 2010.

The annual rental fee shall be $60 per acre. The Lessee will receive a credit of $30 per acre for the unrestricted goose use on the alfalfa field and a $500 per year credit for providing the two or three mowings required to maintain a gosling travel corridor west of the alfalfa field. The remainder of the annual rent may be satisfied upon mutual agreement of the Lessee and WDFW, by providing acceptable quality hay at the fair market value. No rent will be charged on the year that wheat is grown on the field.

Name of Agricultural Lessee: Alan Bassani (Bravo Farms)
Permit #PR-02 Block 26 Unit 80 and Unit 55 circles
Permit History: Initiated 1985
Grant County – Region 2
Priest Rapids Unit

Overview: When the South Columbia Basin Irrigation District broke out Irrigation Block 26 for development, Farm Units 55 and 80 were leased at no cost to the Washington Department of Game for management. WDOG sub-leased a portion of those Farm Units for agriculture, with the aim of providing grain crops for pheasant management and stubble management to attract geese. The circle's corners, and several other small areas within Block 26 are managed for native vegetation.

Permit Goals and Objectives:
The permit goals and objectives of this lease are to provide food and cover for wildlife and to enhance waterfowl hunting through the production of irrigated grain crops. Use of the land by wildlife and the public will be encouraged.

Wildlife & Habitat Resource Issues:
Unit 80 lies in the Southwest corner of section 33. Adjacent to this agricultural lease, breeding loggerhead shrikes have been documented in the North ½ of sec 33. Although fragmented and somewhat isolated the North ½ of sec 33 provides high quality shrub steppe habitat.

Purpose of Lease:
The purpose of this agricultural lease is to provide winter wildlife food and cover when corn or wheat crops are grown and the stubble is left standing through the winter. These crops also provide fall and winter goose-hunting opportunities.

Terms of Lease:

Legal description: Block 26, Farm Unit 55 in Township 14 North, Range 24 East, W.M., Section 19 and Block 26, Farm Unit 80 in Township 14 North, Range 24 East, W.M., Section 33, containing 250 acres more or less. The term of this lease shall be 5 years commencing 01/01/06 and terminating 12/31/10.

The annual rental fee for the term of this lease shall be paid in the amount of $53.00 per acre for corn, and $106.00 per acre for onions or potatoes, wheat will be planted after harvesting root crops, and irrigated to provide green wheat going into the winter.

Name of Agricultural Permit: Brad Dixon
Permit #: UWR-U9
Permit History: Initiated in 1994
Grant County – Region 2
Upland Wildlife Restoration Unit 9

Overview:
Farm Unit 9, Irrigation Block 87 was acquired by the Washington Department of Fish and Wildlife in June 1994. Currently, 38 acres of this 91.2 acre Unit are farmed, the rest is in permanent vegetation.

Permit Goals and Objectives:
Goals of this permit are to provide nesting and brooding cover for upland game birds by delaying the first cutting of alfalfa and to provide winter food and cover with standing grain crops.

Wildlife & Habitat Resource Issues:
This Farm Unit is located in an area of intensive farming and orchards and provides a base for seasonal species congregation and dispersal. This Unit sees significant spring use by migrating Sandhill Cranes.

Purpose of Lease:
This agricultural lease provides winter refuge and nesting and brooding cover in an area of intensive agriculture.

Terms of Lease:
The term of this lease is 5 years, beginning March 1, 2005 and terminating March 1, 2010. Annual rent is $900 for 38 acres which may be satisfied through payment or in-kind services.

Name of Agricultural Permit: Pat McPartland
Permit #: UWR-LCA
Permit History: Initiated in 1992
Grant County – Region 2
Upland Wildlife Restoration Unit LCA

Overview:
The Upland Wildlife Restoration Unit LCA consists of Farm Units 147, 148 and 173, Irrigation Block 43. Acquired by the Washington Department of Fish and Wildlife in 1992, LCA is 390 acres in size, with 65 acres being cropped, 13 of which are planted to winter food plots, and the rest is in permanent vegetation.

Permit Goals and Objectives:
Goals of this permit are to provide winter food and cover with standing grain crops.

Wildlife & Habitat Resource Issues:
This Farm Unit is located in an area of intense farming and provides a base for seasonal species congregation and dispersal.

Purpose of Lease:
This agricultural lease provides winter food and cover in an area of intensive agriculture.

Terms of Lease:
The term of this lease is 5 years, beginning March 1, 2002 and terminating March 1, 2007. Annual rent for farming 52 acres is establishment and maintenance of 13 acres of standing corn as winter food plot at 3 different sites.

Name of Agricultural Permit: Gil and Henry Farms, Inc.
Permit #: UWR-U75
Permit History: Initiated in 1986
Grant County – Region 2
Upland Wildlife Restoration Unit 75

Overview:
Farm Unit 75, Irrigation Block 43 was donated to the Washington Department of Fish and Wildlife in 1986 with the intent to demonstrate that current agricultural practices can complement wildlife habitat. Currently, 48 acres of this 75 acre Unit are farmed under circle pivot irrigation, 10 acres are rill irrigated, and the rest is in permanent vegetation.

Permit Goals and Objectives:
Goals of this permit are to provide nesting and brooding habitat and winter food and cover upland game birds.

Wildlife & Habitat Resource Issues:
This Farm Unit is located in an area of intense farming and provides a base for seasonal species congregation and dispersal.

Purpose of Lease:
This agricultural lease provides winter refuge and nesting and brooding cover in an area of intensive agriculture.

Terms of Lease:
The term of this lease is 5 years, beginning March 1, 2005 and terminating March 1, 2010. Annual rent is $10,500 for 58 acres which may be satisfied through payment or in-kind services. Crops grown are approved by WDFW prior to planting.

When much of the US Bureau of Reclamation lands were turned over to the Washington Department of Game, several agricultural trespasses came with it. In 1991, several of these trespasses were identified when boundaries were surveyed and, in an attempt to be good neighbors, agricultural leases were entered into with the adjacent landowners. The goals and objectives of these leases have been to provide winter food and cover for pheasants, with varying degrees of success. Recently, the appropriateness of applying federally subsidized irrigation water to what was originally determined to be non-irrigable lands has come into question. All eight leases on the Potholes Reservoir Unit, all three leases on the Quincy Lakes Unit, one on the Gloyd Seeps Unit, and the lease on the Winchester Reservoir Unit fit into this category. Rental fees for these leases is $40 to $60 per acre, annually, and may be offset by providing standing grain, wheat in the bin, maintaining enhanced permanent cover, and/or other in-kind services. The future of these leases is uncertain.

GRAZING LEASE SUMMARY

Name of Grazing Permit: W. Keith Behne
Permit # BL-02
Permit History: Grazing permit began in 1969
Grant County – Region 2
Banks Lake Unit

Overview: This permit covers US BOR lands managed by WDFW as part of the Banks Lake Unit, Annual usage is 30 AUMs, spread over 180 acres, season of use is open. 3 miles of fencing are needed to exclude cattle.

Permit Goals & Objectives:
Enhance the perennial vegetation on this site and authorize and control grazing on WDFW-managed lands adjacent to the permittees private property, along an unfenced boundary.

Wildlife & Habitat Resource Issues:
Priority habitats on this allotment include cliffs, talus slopes and riparian areas. Grazing in riparian areas causes minor short-term damage to woody vegetation, but the level of grazing is not high enough to cause serious damage. This area sees regular large concentrations of mule deer and there may be some conflicts with the cattle, although competition between the two is minimal.

Purpose of Lease:
The purpose of this lease is to authorize and control grazing on WDFW-managed lands adjacent to private property on an unfenced boundary.

Terms of the Lease:
Township 26 North, Range 28 East, W.M., Portion of Section 24, and Township 26 North, Range 29 East, W.M., Portions of Sections 18 & 19.
The term of this lease shall be 5 years commencing 01/01/01 and terminating 12/31/05.
The annual allotment is 30 AUMs or 40% or less of the available yearly forage.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Theodore Dormaier
Permit # BL-03
Permit History: Grazing permit began in 1969
Grant County – Region 2
Banks Lake Unit

Overview: This permit covers US BOR lands managed by WDFW as part of the Banks Lake Unit, annual usage is 26 AUMs, spread over 220 acres, season of use is open. 2 ½ miles of fencing is needed along this boundary.

Permit Goals & Objectives:
Enhance the perennial vegetation on this site and authorize and control grazing on WDFW-managed lands adjacent to the permittees private property, along an unfenced boundary.

Wildlife & Habitat Resource Issues:
Priority habitats on this allotment include cliffs, talus slopes and riparian areas. Grazing in riparian areas causes minor short-term damage to woody vegetation, but the level of grazing is not high enough to cause serious damage. This area sees regular large concentrations of mule deer and there may be some conflicts with the cattle, although competition between the two is minimal.

Purpose of Lease:
The purpose of this lease is to authorize and control grazing on WDFW-managed lands adjacent to private property on an unfenced boundary.

Terms of the Lease:
Township 25 North, Range 28 East, W.M., Portion of Sections 2, 11 and 14, above the coulee rim.
The term of this lease shall be 5 years commencing 01/01/01 and terminating 12/31/05.
The annual allotment is 26 AUMs or 40% or less of the available yearly forage.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: William McLean
Permit # BL-04
Permit History: Grazing permit began in the 1950's, CRMP developed in 1975.
Grant County – Region 2
Banks Lake Unit

Overview: This permit covers US BOR lands managed by WDFW as part of the Banks Lake Unit, annual usage is 320 AUMs, spread over 3,610 acres in four pastures, season of use is April 15 through Oct. 15 on a rotational basis.

Permit Goals & Objectives:
Enhance the perennial shrub-steppe vegetation on this site.

Wildlife & Habitat Resource Issues:
Priority Habitats on these pastures include wetlands, riparian, talus slopes, cliffs and shrub-steppe. Wetland and riparian areas include the shoreline of Banks Lake, Osbourne Creek, and several small seeps near the base of the talus slopes. Grazing in these areas has been controversial, volunteers on a BASS riparian enhancement project along the shoreline blame cattle for large scale planting failures. Summer grazing of the riparian areas around the seeps and the creek results in short-term damage and complaints, but with the rotational grazing the vegetation recovers.

Purpose of Lease:
The purpose of this lease is to use light cattle grazing to stimulate good health and growth in Bluebunch wheatgrass by removal of decadent plant materials, remove cheatgrass, and maintain the succulent new grass and forb growth.

Terms of the Lease:
Township 26 North, Range 28 East, W.M., Portion of Sections 12, 13 and 14, above the coulee rim; Township 28 North, Range 29 East, W.M., Portion of Sections 12, 13, 23, 24, 25 and 26, below the coulee rim; and Township 28 North, Range 30 East, W.M., Portion of Sections 3, 4, 5, 7, 8, 9, 10, 18, and 30, below the coulee rim.
The term of this lease shall be 5 years commencing 01/01/05 and terminating 12/31/09.
The annual allotment is 320 AUMs or 30% or less of the available yearly forage.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Everett Cushman
Permit # SL-02
Permit History: Grazing permit began in the 1970's.
Grant County – Region 2
Sun Lakes Unit

Overview: This permit covers US BOR and F&WS lands managed by WDFW as part of the Sun Lakes Unit, annual usage is 124 AUMs, spread over 1,600 acres, season of use is open. 6 ½ miles of fencing is needed along this boundary.

Permit Goals & Objectives:
Enhance the perennial vegetation on this site and authorize and control grazing on WDFW-managed lands adjacent to the permittees private property, along an unfenced boundary.

Wildlife & Habitat Resource Issues:
Priority habitats on this allotment include cliffs, talus slopes and shrub-steppe. Uncontrolled grazing of shrub-steppe has caused damage to native perennial vegetation. This area sees regular large concentrations of chukars, which are benefited by heavy grazing. The presence nearby of a Loggerhead shrike nest, and Striped whipsnake may indicate that these species may benefit by fencing this pasture and eliminating this grazing lease.

Purpose of Lease:
The purpose of this lease is to use cattle grazing to stimulate good health and growth in Bluebunch wheatgrass by removal of decadent plant materials, remove cheatgrass, and maintain the succulent new grass and forb growth.

Terms of the Lease:
Township 23 North, Range 26 East, W.M., Portion of Sections 12, 13, 24 and 25, east of the coulee rim; Township 23 North, Range 27 East, W.M., Portion of Section 6; and Township 24 North, Range 27 East, W.M., Portion of Section 32.
The term of this lease shall be 5 years commencing 01/01/05 and terminating 12/31/09.
The annual allotment is 124 AUMs or 40% or less of the available yearly forage.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Palmer Lake Ranches, LLC
Permit # GS-03
Permit History: Grazing permit began in the 1970's.
Grant County – Region 2
Gloyd Seeps Unit

Overview: This permit covers US BOR lands managed by WDFW as part of the Gloyd Seeps Unit, annual usage is 80 AUMs, spread over 600 acres, season of use is open. 4 ½ miles of fencing is needed along this boundary.

Permit Goals & Objectives:
Reduce the amount and vigor of cheatgrass and authorize and control grazing on WDFW-managed lands adjacent to the permittees private property, along an unfenced boundary.

Wildlife & Habitat Resource Issues:
Priority habitats on this allotment include shrub-steppe and wetlands. Most of the wetlands have been fenced out of this pasture and the level of grazing is not high enough to cause serious damage to the remaining wetlands.

Purpose of Lease:
The purpose of this lease is to use cattle grazing to remove cheatgrass, and maintain the succulent new grass and forb growth.

Terms of the Lease:
Township 21 North, Range 28 East, W.M., Portion of Sections 12 and 13; and Township 21 North, Range 29 East, W.M., Portion of Section 18.
The term of this lease shall be 3 years commencing 01/01/06 and terminating 12/31/08.
The annual allotment is 80 AUMs or 40% or less of the available yearly forage.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Wiley Allred
Permit # TD-01
Permit History: Grazing permit began in 1984.
Grant County – Region 2
The Desert Unit

Overview: This permit covers US BOR lands managed by WDFW as part of The Desert Unit, annual usage is 360 AUMs, spread over 355 acres in two pastures, season of use is open.

Permit Goals & Objectives:
Reduce the amount and vigor of tall emergent wetland vegetation with an intense grazing program, and maintain open shallow water and short shoreline vegetation.

Wildlife & Habitat Resource Issues:
Priority Habitats on these two pastures include wetlands and shrub-steppe. These pastures are part of the Desert Mule Deer management zone and see significant concentrations of waterfowl. The intense grazing necessary to reduce the tall emergent vegetation causes upland habitat degradation and encourage invasion by noxious vegetation such as Russian olives and Phragmites. The Section 17 pasture is part of the Frenchman Hills Game Reserve.

Purpose of Lease:
The purpose of this lease is to use intense cattle grazing to reduce tall emergent vegetation, maintain open water and short shoreline vegetation to produce more waterfowl friendly and diverse habitat.

Terms of the Lease:
Township 17 North, Range 25 East, W.M., Portion of Section 6 (160 acres); and Township 17 North, Range 27 East, W.M., Portion of Section 17 (195 acres).
The term of this lease shall be 3 years commencing 01/01/03 and terminating 12/31/05.
The annual allotment is 360 AUMs, minimum.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Ruland Sparks
Permit # TD-02
Permit History: Grazing permit began in 1985.
Grant County – Region 2
The Desert Unit

Overview: This permit covers US BOR lands managed by WDFW as part of The Desert Unit, annual usage is 450 AUMs, spread over 1,680 acres, season of use is open.

Permit Goals & Objectives:
Reduce the amount and vigor of tall emergent wetland vegetation with an intense grazing program, and maintain open shallow water and short shoreline vegetation.

Wildlife & Habitat Resource Issues:
Priority Habitats on these two pastures include wetlands and shrub-steppe. These pastures are part of the Desert Mule Deer management zone and see significant concentrations of waterfowl. The intense grazing necessary to reduce the tall emergent vegetation causes upland habitat degradation and encourage invasion by noxious vegetation such as Russian olives and Phragmites. A portion of this pasture is part of the Winchester Game Reserve. Loggerhead shrikes use this area for nesting, preferring thorny trees or shrubs such as Russian olives. Grazing in this area promotes Russian olives and is compatible with Loggerhead shrike nesting requirements.

Purpose of Lease:
The purpose of this lease is to use intense cattle grazing to reduce tall emergent vegetation, maintain open water and short shoreline vegetation to produce more waterfowl friendly and diverse habitat.

Terms of the Lease:
Township 18 North, Range 25 East, W.M., Portion of Section 1, 2, 12, and 13.
The term of this lease shall be 3 years commencing 01/01/04 and terminating 12/31/06.
The annual allotment is 450 AUMs, minimum.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Wiley Allred
Permit # TD-04
Permit History: Grazing permit began in 1986.
Grant County – Region 2
The Desert Unit

Overview: This permit covers US BOR lands managed by WDFW as part of The Desert Unit, annual usage is 360 AUMs, spread over 350 acres in two pastures, season of use is March 1 through Oct. 1.

Permit Goals & Objectives:
Maintain open shallow water and short shoreline vegetation. Grazing commences on the dry northern pasture March 1 and then the cows are moved to the wet south pasture after July 1, when ground-nesting birds have completed nesting.

Wildlife & Habitat Resource Issues:
Priority Habitats on these two pastures include shorebird and waterfowl breeding habitat. This pasture is part of the Desert Mule Deer management zone and sees significant concentrations of shorebirds. Breeding Burrowing owls and Tiger salamanders are also found on this parcel. The intense grazing necessary to reduce the tall shoreline vegetation causes upland habitat degradation and encourages invasion by noxious vegetation such as Russian olives and Phragmites.

Purpose of Lease:
The purpose of this lease is to use cattle grazing to maintain open water and short shoreline vegetation to produce more waterfowl and shorebird friendly and diverse habitat.

Terms of the Lease:
Township 17 North, Range 26 East, W.M., Portion of Section 16.
The term of this lease shall be 3 years commencing 01/01/03 and terminating 12/31/05.
The annual allotment is 360 AUMs, minimum.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: George Sparks
Permit # TD-05
Permit History: Grazing permit began in 2001
Grant County – Region 2
The Desert Unit

Overview: This permit covers US BOR lands managed by WDFW as part of The Desert Unit, annual usage is 300 AUMs, spread over 1,000 acres, season of use is July through September.

Permit Goals & Objectives:
Maintain open shallow water and short shoreline vegetation by reducing undesirable and invasive vegetation (Phragmites). AUM fees are paid with in-kind services consisting of mowing, inspecting and maintaining the sand berms that isolate the excavated ponds in this area.

Wildlife & Habitat Resource Issues:
Priority Habitats on this pasture includes waterfowl breeding habitat, wetlands, shrub-steppe and is part of the Desert Mule Deer management zone. Grazing is delayed until ground nesting birds are finished nesting. A portion of this pasture is included in the Winchester Game Reserve.

Purpose of Lease:
The purpose of this lease is to use cattle grazing to maintain open water and short shoreline vegetation to produce more waterfowl and diverse habitat. In addition, grazing is exchanged for maintenance of important dikes that isolate these excavated ponds from carp-infested waters.

Terms of the Lease:
Township 17 North, Range 26 East, W.M., Portion of Sections 7, 8 and 17.
The term of this lease shall be 3 years commencing 01/01/04 and terminating 12/31/06.
The annual allotment is 300 AUMs.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Ray Dagnon
Permit # TP-01
Permit History: Grazing permit began in 1952.
Grant County – Region 2
The Potholes Reservoir Unit

Overview: This permit covers US BOR lands managed by WDFW as part of the Potholes Reservoir Unit, annual usage is 600 AUMs, spread over 7,400 acres in two pastures, season of use is Nov. 1 through April 15.

Permit Goals & Objectives:
Reduce the amount and vigor of cheatgrass with a winter and early spring grazing program, and stimulate the health and growth of perennial grasses, mostly Needle and thread grass.

Wildlife & Habitat Resource Issues:
Priority habitats and species are abundant in this allotment. Habitats include shrub-steppe, dunes, wetlands and riparian. Priority species include many species of shore and wading birds, waterfowl, bald eagles, mule deer, and amphibians. The winter grazing season impacts the habitats and species the least, and minimizes conflicts with the public drawn to this area by the abundance of bird watching opportunity.

Purpose of Lease:
The purpose of this lease is to use light cattle grazing to stimulate good health and growth in Needle and thread grass by removal of decadent plant materials, remove cheatgrass.

Terms of the Lease:
Township 18 North, Range 27 East, W.M., Portion of Sections 2, 3, 4, 8, 9, 10, and 11; and Township 19 North, Range 27 East, W.M., Portion of Sections 27, 28, 29, 32, 33, 34, and 35.
The term of this lease shall be 3 years commencing 01/01/06 and terminating 12/31/08.
The annual allotment is 600 AUMs or 40% or less of the available yearly forage.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Larry Stewart
Permit # CC-02
Permit History: Grazing permit began in 1987.
Grant County – Region 2
The Lower Crab Creek Unit

Overview: This permit covers US BOR lands managed by WDFW as part of The Lower Crab Creek Unit, annual usage is 120 AUMs minimum, spread over 280 acres, season of use is open.

Permit Goals & Objectives:
Reduce the amount and vigor of tall emergent wetland vegetation with an intense grazing program, and maintain open shallow water and short shoreline vegetation.

Wildlife & Habitat Resource Issues:
Priority Habitats on these two pastures include wetlands and shrub-steppe. The intense grazing necessary to reduce the tall emergent vegetation causes upland habitat degradation and encourage invasion by noxious vegetation such as Russian olives and Phragmites. It is the opinion of the District Team that the goals are not being achieved damage to the uplands is intolerable and recommends discontinuing.

Purpose of Lease:
The purpose of this lease is to use intense cattle grazing to reduce tall emergent vegetation, maintain open water and short shoreline vegetation to produce more waterfowl friendly and diverse habitat.

Terms of the Lease:
Township 16 North, Range 25 East, W.M., Portion of Section 13.
The term of this lease shall be 2 years commencing 01/01/05 and terminating 12/31/06.
The annual allotment is 120 AUMs, minimum.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

GRAZING LEASE SUMMARY

Name of Grazing Permit: Lloyd Goroski
Permit # CC-04
Permit History: Grazing permit began in 1983.
Grant County – Region 2
The Lower Crab Creek Unit

Overview: This permit covers US BOR lands managed by WDFW as part of the Lower Crab Creek Unit, annual usage is 130 AUMs, spread over 2,840 acres in three pastures, season of use is Feb. 1 through May 1.

Permit Goals & Objectives:
Reduce the amount and vigor of cheatgrass and other non-native annuals, and stimulate the health and growth of perennial grasses, mostly Needle and thread grass. Removal of annual cheatgrass growth will reduce range fire risk.

Wildlife & Habitat Resource Issues:
Priority habitats on this allotment include shrub-steppe, wetlands and riparian areas. The shrub-steppe is infested with several annual weedy species, such as cheatgrass, tumble mustard, and Russian thistle. Several perennial weeds, including Russian knapweed and perennial pepperweed, heavily degrade the wetland and riparian habitats. Grazing in these areas may be contributing to the degradation of the habitats.

Purpose of Lease:
The purpose of this lease is to use cattle grazing to increase the vigor, diversity and recruitment of perennial shrub-steppe vegetation.

Terms of the Lease:
Township 16 North, Range 24 East, W.M., Portion of Sections 15, 17, 18, 19, 20, 22, 23, 29 and 30.
The term of this lease shall be 3 years commencing 01/01/06 and terminating 12/31/08. The annual allotment is 130 AUMs.
The site will be inspected and evaluated twice annually by Wildlife Area personnel to determine if objectives are being met.

REFERENCES AND LITERATURE CITED

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